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On the 2d of June 1863 a photograph was taken of the Harbour of St. John's. The apparent sea-horizon, distant ten miles or so from the spot, was hidden by a solid raft of pack-ice in which large bergs were fixed ; the narrows and the harbour were full of broken bits. On the beach great rounded blocks were stranded. By drawing perspective lines to the horizon from these, past Fort Waldegrave, dimensions can be measured in the picture, for all photographs are drawn to scale. Many of the stranded blocks equalled the size of the gunners' cottages. The frontispiece is faithfully reduced from the photograph by an able artist, but no copy can express the detail of the sun-picture. On the left is a flake at the foot of Signal-hill. On the top of that hill, which nearly equals the height of the opposite hill on the right of the picture, fresh glacial striæ, at a height of 540 feet, point out to sea. On the sky-line of the hill to the right, perched blocks can be made out in the photograph, with a good lens. They are blocks of native rock poised upon glaciated weathered surfaces. They are too minute to be shown in a woodcut, but the camera found them out and copied them, as it did a small berg ten miles off on the horizon.

GLACIAL STRIÆ COPIED BY RUBBINGS.

Skyline of Signal-hill left.

Height.	*Bearing* (true).
540 feet.	—— West to East.
360 ,,	—— West ,,
270 ,,	N. 85° West ,,

Hollow near Quidi Vidi.

180 feet.	—— West ——

Hill-face beyond Quidi Vidi, behind the coast-range, and in the rock-groove.

360 feet.	N. 42° W., and N. 80° W.

These last seem to run up-hill ⌣ ⌢ out of the groove.

Break in the coast range
The Narrows.

South Head
distant
S. 60° E.

Harbour light,
one mile,
true.

Coast-range
Signal-hill, 540
feet.

Seal meadows.'

Arctic Current,
jack- and bergs
moving south,
outside of Cape
Spear, towards
Cape Race.

Flakes and stages
in a hollow which
leads to Quidi
Vidi.

Coast range, a
hog-backed ridge
of glaciated
red sandstone,
with perched
blocks at 630 feet.
Lakes, in 'rock
basins,' are on the
top; vegetation—
scrub and berries
growing on glacial drift.
The coast-range
runs N. 30° E.
and S. 30° W. for
many miles on
the strike.

'Pan-ice' in St.
John's Harbour.
Large rock-groove
, which ex-
tends for many
miles N. 30° E.
and S 30° W. be-
hind the coast-
range. It con-
tains numerous
lakes, small
rivers, & creeks,
open to the sea
through gaps in
the coast-range.

HARBOUR OF ST. JOHN'S.

N. 60° W. | true.

'Pan-ice' stranded by the ebb in Maggoty Cove,
St. John's Harbour. From a photograph taken June
2, 1863

Lat. 47° 32′ N. Long. 52° 38′ W. Variation, 30° W.

A SHORT

AMERICAN TRAMP

IN THE FALL OF 1864

BY

THE EDITOR OF 'LIFE IN NORMANDY'

EDINBURGH: EDMONSTON AND DOUGLAS

MDCCCLXV

AN AMERICAN TRAMP.

CHAPTER I.

INTRODUCTORY.

On the fourteenth of June, boys, we got under weigh
In the bold Princess Royal bound for Americay,
And fifteen bold sailors made our companee,
To the east and the west, and across the salt sea.
Oh, we'll go a cruising ; oh, we'll go a cruising ;
Oh, we'll go a cruising across the salt sea.

SEA SONG.

ANXIOUS to see a new country, and to test a glacial theory formed and matured in Switzerland, Scandinavia, the British Isles, and Iceland, the writer of the following pages started for a cruise in July 1864.

An ice-laden ocean-current now describes a south-west curve from Spitzbergen, lat. 80°, to Cape Farewell in Greenland, lat. 60°. There, in the latitude of the Shetlands, it eddies northwards, and turning southwards again it coasts Labrador to 52°. Part of it flows south-west through the Straits of Belleisle, near the lati-

tude of the Straits of Dover; the main stream flows southwards outside of Newfoundland, over the banks, and there it crosses the Gulf Stream about 46°. The tail of this arctic current carries icebergs, 100 feet high and a quarter of a mile long, to lat. 36° 10′ at least, as the following quotations show:—

'On the 27th of April 1829, Captain Couthony passed, in lat. 36° 10′ N., long. 39° W. (probably south of the Gulf Stream), an iceberg estimated to be a quarter of a mile long and from 80 to 100 feet high. It was much wasted in its upper portion, which was worn and broken into the most fanciful shapes.'

'In 1831, at daylight on the 17th of August, lat. 36° 20′ N., long. 67° 45′ W., upon the southern edge of the Gulf Stream, he fell in with several small icebergs in such proximity to each other as to leave little doubt of their being fragments of a large one, which, weakened by the high temperature of the surrounding water, had fallen asunder during a strong gale which had prevailed from the south-east.'*

The icebergs which float in this great Atlantic stream are portions of glaciers which grow in Greenland at the

* Silliman's Journal, vol. xliii. 1842, quoted in a memoir on dangers in the Atlantic; eleventh edition, p. 15. New York, E. and G. W. Blunt, 1849.

nearest, and they are often loaded with moraines, that is to say, with large stones and clay.

'In September 1822, Captain Couthony saw an iceberg aground on the eastern edge of the grand bank, in lat. 43° 18′ N., long. 48° 30′ W. Sounding three miles inside of it the depth was found to be 105 fathoms (630 feet.)'

'In the month of August 1827, the same observer, while crossing the banks in lat. 46° 30′, long. 48° W., passed within less than a mile of a large iceberg which was stranded in between 80 and 90 fathoms (540 feet) water. He was so near as to perceive distinctly large fragments of rock and quantities of earthy matter imbedded in the side of the iceberg, and to see from the fore-yards that the water for at least a quarter of a mile round it was full of mud stirred up from the bottom by the violent rolling and crushing of the mass.'*

To the memoir above quoted a small chart of the Atlantic is added, on which spots are noted where ice has been seen, and the fact recorded in the 'Nautical Magazine,' Purdy's 'Memoir of the Atlantic,' newspapers, or other publications, chiefly since 1832. It is there shewn that floes, fields, and bergs occur most frequently between long. 44° and 52° W., occasionally eastward of 40°, and westward of 60°. This region is

* The mud was probably moraine mud.

never wholly free of heavy ice, and it is sometimes thickly crowded for great distances between lat. 40° and 50°, and further north. Such facts, picked up in a course of reading, a series of observations made in Europe during twenty years, a set of experiments, and a train of thought, had led to the belief that an arctic current once flowed S.W. down the Baltic and over the British Isles, and that such currents were amply sufficient to account for many glacial phenomena in Europe and elsewhere.

Sea-shells of arctic types occur at great elevations in Western Europe. One bed occurs above 3000 feet on Snowdon.* Horizontal glacial striæ also occur on the tops and shoulders of isolated hills in the British Isles at all elevations, up to 3000 feet, and their direction is generally N.E. and S.W., or thereby. Shells and high striæ tell of sea-water and heavy moving ice, and on them a theory was built. As large islands of ice are now carried by currents to latitudes which correspond to Gibraltar in Europe, and to Richmond and Cairo in North America, similar currents may have carried drift to any spot north of these latitudes, and lower than old sea-margins. If ever America was submerged, and the existing arctic cur-

* *Times*, Sept. 20, 1864. Letter from Mr. Baumgarten. 'A conglomerate of shells, and casts of them, with sand and pebbles.'

rent then continued its present south-west course, the spoor of it ought to be found along a south-west curve produced from the Straits of Belleisle. So it appeared; but this theory had to be tested.

The plan formed to test this 'glacial theory' was first to study the ways of icebergs and the climate, on the coast of Labrador, in British latitudes; then to follow the spoor overland in North America as high up on hills, and as far south as possible, and to learn facts from the works of others, and from all available sources.

Icebergs were seen, and a spoor was followed to St. Louis, on the Mississippi; there it ended, about lat. 39°. The broad trail was crossed westwards at lat. 44° and 45°; eastwards about lat. 39° and 41°, and it was followed northwards to Boston, westwards to Albany, and southwards to New York. It confirmed the opinion formed in Europe.

While thus spooring for some thousands of miles, other things were noticed. A badly-kept journal may perhaps interest glacialists and amuse readers who, like the writer, delight in wandering to and fro under some pretence or other.

The first step in such a trip ought to be an attempt to gain some notion of the general shape of the country, its physical geography and geology, so far as they seem to bear on the subject to be studied.

American Physical Geography.

The following are a few facts noticed, picked up by the way, and gathered from various sources :—

The Atlantic coast of North America is the low shelving edge of a broad slope. It is from 50 to 200 miles wide, and from 300 to 500 feet high at the base of the Alleghanies. These mountains form a chain 1300 miles long. The highest point is Black Dome, North Carolina, 6707 feet. The ridges are generally continuous for long distances, and run from N.E. to S.W. They are more broken and worn to the north. Gaps in the White Mountains are about 2000 feet high, and the highest point is Mount Washington, 6288, according to Guyot.* From the low sea-coast, westwards to the mountains, from the head of the Bay of Fundy to the Potomac the slope is generally a rolling plateau covered with drift. It is furrowed in every direction by branching watercourses of small depth, and varied by steps, terraces, and hollows, which, like the coast and mountains, trend N.E. and S.W., or thereby, or follow zig-zag contour-lines on hill-sides.

Similar steps, ridges, and furrows are repeated under

* American Journal of Science, vols. xxxi. and xxxii.

water, and two great ocean-currents and strong tides pass up and down along the coast. The waters move N.E. and S.W. The banks off shore are in continual movement. An article on the defences of Cape Fear, about latitude 35°, copied from a southern paper by the New York Herald of November 4, 1864, says :— 'Along the whole extent of the North Carolina coast the bays, inlets, and harbours are constantly changing : the sands shifting from place to place, filling up an entrance here, and opening another there. Above Hatteras Swash there is not one inlet at the present time at all navigable, while no longer than twenty years ago there were three or four. At this place there is the same change constantly going on—the channel moving about from place to place, and the Rip filling in with astonishing rapidity.' According to the memoir above quoted,* two miles of the western end of Sable Island, about latitude 44°, have been washed away since 1828. Large ice-islands have been seen near this spot, and an opinion prevails that the whole island is becoming narrower ; that these changes have been going on since 1811, and that they are certain to continue. About latitude 48° and 54°, the sea, according to fishermen, is growing *shallower* on the banks of

* Published by E. and G. W. Blunt, 179 Water Street, New York, 1863, p. 4.

Newfoundland. In these shallow regions, the bottom consists of mud, sand, coarse sand, gravel, broken shells, and large stones. Ice in all shapes abounds, and the movements of ocean-streams are constant and regular in this region. The sea-coast, from Cape Race to Cape Harrison in Labrador, is rocky, and it is slowly *rising*. Numerous rocks and other dangers, which were marked elsewhere on old charts of the Atlantic, have been vainly sought by modern surveyors. These, if they ever existed, may have sunk, or they have been washed away. The coast-line and the sea-bottom are therefore in a state of transition : the bed of the sea is drift arranged by water and by ice, and it is rising so as to become dry land in time. If the Atlantic shore of North America were submerged, currents and tides would flow in hollows, which now contain bays and rivers, and they would certainly work in them as they do now in hollows off shore.

The land on the eastern slope consists of mud, sand, gravel, pebbles, and large glaciated boulders packed in layers upon a foundation of solid rock, which is striated in many places ; the land looks like an old sea-bottom.

According to theory, every depression and elevation of land would change the course of currents, the run of tides, and the climate on shore.

A depression of 100 feet would make Newfoundland

an archipelago, and join the Gulf of St. Lawrence to the Bay of Fundy. A tide of 75 feet, on one side of a low narrow isthmus, would be changed into a tide of 6 feet if the barrier were removed. The cold stream which now pours south-west through the Straits of Belle-isle would then pass through straits in Newfoundland and enter the Bay of Fundy. Nova Scotia would then become a range of low rocky islands, and the cold country of Blue Noses, about lat. 44° and 48°, would be chilled by streams of iced water on both sides, instead of one. It seems plain that a change would result from a slight rise of land at this spot; and the principle, if established, may be applied elsewhere.

The same depression would sink great part of New Brunswick and a wide zone in the Eastern States; and the change would chill the climate of the coasts which are now protected from arctic waters by Nova Scotia, at least as far south as Boston. A depression of 100 feet would chill the climate of the Eastern slope of the Alleghanies.

A depression of 600 feet would sink most of the land in the British provinces and in the Eastern States. It would fill the valleys of the St. Lawrence, St. John, Hudson, Susquehanna, and Shenandoah, and leave parallel ranges of low islands where parallel ridges now

cross from New Brunswick into the Northern States, and from Pennsylvania into Virginia, about lat. 39°.

One cross sound would be at the foot of Peter's Mountain, near Harrisburg, about lat. 40°, another at the valley of the Hudson, another at the St. John River in New Brunswick. St. John New Brunswick, Eastport, Portland in Maine, Boston, New York, Philadelphia, Baltimore, Washington, Richmond, and the highest points on the railways which join these towns, would then be more than fifty fathoms under water. The land looks as if it had been submerged, and the shape of it may indicate the former courses of existing currents, and climates which once prevailed, in consequence of the distribution of hot and cold streams.

If the depression of 600 feet were general in America, the sea would reach to Chicago, and cover the shores of the great lakes.

The central region of North America consists of two great basins — one drained by the St. Lawrence, the other by the Mississippi. A general depression of 700 feet would sink the common edge of these two shallow basins in the wide flat prairie near Chicago. The Belleisle stream might then flow into the Gulf of Mexico behind the Alleghanies, and so chill the climate of all that region. 800 feet would sink the common watershed at Fort Wayne, where rivers now

flow opposite ways within four miles of each other. 1200 feet would sink it at Crestline, and Upper Sandusky, near lat. 41°, in the centre of Ohio ; and at these places stratified water-drift abounds. If the sea were at Crestline, long ranges of islands crossed by sounds would remain, where chains of mountains now extend from New Brunswick into Georgia and Alabama. Great part of Labrador and Canada would also remain a cluster of rocky hills to the north of a wide sea. But the cold arctic south-west current which is now turned eastward by Labrador, Newfoundland, Canada, New Brunswick, and Nova Scotia, and which now carries icebergs 100 feet high to lat. 36° 10′ in the Atlantic, would surround Labrador, chill the cold climate of the land which it now chills on one side only, and flow south-west to St. Louis on the Mississippi about lat. 39°. The case supposed for Nova Scotia, would be repeated on a larger scale. So far, there is nothing in the shape of the land to stop the flow of an arctic current 700 feet deeper than the Atlantic. The warm equatorial current which now flows westward into the Gulf of Mexico, and turns eastward towards Europe, might, if the sea were at Crestline, flow on towards the north-west beneath the Rocky Mountains, and reach as far as it now does on the coast of Europe and about Iceland and Spitzbergen.

According to theory, all this would result from a general depression of 700 to 1200 feet in North America. Ocean-currents would change their courses, and they would carry their climates to other longitudes, but to the same latitudes.*

A depression of 2000 or 3000 feet would only narrow the land still more, and widen, deepen, and multiply gaps in chains of American islands ; for many points and wide tracts in the Rocky Mountains and in the Alleghanies rise far above a level of 3000 feet.

If this theory be well founded ; if currents like those which now flow in the Atlantic have in fact flowed over North America in late geological times, ancient sea-margins ought to be found at old sea-levels on hill-sides ; and drift arranged by water in various forms ought to cover the plains and low-lands. The bed of the arctic current in the basins of the St. Lawrence and Mississippi should be scored by icebergs, or strewed with glacial drift at least as far as the present known limit of Atlantic icebergs, namely, lat. 36° 10′. The western coast of the American sea, and the ancient bed of the equatorial current, the plains

* Many of the heights given are from observations taken with a pocket aneroid barometer, and are merely approximations to the truth.

about the foot of the Rocky Mountains, ought to be as clear of glacial drift as the bed of the Gulf Stream in the Atlantic now is ; but if the equatorial current passed westwards at Panama, the old arctic current and its drift may have reached lat. 36° 10′ in these western regions also. The memoir above quoted says (p. 19)—

'Perhaps too little consideration has hitherto been given to the character and effects of the polar currents. These appear to be well worthy of the attention of both the navigator and the philosopher. We have seen that the moderate but unceasing flow of these currents often interposes an icy barrier in one of the most common routes of navigation. The observing geologist will also discern in the course of the great ice-currents of the Atlantic, both before and after their contact with the tropical stream, a striking coincidence with the directions of the two systems of striæ which mark the abraded surface of the continental rocks, the origin of which must be referred to the early and prolonged period when these rocks were situated beneath the ceaseless flow of the ocean-currents.'*

Assuming that all North America was submerged to a considerable depth, it seems to follow that climates

* Silliman's Journal, vol. xliii. p. 152 ; vol. xlv. p. 326. Quoted in the memoir.

changed place when the sea was over the central district.

Some fresh evidence of a general submergence was found in North America, and more was gathered from recent books. In the first place, American rocks and fossils prove that every part of the continent now above water has been repeatedly submerged and upheaved. Sea-shells are preserved in sedimentary strata of all ages. Regions on which land-plants grew in the carboniferous age were then above water, and yet sea-fish are buried in rocks which overlie coal-seams and upright tree-stumps. Strata of vast thickness, which are now crumpled and folded into ridges in the Alleghany Mountains, cover regions of ancient disturbance, and may therefore have been lately disturbed. They may have sunk and risen again ; for land is sinking or rising now in Scandinavia, Spitzbergen, Greenland, Labrador, and Newfoundland. Volcanic phenomena, earthquakes, etc., abound in the Rocky Mountains. Areas which were sea-bottoms in Laurentian, Silurian, Devonian, Carboniferous, Cretaceous, or later ages, and which are now moving, may have formed the bed of an American sea during some recent post-tertiary age. Recent sea-shells, water-worn gravel, sand, and such-like materials, packed in certain forms ; 'terraces of deposi-

tion'—matter arranged in the form of sea-margins, and 'terraces of erosion'—horizontal shelves and cliffs—are water-marks; and their position may be such as to prove them to be sea-marks. These marks prove a possible case. They abound along the coast in Labrador and Newfoundland, and mark a sea-level there. Recent sea-shells of arctic type occur at an elevation of 500 feet above the sea, near Ottawa, in the centre of Canada, and the hills in that region are conspicuously terraced, and covered with drift. Similar shells occur above terraces near Quebec. Allowing these shells 70 feet of water to live in, this level carries the sea to Chicago. A bed of cockles was lately found by an Irishman in digging a well at Brockville, at the foot of Lake Ontario; and the bones of a seal, and of a whale, were found, together with sea-shells, near Montreal. The bones of a whale were found in Vermont. These marks carry the sea to Hamilton, close to the Falls of Niagara, and through the valley of the Hudson to New York, and prove that it was a cold sea. Foreign boulders are perched on the top of Montreal Mountain, a rock which stands alone in the wide river-plain; and Montreal Mountain is scored with glacial striæ. These are authentic records; some of them are preserved in the museum at Montreal, and recorded in books of authority; others rest on per-

sonal observation : they seem to prove that a great part of America was submerged during a glacial period. Other records less well authenticated have value when thus supported. An English hunter who now lives at Wilmington, near Chicago, asserts that common oyster-shells are scattered on hills between Madison and the Yellowstone River, somewhere between lat. 44° and 46° N., and long. 110° and 114° W. They were 'as natural as on a beach.' Baltimore oysters are commonly eaten in all western towns to which railways extend, and everyone knows an oyster ; but no luxurious emigrant would be apt to carry barrelled oysters to the far west. The hunter supposed that Indians had carried the oysters to their hills, for though moss-grown they seemed quite fresh. They were found in great numbers, and at many places in the region. If these be recent shells *in situ*, or washed out of drift by the rains, they carry the sea to the foot of the Rocky Mountains, and drown the whole central district of North America. The salt lakes of the Rocky Mountains seem to carry it still further : they are supposed to be remnants of a partially-dried-up inland sea, for they have no outlets.

Returning to the Atlantic coast, a sick soldier who had been a schoolmaster, and who had lately returned

from 'the front,' asserted at Washington that, in October 1864, he had seen a bed of common sea-shells of many sorts at a considerable height above the James River, near Richmond.

According to Dana, Sir W. Logan, and others, who are able geologists and skilled witnesses, recent sea-shells of arctic type occur at many spots in drift, in Canada, in central and eastern North America, and elsewhere, *e.g.*, at Boston and near New York.

The formations which are associated with these sea-shells—namely, stratified gravel-beds, rolled stones, etc., arranged in plains and terraces—abound on both sides of the White Mountains along the Grand Trunk Railway. At Mount Washington a patch of drift occurs above 3000 feet, near the newly-made coach-road. Glacial striæ at 2600 feet point horizontally south-westwards, through a gap, and the watershed of the gap is 600 feet lower than these striæ. There is a drift-terrace in the pass. Terraces and plains of water-worn drift abound throughout this mountain region. On the Canadian side they occur at 1500 feet, at the highest point on this line. These were observed by Hitchcock. On the Atlantic slope they occur at equal and greater heights. They are conspicuous objects all along this railway line, and similar shapes and materials

recur about the same levels on the road between Boston and Albany, and on the Catskill Mountains. The nearest lands of equal height are eastwards in Europe; northwards beyond the St. Lawrence, in the Laurentian chain; and westwards beyond the Mississippi and the great lakes, in the Rocky Mountains. At the head of Lake Superior is a terrace 930 feet above the sea, and all the great lakes are surrounded by systems of terraces at lower levels. If any of these high terraces are in fact ancient sea-margins, the whole land has risen pretty equally, for the variation in the level of each terrace is small. But if the land has risen equally, the level of the terrace at the head of Lake Superior sinks the watershed at the foot of Lake Michigan, and leaves no opposite shore to hold a lake. The northern terrace is 930 feet above the sea, the watershed below Chicago is 650. It is only 800 feet at Fort Wayne, and 1000 at Sandusky, a place more than 250 miles east of Chicago. At all these places glaciated boulders, water-worn drift, and stratified sand abound.* When sea-shells are carefully sought, they will be found in the

* According to the survey of the Mississippi basin, the junction of the Mississippi and Missouri is 381 feet above high water; the utmost source of the Mississippi, 1680; mouth of the Ohio, 275; Louisville, 361; Pittsburg, 975; northern watershed towards Lake Erie, 1563 to 1065.

prairie, if this theory be well founded. Thus ancient water-levels are marked on opposite heights. In Europe by shells on Snowdon at 3000 feet; on Mount Washington by drift about the same level; at Ottawa by arctic shells in drift at 500 feet; at the head of Lake Superior by a terrace at 930 feet; at the foot of Lake Michigan by water-rolled gravel and stratified sand, beneath boulder-clay, which contains scratched stones of northern origin. A few links only are wanting to carry the sea-level to the oyster-shells of the buffalo-hunter, to the salt dominions of Brigham Young, and to the Pacific.

In this argument boulders have weight. They speak from high platforms in the White Mountains, from a Chicago platform of their own, and down south. But in order to understand their drift, some explanation is necessary.

The chief features of American geology, as explained by American geologists, are marked and simple. The Laurentian chain to the north of the St. Lawrence is from two to three thousand feet high; it consists of so-called azoic rocks. The formation extends from Hamilton Inlet in Labrador, westward beyond Lake Superior; its northern limit is unknown, but, according to Dana,* no rocks of the age occur at the surface between lat. 45° and 36° 10′, except near Lake Superior and at the foot

* Manual of Geology, 1863.

of Lake Erie. The Laurentian formation consists chiefly of hard metamorphic crystalline rocks, granites, gneiss, syenites, schists, serpentines, marbles, quartz, coarse conglomerates, etc. The parent rock, the oldest sedimentary formation known, has been upheaved, shattered, crumpled, contorted, and is so altered, as almost to obliterate all traces of life. Fossils lately discovered in rocks of this age, by Sir William Logan in Canada, and by Sir Roderick Murchison in Scotland, were hard even to find and recognise. These 'azoic' rocks are hard, glittering, and susceptible of high polish; they are striped, barred, and spotted with conspicuous bright colours, strongly contrasted and arranged in patterns which catch the eye. They resist weather, and retain their shape and polish.

Rocks to the south of this Laurentian region, in the central districts of North America, between lat. 45° and 36° 10′, belong to newer formations—Silurian, Devonian, Carboniferous, Cretaceous, etc. These have been less disturbed, and are less altered, than the 'fundamental gneiss' on which they are supposed to rest, and from whose debris they grew. They are not generally crystalline, and do not usually shine; their colours are sombre and uniform, they have numerous traces of life, and they are easily scratched with iron or hard stone:

some even with the nail. They are not susceptible of a high polish, and, when smoothed, easily yield to weather. A bit of old Canadian azoic rock—a striped, polished, sculptured boulder, transported to Niagara, or to the coal regions of the Ohio—is therefore conspicuous from contrast in hardness, lustre, colour, shape, and polish. It is as remarkable as a red coat is in an army of graybacks, or a tartan plaid in Philadelphia, or threadbare broadcloth amongst shoddy ; to see it is to know it as a foreign production carried from north to south. These large conspicuous stones have been carried to great heights, and southwards in great numbers, from lat 45° at the nearest, at least to lat. 39°, near St. Louis on the Mississippi ; and the phenomenon demands some explanation.

It is admitted by all geologists who know the facts, that ice in some shape carried boulders from north to south ; but there are two rival schools of 'Glacialists. Like American politicians, they are republicans and democrats, both far advanced, and both determined to go ahead and fight. The old tory party call both ice-mad ; but there is method in such madness, and such crazy folk are apt to lead wise men.

The views of the most advanced school are now held by Agassiz, and are clearly stated by him in the *Atlantic*

Magazine for 1864. The author, who did so much for science in his own country, describes Alpine glaciers, their nature, movements, action, and marks new and old. Having clearly explained that which he thoroughly knows, he refers to marks in the British Isles, which he studied in 1840. These 'dressed rocks' were early noticed by Scotch geologists, who could not explain them without the ice-key. They are well described in a late pamphlet by Mr. A. Geikie.* These and similar marks, found and described by others in Scandinavia and elsewhere, led the Swiss philosopher, familiar with ice in the form of glaciers, to believe that during a late period, to be called 'the glacial period,' all northern Europe was covered by one great compound glacier. It was a sheet of ice which flowed down from all mountains and mountain-ranges, filled and bridged over hollows which now contain lakes and inland seas, covered and moved over plains and low hills. It crushed and ground rocks, pushed and carried stones from centres of dispersion, as glaciers still do in Switzerland and Greenland. Vast moraines in Lombardy and in Germany now mark spots to which the Alpine system once extended; the Scandinavian system reached Poland and England, and it

* On the Phenomena of the Glacial Drift of Scotland, by Archibald Geikie. Glasgow, John Gray, 99 Hutchison Street. 1863.

joined the Scotch, Welsh, and Swiss systems. Many of the Italian lakes are but pools of rain-water behind giant moraines of this European 'glacial period.' Northern boulders, the Goths and Vandals of geology, invaded the south, overran and remodelled it; their hardy remains have caused a modern geological revolution, and a sturdy fight, which still endures.

The July number of the *Atlantic Monthly* contains the growth of this Alpine glacial theory on American soil. It is broadly stated by Agassiz, that drift and other marks of glacial action reach the banks of the Ohio, and extend to Georgia and Alabama in the Alleghany Mountains. If so, they only reach latitudes which are now reached by floating glacier-ice in the Atlantic; but these facts have led the advanced party to believe that a continuous glacier covered the whole American Continent, from the Polar Regions to the limit of northern drift. European glaciers, and European and American facts, together form the base of the glacial theory now explained and adopted by Agassiz. He holds that two ancient glaciers covered great part of both hemispheres; their névé was 15,000 feet thick at the poles, and grew chiefly there from falling snow; the ice, formed by pressure, was 6000 feet thick about latitude 44° in the White Mountains, and 10,000 feet thick in the Alps. The two polar glaciers

moved towards each other, and towards the equator, radiating every way from the poles on meridians ; they spread like lumps of putty or dough, which are crushed and pushed outwards by their own weight. This general direct movement was slightly modified by the shape of the ground ; and ice also spread from local centres, as it now does in Greenland. The northern glacier, it is said, passed over the low mountains of the Laurentian chain in Labrador and Canada, as small glaciers now pass over smaller elevations ; it ground these mountains into 'roches moutonnées' 2000 or 3000 feet high ; and at the same time a southern glacier of equal dimensions did as much at the antipodes, and left its tracks in South America. 'The glacier was God's great plough, which left the land prepared for the husbandman.' The causes which changed the climate of the whole world have yet to be explained by Agassiz in a promised paper.

A similar theory was less boldly advocated by Dana, in his Manual of Geology, 1863. The prevalence of long deep fjords, and the abundance of lakes and rock-basins in high latitudes, are noticed as facts which support the big glacier. Both these writers quote Professor Ramsay, Sir W. Logan, and other eminent geologists, who either hold similar views or incline towards them.

Mr. John de Laski also supports the glacier, and

gives an account of glaciated rocks about Penobscot Bay. According to his description, the amount of glaciation equals, but does not exceed, that of Newfoundland, Nova Scotia, New Brunswick, Canada, Maine, New York, Scotland, Ireland, Wales, Iceland, and Scandinavia. One explanation must fit all these countries or none.

On the other hand, democratic American glacialists, ready for battle but hankering after peace, have supported more conservative views. Jackson, in his Geology of New Hampshire, 1844, attributes glacial striæ and the transport of boulders to ice-rafts and tides. He points out the usefulness of the water-flood, which, as he maintains, mingled the soils and augmented their use for agricultural purposes. He mentions the glacial theories of Agassiz, published about that time, but only to object to them. The American explained the puzzle by ice-rafts in a shallow sea, with which he was familiar at home; the Swiss, by his native glaciers. At page 113, Jackson describes a notable set of water-marks near Mount Washington, which is 6228 feet high. At a height of 1229 feet above the sea, at a summit-level which divides the tributary streamlets of the Connecticut and Merrimac rivers, and from 900 to 1000 feet above these streams, he found large pot-holes in hard granite. One is 11 feet deep, and 4 feet in diameter. When

first discovered, it was full of smooth round stones; it was smooth inside, and in all respects similar to pot-holes in neighbouring river-beds; but no large stream could possibly reach the spot without some extraordinary change in the physical geography of the district. 'Drift-scratches,' running from N. 10° E. to S. 10° W. (by compass), were numerous on all rocks newly uncovered in this neighbourhood; and rows of smaller pot-holes corresponded to this direction, which is about N. and S. true. In such a position, large pot-holes and striæ seem to mean heavy streams of water bearing heavy ice nearly due south (true), at a level which would sink most of the land in America, and, in particular, many terraces in this region.

Those who uphold the glacier call such marks giant's tubs, and attribute to them streams falling through glaciers into 'moulins.' In this case no mere local glacier could reach the spot. Striæ noticed by this writer on the eastern slopes come generally from N. 15° W., and go to S. 15° E. They do not radiate from local centres as glaciers do. Silurian boulders have followed a similar course from heights near the Canada road and Aroostook river to islands in Penobscot Bay. Conglomerate of Sugar-Loaf Mountain is found 100 miles S.E. in Eddington. Iron-ore from Iron Mountain in Cumberland, R. I., has been

carried 40 miles southward. How much further stones may have travelled from these points, or where stones really came from, it is hard to say; for the whole eastern coast is strewed with stones which may have come from Labrador, because they resemble rocks in that country. There are conglomerates in Newfoundland, and iron-ore is found in Nova Scotia.

The whole subject of surface-geology is treated by Hitchcock, in papers in the Smithsonian Contributions to Knowledge, 1857. After quoting Chambers on ancient sea-margins, Lyell, and other writers, he declares his own impression to be that old sea-bottoms may still be traced in many parts of America to the height of 1000 to 2000 feet above the present sea-level. It has been shown above that drift rises to 3000 feet at least on the flank of Mount Washington. Maps, sections, and a table of elevations at which 'terraces' and 'beaches' were found by this author, are added to his work. Two beaches are marked near Mount Washington—in White Mountain notch, and Franconia notch—both of which are high passes. They occur at 2665, 2449, 2073, 1963 feet above the sea in this region, according to this author. No sea-shells had been found in the Alleghanies in November 1864, so far as known to the learned at Boston, though drift-shells had been discovered in low

hills near Boston itself. Similar beaches were observed by Hitchcock at 2547 feet on Snowdon, where marine shells have since been found at 3000; and more 'beaches' were found at 2640 feet in Switzerland, where shells have not yet been found. After 30 years of experience in the study of surface-geology, this writer says: 'It is hardly venturing beyond a legitimate conclusion, in view of the preceding facts, to say that all the northern part of this (American) continent, at least all east of the Mississippi, has been covered by the ocean since the drift period. The same reasoning, of course, applies to Europe also.

The travelled American, familiar with Swiss glaciers, and with American ice-rafts, and with the works of other writers, appears to have hit the mark. He supposes that the whole continent sank during the period of boulder-clay, and rose during the period of 'modified drift.' While sunk it was covered by an ice-laden sea, which grew warmer as the land rose again. The sea was then inhabited by shells. No reason for the change in climate is given by Hitchcock.

The reason suggested above is the change in the direction of the Arctic Current, which would result from the sinking and rising of the Laurentian chain. That block of land now bars the way, and sends ice and its climate

to the middle of the Atlantic, instead of the Western States. Were it to sink 1000 feet, the stream would flow south-west to the Western States, instead of the land under the sea about lat. 36°.

There are then two schools of glacialists,—a small party, who attribute the phenomena of the drift almost entirely to the action of enormous land-glaciers; and a larger party, who attribute them chiefly to icebergs. According to some writers, a great elevation of land produced large local glaciers in low latitudes. According to others, a general rise of land about the poles, which confined the ocean to warm regions, intensified polar cold so as to change the climate of the whole earth. According to some, the cold geological period passed away when land and sea were more evenly distributed, as they now are. Others, again, explain the facts which all must admit by assuming a change in the temperature of the solar system, or in the position of the earth's axis. On the facts they found a glacial period, on which they found their astronomical theory.

Admiring all theories, wedded to none; attracted by icebergs, attached to glaciers, and anxious to choose between them, the writer set off for Yankeedoodledom in search of cold hard facts.

CHAPTER II.

LIVERPOOL TO HALIFAX.

With divided affections, dragged forward by sympathy with vagrant icebergs held by the big glacier and by the strong men who stand by it, and anxious to steer his own course, the writer started for Labrador in search of facts to be added to a store gathered elsewhere during twenty years. The following pages may help to swell the pile on which truth must finally rest. So now for the journal.

Steamer Europa,
July 10, 1864. Off Ireland.

I found ——— at the station in a state of mind about catching me in America. He might as well hope to find a needle in a hay-loft. I shall leave him letters at Halifax, and elsewhere, and if he chooses to follow me, I shall be very glad to see him. I got to Liverpool at 3.15, and slept till eight. At ten, I got on board the Satellite, and boarded the Europa with the rest of the passengers, and all their luggage; and thereupon we sailed. The Great Eastern was getting up steam to go

to London for the Atlantic cable. We expected a race, but she did not start so soon as we did. The Liverpool lads were firing great guns at a target, and we gradually slanted across their line of fire as we passed out. The shot came skipping across our bows, and then right after us, within a couple of hundred yards. It was curious to watch first the smoke, then the heavy plunge, and long afterwards the distant boom of the big gun a couple of miles away. The Liverpool banks, and the Welsh coast, were covered with haze, and we saw nothing till we got near Holyhead. There is a haze over the land now, and we can see nothing to-day, but the weather is delightful. The sun is shining, and a soft breeze blowing right after us; the sea blue and crisp, and the lazy old ship rolling quietly along from side to side with a quiver at every stroke of the paddles. Wind and tide and all in her favour, she cannot make more of it than nine knots. A stupid little brat of a steamer, running to the Isle of Man, went past us yesterday as if we were at anchor We are a numerous crew, with nothing to do, and ten days to do it in. At eight a bell rings, and till 9.30 we may breakfast. At one we have a solid lunch; at four we dine. Everything at dinner goes on as if by machinery. A row of stewards stand in the doorway, and the dishes pass in to the steward

who is at the head of the column, who drops each dish into its place. As the operation advances, so does the column of stewards, and the leader is at the end of the cabin by the time the tables are covered. Then comes a solemn pause, and then a wink, and all the covers rise simultaneously, clatter like a flock of gulls, pile themselves in heaps, pass down the line, and disappear. Then in such weather as this, it is worry worry, and the food disappears down the red lane. Dinner over we smoke, and at seven we tea; after that we smoke, and at ten we drink night-caps.

I hear that it is very easy to get a small vessel at St. John's, and that there are lots of steamers running about in the Gulf of St. Lawrence; so I can get away when I get tired of my ship. There are lots of Jersey men established along the gulf, and generally it looks very pleasant in the distance. And now for the cigar of resignation on the quarter-deck of this great Noah's ark.

One P.M. Here we are at Cork.

July 12, 1864. At sea.

On Sunday we landed at Queenstown, hired a jaunting-car, and drove for an hour and a half up towards Cork, and round by the back of the town. I wanted to find

ice-marks; and, to my surprise, I saw neither boulders nor scratches. The driver modestly asked half-a-crown a head, and got it; for we were in a good humour. At 3.30 we started from the pier, with the mails, in a small steamer, and the big one cast loose as we came alongside. The two vessels, tied together, steamed out past Spike Island; and when we got clear of the harbour, the little one cast loose and went home to Ireland. We saw the old Head of Kinsale in the evening, and at night we passed Cape Clear, and made our course for Cape Race. As Admiral —— used to say, "In good time be it spoken," we have had glorious weather so far. The wind has been steady, northerly and easterly, and we have carried sail all the way. The air is about 62°, and the water 60°, the sun shining at intervals, and no swell to signify. Of all our numerous company, only half-a-dozen are absent at meal-times, and these eat and drink merrily in bed. The most of us play games of various sorts—draughts, chess, backgammon, whist, ecarté, yucca, etc.—in the saloon; and on the deck outside there are two games at shuffle-board continually going. Another entertainment is to throw small bags of beans through hoops hung about seven feet from the deck. These are pastimes; the occupation of the day is eating. If any one wants perfect

repose of mind and body, this seems to be the right shop.

I have fallen in with an old friend whom I met once, fifteen years ago, at Trondhjem. He was up at Alten with Robert Chambers, and helped him to measure terraces. Since then he has been a great deal in South America, and he is now going to Bolivia. He says that terraces abound in Chili along the coast, and up the valleys there are generally three distinct steps at corresponding levels. There are no glaciers, and no ice-marks in any part of South America; where he has been, at least, he has seen none. He is great upon earthquakes. He says that he has often heard the sound rising up under his bed, getting nearer and nearer, and then he has felt his bed rise under him, as if some one had lifted it. So have I felt a coming outburst of the great Geyser in Iceland. He gave me a curious bit of information about an observatory in Chili. It was built on a conical hill of basalt, and the transit instrument gave all sorts of unexpected results. At last some one discovered that the intense heat of the sun made the whole hill expand unequally, so as to move the observatory, instruments and all; so the light of the sun is a mechanical power. Except this friend, I never saw one of our lot before.

July 1864.

Wednesday 13.—The weather, the same; temperature, ditto; employment, ditto. It has been discovered that the first lieutenant and several of the crew of the 'Alabama' are on board; also a man whom they caught and kept prisoner, on board, for six weeks, after burning his ship; also a man belonging to the 'Kearsarge.' They keep themselves to themselves, and, generally, we are a very unsociable lot of mortals.

Thursday 14.—Yesterday we had three adventures. We saw a rat, some porpoises, and the 'Africa' on her homeward voyage, about lat. 51° 22′ N.; long. 26° 05′ W. We ran 232 miles between noon and noon, and on the 12th, 239. In the evening it fell dead calm, and then the wind shifted right round from N.E. to S.W., and it began to blow up a bit of a breeze. It is now blowing smartly, and we are spinning along, making more than ten knots, with lots of sail set. The captain who was taken by the 'Alabama' has been confiding his sorrows to one of the officers, who has retailed them to me. He says that it was unpleasant to lose his chronometer, his own private property, and to see his wife's dresses put under a table to set the ship on fire.

Friday 15.—Yesterday we saw a bird, a ship, and a rat. In the evening, the wind headed us, and then it

fell calm: now the wind is back to S.W., the sea is smooth as a mill-pond, and there is a thick fog. We are making $10\frac{1}{2}$, all sail set.

If it were not for the trembling of the ship, this life would be 'truly rural.' I am awakened by the crowing of a cock and the lowing of a cow; or rather I was, for the cock has ceased to crow, and it is my firm conviction that he was roasted. The Secesh lieutenant is very like a big Garibaldi. I have been striving to make a portrait of him, under the table, but I have not managed it yet. This crossing of the Atlantic is a very slow proceeding, and 'that's a fact.'

Saturday 16.—In the evening it fell quite calm, and the moon came out brightly. The air was soft and warm, and I stayed on deck till near midnight, smoking and enjoying the weather. I was roused in the morning by the fog whistle, and found a wonderful change. The water was a great deal colder yesterday; to-day it was only $47\frac{1}{2}°$, and after breakfast we came in sight of icebergs. There was a big one on the horizon, and we passed close beside two small ones. They were beautiful. The fog had vanished, but it could be seen resting on the sea behind us. The sun shone on a bright, sparkling, blue sea, and the icebergs glittered and shone like polished marble streaked with Prussian blue. The

highest of the near ones was about 30 feet above water, at one-seventh, 210 feet thick. About noon, we passed a big one, distant about six miles. He looked about the size of the Bass Rock, and, through the glass, the ice looked like a splintered cliff. I could make out veins and strata of dark-coloured dirt, probably beds of gravel. One bed in particular was very plain. I took the opinion of several knowing hands on board, and we all agreed in estimating the height at more than 200 feet. The visible length was about 200 to 300 yards. At one-seventh, this lump was 1400 feet thick. As we are far south of England, in lat. 48° 44′, long. 44° 35′ W., 336 miles from the nearest land, and a long way from the nearest Greenland glacier, this is a good case of transport of drift by sea-ice. There has been a deal of excitement about the bergs. Yesterday, we nearly had a different excitement. A young Yankee, who seems to be a snob, thought proper to talk loud about the late fight. He said that Semmes had surrendered his ship, and ought to have surrendered himself, but that he had sneaked off like a villain. The big lieutenant could have eaten him, and some of the people advised him to punch his head, but he wisely spoke to the captain, who took the young offender into his cabin and gave him a bit of his mind. I found him on deck pulling at his gloves and fuming

tremendously. A friend was advising him to lay the matter before the authorities at Washington. He has now grown calm, and there will be no bloodshed this bout. Now for another iceberg.

Sunday 17.—We saw large icebergs till sunset, and the water continued cold. The berg near which we passed looked like a small white speck on the horizon, and it was thirty feet high at least. Those which we saw at a distance looked like large islands. One at about fifteen miles looked very like Mont St. Michel as it appears from Avranches ; another was very like Ailsa Craig ; a third was like the end of the Isle of Wight as seen from Blackgang Chine. I firmly believe that they were as large as hills on the English coast. At sunset their colours were very beautiful, rosepink with Prussian blue shadows ; but they were so far away that without a good glass no details were seen.

These are some of the shapes of the big ones. At one time we got amongst a cluster of small bits, and had to turn out of our way to avoid them. They were as big as haystacks, and melted into strange shapes. They were plunging and rocking, and the sea breaking over them. If we had run foul of them they would have sunk us, or the paddles would have been smashed. I am in luck thus to see bergs at once. As for weather, I

am tired of praising it. The fog-whistle was going in the morning, and fog banks are resting on the horizon here and there, but the sun is shining brightly, and the sea is smooth. The wind is cold and sharp, and we are in arctic water, but it is very pleasant sailing.

Monday 18.—It was curious last night to watch the fogs. It seemed as if the region of clouds had been lowered to the sea level. The horizon was hard as a board, and the air quite clear, but every here and there a gray wall of cloud rested on the sea. It came sweeping down wind, and when it reached us the bow was hidden from the stern in a moment. The melancholy groans of the fog-whistle began, and the old ship, shrieking and groaning every two minutes, plunged on her way through the dense cloud. In ten minutes it passed away to leeward as suddenly as it came; the moon shone out, and the groaning ceased. About grog-time a big steamer was seen, and we exchanged rockets and blue-lights and such like marine civilities. We heard no sound, so the fog-whistle is of small use. The captain made for the place where Cape Race ought to be, but he could not see the light, which is placed high, and he held on his course. This morning we have got into the lee of Newfoundland, and there is a marvellous

change. The water is seven degrees warmer, and the clouds are up in the air where they ought to be. The sun is bright and the air balmy, and the passengers are hard at their usual games.

Tuesday 19.—All yesterday very fine and warm. The water getting warmer as we get under the lee of the land. We saw some whales spouting, and a Mother Carey's chicken, and that was the only excitement.

A gentleman told me part of his adventures in the evening. He went up to the diggings in Australia and worked with two others till they dug a hole sixty feet deep. They had then reached a layer of big stones, 'common blue stones,' with the corners rounded off, and neatly packed as if laid by a mason. In the chinks they could see the gold glittering, and they washed some dirt and found it rich. Well pleased, they left their tools in the hole to keep possession, and went to sleep. In the night a pool of water broke in, and when they went to the mine the sides had fallen, and all their tools were buried. All the money they had was invested in the tools, so they walked back to Melbourne, sixty miles, without 'a red cent,' and the sailor went to sea again.

In the night the fog-horn groaned two or three times. Now the sky is blue, and the sun white-hot

and brighter than any sunlight that I have seen since I was in the same southern latitudes many years ago. When this steamer stops at Boston she will be in the latitude of Rome. When I get north to St. John's, I shall be as far south as Nantes.

Wednesday, July 20, *Halifax.*—We got in last night at a quarter to nine by the time here; one in the morning by London time. We got to this, Halifax Hotel, and then wandered about the streets till all hours of the morning.

By all accounts here, it will not be easy to get to Labrador, for all the fishermen are gone from Halifax and Newfoundland. If I can't get on I will come back, but I will go as far as I can.

CHAPTER III.

NOVA SCOTIA TO NEWFOUNDLAND.

July 20, 1864. Halifax.

HERE we are about the latitude of Bordeaux. Asked about sporting and icebergs. It seems that there is no fishing in Nova Scotia worthy of the name. It seems strange that so little should be known about neighbouring colonies. Only a few wandering sportsmen know anything about the places to which I am bound; the ways of Newfoundland and Labrador seem utterly unknown to 'Bluenoses.' Tried for a chart of Labrador, and found that no good chart exists.

In the evening drove by rail to Windsor, forty miles. The route is through a country which is as nature made it. The highest point on the line is about 550 feet above the sea. The woods are chiefly pine, with hard wood and low brush; the ground a mass of boulders and bare rocks. Lakes abound; and in one of them, called Rocky Lake, a company have established an ice-

house, with railway complete, for exporting ice to the States and elsewhere. About thirty miles from the eastern coast the country changes. The rocks are softer, and include shales and sandstones, limestones and beds of clay. The country is cleared and well cultivated. The belt of forest and wild land extends about twenty miles from the eastern coast all along Nova Scotia. The Gulf Stream runs nearly east, at a considerable distance from the coast. The cold stream runs westward, near it. The tide at Halifax rises only four feet. In lat. 45° the look of the country is the same as in lat. 71° in Norway; but here are willows, and other such trees, which do not grow about the North Cape. Gold abounds, and the colonists are in a fever about it. At one place, near the sea, they found enough to make it pay; now they are quartz-mining. Windsor is a neat wooden town on a branch of the Bay of Fundy. It is surrounded by gardens and green fields; and when we arrived, a vast plain of mud stretched as far as the eye could reach. Vessels on the stocks were forty or fifty feet up, and looked as if they never could get afloat. After going to bed, heard the rushing of the tide, and then remembered that the tides are famous in this place. A travelling gymnast was walking matches against time, backwards and forwards, with a wheel-barrow and with

a cart-wheel, and throwing 56 lbs. over his head. Gave the poor d—l a shilling; for he had only got a few coppers for all his work.

July 21, 1864.

Windsor, Nova Scotia.—Water 70°, air 80°, at 3 P.M. Heat oppressive after the cold of the sea. Walked about six miles, and made a sketch from the bank above the bridge. The flood-tide was well worth seeing. A broad plain of red mud stretching to the horizon, was suddenly streaked with silver lines, and then the 'bore,' a foot high, came rushing up the narrow lanes of water. It came slowly, roaring hoarsely, and the broad tide spread behind it. In half an hour the broad plain was covered by a wide, red torrent, whirling like a mill-sluice, boiling, eddying, and sweeping everything that would float before it. From the water's edge the sea looked like a steep mound of water, a furious rapid, pouring down from the horizon. By 3 P.M. the tide was up to the edge of the wharfs, and the muddy water had cleared in the centre. Boats came creeping out of odd corners, and the sea was forty feet deep over the plain of mud. According to the sailing directions the tides in the Bay of Fundy seem to result from the cramming of the tidal wave into a narrow wedge-like opening. In

the Bay of Mines the water sometimes rises 75 feet, while the tide in the Gulf of St. Lawrence, beyond the narrow isthmus, 16 miles wide, rises 8 feet. At Windsor, where the tide has to turn round a point, it rises 40 feet. In the wider part of the bay it rises 30 feet only. In some parts of the bay are dangerous whirlpools, where the stream runs nine knots. The bottom seems to be composed of the debris of the soft rocks, and it seems highly probable that the sea will break through, and make an island of Nova Scotia, unless the land rises. About high-water mark the shore is strewed with very large boulders of coarse granite, and numerous other stones foreign to this district. It is evident that this creek is growing larger by the wearing of its banks. They are undermined at high-water mark. The rock near the bridge is a soft limestone full of fossils, interstratified with beds of loose clay dipping at a high angle.

In winter the Bay of Fundy freezes, and this great tide packs the ice till it looks 'like the boulders on shores.' No doubt the ice moves the granite boulders and cuts into the grooved bank like a big saw. Ice-marks abound in this district. In Halifax I took several rubbings; and at the summit level, 550 *feet*, took some more. The natives supposed that I was prospecting for gold, and

were very much interested in the proceedings. The direction is about N. 55° W. to S. 55° E. The direction of the Gulf Stream S. 70° W. The trend of the coast S. 50° W. There are no high mountains to account for local glaciers, and the marks on the highest tops correspond in direction with marks near the sea-level twenty miles away. The boulder-clay contains fragments of sandstone, and the coal-measures are to the N. 50° E. in Cape Breton, and N.W. in New Brunswick. Saw several Indian camps. The small boys came to the train to stare and sell strawberries. The men carried guns, and dressed like English gamekeepers. The women were wild-looking, and very picturesque ; their walk, a peculiar stride like the gait of men who in Sweden walk on snow-shoes. The wigwams were made of birch-bark and fir-poles, conical, with a hole in the top. These people are Micmacs, and speak English and their own language. The forest was burning in a dozen places, set on fire by cinders from the engine.

In the evening went on board the steamer Delta, and slept in a small cabin with five other big men. Consequent mutual suffocation considerable.

July 22, 1864—*Friday.*—Start at 10. Coast bold and hills rounded, but weather hazy ; sea smooth, fair

wind, vessel rolling abominably all day. Lots of ships in sight. In the morning in sight of Flint Islands, on which there is a lighthouse. There is a gap between these islands. A few years ago there was a foot-bridge across the gap, now it has become a wide deep passage. This coast is therefore wearing rapidly; it is broken by the undermining of waves and the battering of ice. The rock is sandstone, in beds nearly horizontal. Coal is seen in the cliffs, dip N. Made Sydney at 10.15, twenty-five hours from Halifax. A fine section of the coal-measures is in the sea-cliffs. There is not a single fault or dyke in many miles, apparent dip N. 10.° The hills are about three or four hundred feet high, forest-clad; trees low, soil thin, and strewn with boulders of granite and other hard rocks. The vegetation is very like that of Scandinavia—stunted pines, birch, and hard wood, multiberries in the bogs, and strawberries abundant. One coal-mine is about five miles from the sea, and has a railway. The temperature of the water at the bottom is 47°, air 68° outside; it is 360 feet deep. The average temperature of the place may therefore be taken at 41°, as marked by Dove. It is near the latitude of La Rochelle, where the average temperature is 55°. A similar cold temperature on the European coast is found north of Bergen, and the isothermal line passes

near the south of Iceland. The appearance of the country coincides with the ascertained climate. It is very like Norway, very unlike La Rochelle, in sunny France. The colonists are chiefly Highlanders from Uist, Barra, Inverness, and other parts of the Highlands. Grown men who were born in the colony, children, and people who came from the old country, all speak Gaelic. Many are flourishing farmers, others work in the mines, and earn as much as 'ten shillings a day.' Asked many of them if they thought more emigrants would succeed. The answers were various; but the substance is that young men will find plenty of employment, and that a man with a strong family is sure to succeed. The winter cold is the great drawback. A cute Irishman on board the steamer, who is said to be a famous farmer in Newfoundland, held the Cape Breton people very cheap; he pointed out that Yankees come all the way from Boston to catch the fish which none of these fellows will catch themselves. The mines are worked by Yankee companies, and the farmers allow themselves to be cheated by hucksters, who buy their produce cheap and retail it to the ships. At one farm he found a man well to do but a wretched farmer. He asked why he did not lime his land, as there was excellent lime beside him. 'Oh,' said the other, 'I did once, but the grass grew a

yard high, and I was afraid that I would take all the good out of it at once, so I have never tried it again.' Why did he not put on the sea-ware which was piled upon the shore in vast mounds? 'Oh, that burned the grass right off.' 'In short,' said the man, 'I don't want to do better, I am well enough.' This was an Englishman; but the principle is very like that of the old country of Mrs. Maclarty. Went into sundry houses and found the usual familiar untidy ways. One fellow had built a round end of loose stones at the end of his wooden shanty. As this round-ended architecture is common in the Hebrides, asked if he did not come from the islands. He did, from Barra. The old familiar Highland manner here in the new world was polite as ever. One fellow with a black face led me to an Indian camp. Found squaws making baskets; the men were at work stowing coals in the steamer, and doing such-like work. One woman was really pretty. In winter there is a great deal of ice in this harbour. The rocks at the water's edge are ground and rounded. The beach was quite different from anything which I have seen on the other side of the Atlantic. Searched in vain for bare rocks on shore. So went on board the steamer and sailed. This country is in a very primitive state. Directly the town is left, the wild forest begins. It is a maze of

tangled plants growing in marshy hollows, and a wilderness of pine thickets on stony rock hills. In striving to run a bee-line towards the coal-mines, which we had seen from the steamer, we got fairly astray, and only made our point by steering so as to hit the railroad. Plants and landscapes resemble those of Scandinavia, about 60°. The temperature of the water in the coal-mine proves that the earth itself is no colder here than it is in Europe, but the temperature of the sea is very different. There is a cold current outside, inside in the Bay of Fundy it is less cold, and the difference in climate is proved by the aspect of the country. On one side is an English landscape with Indian corn added, on the other within forty miles is the bleak north. It is questionable whether a farmer gains by moving three thousand miles from a rocky sea-coast where the average temperature is 50°, to another equally rocky sea-coast where the temperature is 41°. If men will not fish and cannot farm at home, why should they farm and fish better without help or instruction in a worse climate, and a far wilder sea abroad? The general feeling amongst these men appeared to be strong regret for their old haunts, and a yearning towards a countryman. 'These shores are not like our shores,' they said. 'This cold, gloomy, bleak winter is not like our own.' Many who only knew of the old

country from their grandsires or their neighbours, asked if the other side was not a very different land. Philanthropists who benefit tenants by helping them over the sea, would do well to study Dove's isotherms, and the effects of ice on climate.

Strong breeze, bright sun.

Sunday, July 24.—At sea; strong breeze, vessel rolling fearfully, and a good sea on. Ran rather close to the Newfoundland coast in a haze, and clawed off; then made for Cape Race, which we passed in the night for the second time without seeing the light.

CHAPTER IV.

ST. JOHN'S TO STRAITS OF BELLEISLE.

Monday, July 25—9.30 A.M.—Made St. John's. The coast about Cape Spear is fine, hills about 500 feet high, with brush and stunted pine growing on them. The rocks are red sandstone, evidently very much glaciated, dipping at high angles. The entrance to the harbour is through a narrow passage guarded by forts. The harbour itself is in a hollow, at right angles to the entrance. All the town turned out to see all the military authorities salute the general commanding, who, with his aide, turned out in full fig—cocked hat and spurs. The 'Ariel' was to start next day for 'the Labrador;' so went on board, and found a filthy steamer, stinking most villanously. A place forward, newly painted, seemed the least bad, so chose a berth. The place in question was the forehold, roughly boarded over, and with twelve bunks rudely set up at the sides. They were too short for a man of ordinary dimensions, too low for common shoulders to lie on edge; to get in

was a gymnastic feat; to lie still, a violent exertion; to get out, an exploit. To stand upright on the floor was impossible. The paint was wet; but there was a companion-hutch which could not be closed, so fresh air must circulate below; the screw was aft; the paint would dry; the blankets were new; the sheets, though coarse brown holland, were fresh from the shop. It was the least dignified part of the ship—smoking was allowed; and so the forehold of the 'Ariel' was chosen for a home on the ocean wave. Passage up and down, and food for three weeks, £5 sterling; cheap and nasty.

Walked up to the top of the signal-hill, and found ice-marks very well preserved; the direction nearly at right angles to the coast. There does not seem to be anything peculiar in the water-line; yet this harbour freezes, and sea-ice drifts in and out every year. The marks on the hill were not made by shore-ice of this description; on the other hand, they point directly across the main valleys and fjords of the island, and there is no higher ground from which local glaciers could come, and yet the marks are perfect on the sandstone. This must be the work of sea-ice, like that which passes to the eastward in spring. We are here in the latitude of Nantes. There is an iceberg now in St. Mary's. Earlier in the year, sailing vessels, which got into the

ice far north, drifted down past St. John's, with bergs and pack-ice, in one great moving mass, 150 miles wide. The sea-coast consists of cliffs and round rocks at the water-line. It is said that the land is rising now.

July 26, *Monday.*—Sail at 10.30; very fine and warm, bright sun, wind off shore. Crowds on board going to a regatta at Harbour Grace, and to places all down the coast. The coast is high as far as Cape St. Francis. The section is very fine; at one place the beds run in long folds, which are planed off at the top—a more conspicuous instance of denudation could not be conceived, and because of the marks on Signal-hill the plane was ice. The outline of the upper country has nothing to do with the geological formation below. It has been shorn over by some great ice-engine, but the last movement here was *across* the bays and valleys. Landed at Harbour Grace. Found great masses of terraced drift resting on polished striated rocks. Here the direction agrees with the shape of the country in some degree; but the striæ, though perfectly well marked, do not run down the harbour; they cross it diagonally, and seem to run northwards. The marks on the shore where bay-ice abounds do not resemble these in the least. A large square island of ice, about eighty or one hundred feet out of water, was aground in Conception Bay. The chart

gives 45 and 115 fathoms (270 and 690 feet). At the rate of one-seventh, 100 feet above gives 600 below. Sketched the berg as we passed it, but saw no sign of a stone on the ice. It was of the colour of white marble, lustrous and shining, but shaded with blue; some veins looked like brilliant lapis lazuli, but we were too far off to see it well. A whole fleet of small pieces were drifting from it out of the bay before the wind. In the middle of the night there was a disturbance. A reverend 'bayman' went on deck and saw breakers, upon which he shouted, 'Breakers ahead!' The captain, who took him for one of the crew, cursed him, and asked if he had only just seen them. No one stirred in our bunk; but the fact was, that the vessel had nearly run stem on to a cliff in a thick fog.

Wednesday 27.—Landed at 5 A.M., and walked in a fog to a hill-top. Perched blocks here and there; but the rocks were all weathered, though rounded. Came down and joined the crowd. Went to breakfast at a kind of lodging-house, where the pork tasted of cod-liver oil, and the eggs were abominable. Got a wash and went on board again. The dip of the rocks 42° S. Steamed to Catalina from Trinity. Landed again and walked to the top of another hill. Rock yellow, slaty; dip 14° W.N.W. Cleavage E.S.E. 54°, magnetic. At this place the ice

in winter extended 140 miles from the coast. It was the mass in which the sealers got entangled. All the cod have gone away, and some knowing cards attribute their departure to the unusual quantity of ice. It is said that fish were picked up dead, and that lumps of ice were found in their stomachs. It is supposed they swallowed the ice and died of cramp. Rounded Cape Buonavista and sighted an iceberg. Landed at Buonavista, a large place in a port open to the westward. The town stands in a hollow, on vast terraced masses of glacial drift, consisting of gray clay, with large boulders of granite, black marble, and numerous other hard rocks; many of these are scratched and polished. The rock of the country is sandstone; the water-line is broken, and the boulder-clay undermined so as to leave a terrace. The coast is like beaches elsewhere, but worn and rubbed in spots. The hills are all rounded and of one pattern. No striated rocks were found in the town, and there was no time to search further. Steamed to King's Cove and anchored for the night. Passed an iceberg aground below a house. The white mass contrasted strangely with the green hills, corn-land, and white walls of the farm-house. Landed with a comrade. This genius is wild about treasure-seeking. He pointed out several places where treasure is buried, and

told no end of stories about his adventures. He has a divining-rod, which is a great secret, for which many would give him large sums of money; but he knows better than to tell them anything about it. A man who taught him the art of using it, proved the value of the article by finding a pose of silver. He put two pounds in silver in a handkerchief, and hid it in a barren moor, 'where no man would think of looking.' They went to the place, and the rod led the diviner to the very spot. According to the account of the narrator, he must have gone dancing about his pose like a hen partridge with a nest, while the operator prowled round and pretended to be dragged from his path by the rod. When they got close together, the man who hid the plunder pulled it out himself in a transport of joy; the other sacked it, and he got the stick. An article in the *Quarterly Review*, some years ago, attributed the phenomena of biology, table-turning, and mesmerism, to 'suggestion.' This is a case in point. An officer in the navy had given him some useful hints about making the engine; in particular, he had told him to put mercury into it. Seeing me at work with various glasses and instruments, he attached himself to me, and we set off for a scramble. Walked to the tops of two hills, the highest in sight. One was a regular scramble over broken rocks, and

through very rough forest ground. Vegetation, berries, ferns, and small pines. The view was fine. On coming down Mr. ——— spoke out; 'Well now, this is the last time we shall be together; you might as well tell a fellow how to make a divining-rod.' 'Well,' said I, 'I'll tell you all I know about it, but it is all nonsense;' and then I told him about the hazle rod, but the worthy man was not half pleased. He said that he knew a man who had found a great treasure lately. He had seen a bit of the very box in which it was stowed. But two fellows were beforehand with him. They went at night and took the treasure, thirty thousand pounds, with which they departed for the States. One bought a mill, and the other a farm, and they are both alive and flourishing. Found a man who spoke Gaelic, and reads a Gaelic bible; and went to his house with a worthy missionary from Nova Scotia, who is bound for the Labrador. We had a sociable glass of cold spring water, and then wandered down to the fish-stage, where we sat admiring the beauty of the night. In the midst of our talk, a strange, low, wild, eldrich whimpering yell, like the howl of a wild beast, startled me. 'What's that?' I said. 'Oh, it's only the dog,' said the Highlander. 'Do you know what he's at? All the dogs here have something of the wolf in them, and at night they answer

one another,—listen.' Accordingly we listened, and from all sides of the still harbour there suddenly sprang an answer to the challenge of our dog; it was a chorus of howling, yelling, and whimpering, which rose and fell and died away in the distance, to be taken up again by still more distant country dogs. With the singing of the mosquitoes, the ripple of the sea, and the still quiet of the night, it was a strange, wild scene. After a deal of shouting got a boat and went on board, and to bed. Every one has heard of Newfoundland dogs, and everybody wants to get one. They ought to be pretty large, quite black, with rough waving shiny hair, black roofs to their mouths, mild wise faces, and long tails, with a slight curl at the end. There is hardly a specimen of the pure breed left in the country, and the few that remain are prized. The small smooth black Labrador dog is not so much valued. Packs of cross-bred brutes of all sizes prowl about all these coast settlements. They feed on fish offal, and seem to be a highly independent community. Venturing once to pat the head of a venerable brown shaggy dog, who looked like a fat, sleepy, good-natured bear, my hand got an ugly squeeze, which was followed by growling and grinning, and gnashing of teeth. Head and tail went down, and bristles went up, and the old brute looked perfectly savage and sulky as

long as we kept company. These dogs help the men to drag blubber on the ice in sealing times, and fatten on dead seals. They are allies, not slaves or hired servants.

Thursday 28.—Steamed to Green's Pond, passing several large icebergs aground. The island is a broad tor about 180 feet high. There is very little soil on it, and that little is peat. The vegetation is arctic ; rein moss, Indian tea, crowberries, bake-apples, and such like. The houses are perched upon weathered granite, all ground into one shape. Many houses are on separate rocks, and cannot be reached without a boat. At the end of the harbour is the churchyard—surely the strangest that man ever made. All the tombstones lean, except those which have fallen down. One records the age of a girl who died in 1808, and begs her parents to weep no more. It stands about three feet above the sea, and close to the edge of a peat bank. On looking over, there was the coffin in the sea, with the bones of the poor girl rolling about in it. The sea has encroached on the churchyard ; but the inhabitants do not seem to care, for their path from house to house skirts this grave, and the bones are visible to all who care to turn their heads. This looks as if this part of the coast were not rising but sinking. The churchyard, however, is still used, and it is said that coffins are scuttled and anchored

with stones in peat graves which fill with sea-water as soon as they are made. The bog is the only soil on the island deep enough for a grave : there is very little of it, and boats and vessels run their prows against the bank, and wear it away. Still the fact remains, that a peat-moss is partly submerged. Unless peat was washed down, this spot has sunk with the plants which grew in the rocky hollow. Stopped all day, as a fog came on, and the next bit of the voyage is dangerous. Walked about with sundry agreeable shipmates. Found a curious plant, Indian cup by name. It has a yellow flower like a waterlily, and the leaves are like small pitchers. These fill with water, and nourish the plant in dry weather. The root is said to be a cure for small-pox. Found a garden in which potatoes and pot-herbs were flourishing amongst a litter of cod-heads. The owner was fishing, but the wife did the honours of her cabin. Nine-tenths of these people seem to be Irish, and the accent of the whole colony is a decided brogue. Studied the rocks at the sea-level, and found them very smooth, but not striated. There is a wide sea-margin above high-water mark, upon which nothing grows, and no sea-weed grows on the rocks below water. There are no limpets, and very few shells of any kind. A few small whelks crawl about, and in chinks a few white

barnacles are to be found. It seems that bay-ice rubs everything from the stone ; but at a short distance from high-water mark, the rock is weathered. The trend of the island is N.W. magnetic. A more dreary desolate human camp it is hard to imagine ; but people live here all winter, and the shops make fortunes. Got some tea at a neat little house kept by a lady, who gave us tea with real cow's milk, dried caplin, fried ham and eggs. Some Indians from the interior, armed with bows and arrows, crossed to the settlement, and prowled about the houses and shops buying stores and drink. Unfortunately they departed before I saw them. A pretty little girl at one house had got a nest of young chickens in a box ; but they were Mother Carey's chickens, and she was feeding her pets with dainty bits of cod-liver. These strange little webfooted sea-swifts breed here in great numbers. This wild place corresponds nearly to the Scilly Isles, where cacti flourish, and geraniums grow to be hedges ten or twelve feet high. In winter the whole sea freezes ; sometimes the drift is hundreds of miles wide, and the sounds are roads. There is scarce a fragment of a shell on the beach on one shore, on the other is shell-sand. One great difficulty in exploring glacial drift is the absence of shells ; if shells be so rare on the beach in this latitude now, their chance of preservation in old drift was

small. Future geologists may hunt for them in vain here, as geologists do now elsewhere.

Friday, 29—Air 48°, water 46°.—Sun shining, wind N., 11 A.M. Steamed through a lot of reefs and small islands. Passed Cape Freels and the Wadhams, and ran into Fogo. This is a queer little harbour, with two entrances ; a heavy sea was running, and as we came out the vessel ran very near some nets. If the screw had caught, we should have been wrecked to a certainty, for a very heavy swell was setting us broadside on to the rocks. The people ran out to look at us.

There is a low neck of rock here, and on it striæ were well enough marked to take a rubbing. Went to the top of a hill and found nothing but broken shattered sandstone rocks. Ran in to Toulinguet, and anchored for the night. Landed and went to a merchant's house, where a young agent entertained us with baccy and grog.

About thirty sealing vessels were lost this year. In March, the whole spring fleet first tried to get outside the ice, and, failing, tried to work up inside of it. Off Toulinguet, they were all jammed hard and fast. Fifteen hundred men used to walk ashore from their vessels, and they were quartered on the inhabitants. The place is neat and well built, and about it there is a great deal of cul-

tivation—potatoes and pot-herbs flourish. There are well-grown firs here and there ; and wild-roses, and such-like plants, show a tolerable climate. In latitude, the place corresponds to the Scilly Isles. The wood for the houses and stages is got from the head of the bay, about the River of Exploits. Some of the logs were three feet round. A few years ago, great herds of seals came off this harbour, and many were killed. The men walked six to ten miles out to sea, and killed the seals with guns and clubs. The big ones are called 'harps,' and show fight ; the young ones are helpless. As soon as slain, the seals are flensed, and the blubber and skins of five or six are made into a package. Dogs and men are harnessed to this bundle, and the spoil is dragged home. Our host went out himself, and slew a lot of seals, with which he was proceeding on his homeward march, when a cry was raised of, 'Slip your seals and run.' The ice was opening. He stuck to his seals, but he presently came to an open lane of water. Others joined, and they broke off a piece of ice and ferried themselves across ; but there was another lane before them. Here another piece was freighted, but, this time, there was a man too many on board, and the ice-raft began to sink. There was a shout of 'Leap for your lives,' and one leapt into the water and swam. They all got safe to land at last,

but there were hundreds outside, and the whole sea was opening. It was a wild and fearful scene. Distracted women, on the shore, were shrieking and wringing their hands; dogs were howling in all directions; and men and dogs were struggling in the ice outside. A sudden change of wind drove the pack ashore again, and the men were saved—all but two, who perished. The ice breaks up here in June, sometimes in the end of July. The sea freezes to a thickness of eighteen inches in the harbour, but the pack and large bergs come drifting from the northward, and jam on this headland. One berg came in this year behind a hill, and the top was seen from the shore of the harbour. The hill is 270 feet high (by aneroid), so the berg must have been over 300 feet high. It broke up on the shore, and fell to pieces with a noise like thunder, or like the firing of heavy guns. A similar account of the death of an island of ice was given by an old man, at King's Cove. The water there is deep, and large bergs commonly drift to the mouth of the harbour. There they ground, and pour down streams of excellent pure fresh water. From time to time, the island starts and groans; moves and changes its line of flotation. At last, with a final roar, it bursts asunder. Like a dying whale, it makes a great flurry, and then the fragments set off on separate cruises. How the people in

St. Heliers or Falmouth would stare if a thing as big as the cliff at the end of Jersey or the Land's End were to sail in and explode there! After wandering about in the dark, for some time, got a boat, and went on board.

Saturday 30—Air 48°, water 40°.—Off Little Belleisle. Icebergs in sight when the temperature was taken, wind south; long rollers from the north. Passed near a small berg, which rose about 40 feet out of water. Made a sketch, and got the pilot to steer close to it. It was perfectly clean, and looked like translucent white marble veined with Prussian blue. The vessel had hardly passed when one of these blue veins opened about a foot, and the berg slid so as to alter its line of flotation. It made a loud, harsh, rattling sound, like near thunder, and rocked to and fro. Then it gave a second loud growl and settled. The captain shook his head, and said we were a great deal too near. This sound gave a better measure of the size than the look of the thing. It must have been 400 feet thick and 200 long. Passed many others of far larger size, but the captain gave them all a wide berth: some were guessed at 200 feet high, and they were certainly 150 above water. Most of this day out of sight of land, or nearly so; passed Belleisle in the straits in the night, and made *Henly Harbour at* 5 A.M.


MAP
Showing the
PRESENT POSITION
of a
MARINE GLACIAL
PERIOD.
Drift currents thus →
Icebergs
LABRADOR
Nain
Davis Inlet
Hopedale
C. Harrison
Esquimaux Is.
Hamilton Inlet
3 small bergs Aug. 2 1864
Sandwich Bay
Indian I.
South Brook
Seal Islands
Hawke Bay
S.C. Bluff
Large bergs 200ft high aground
St. Francis I.
C. Charles
Henley Harb.
Battle Harb.
Bellisle
Red Bay
Many small bergs
Mokichemun R. N.W. River
Lara a Head
Strait of Belleisle
C. Bauld
Hare B.
Groais I.
St. John's
Bell I.
Canada or Canary B.
Whittle
Bonne B.
ANTICOSTI
Is.
Bay of Is.
The Grand Pond
Red Indian L.
C.St. George
St. George B.
GULF of ST. LAWRENCE
NEWFOUNDLAND
Magdalen Islands
C. Ray
La Poile B.
C. la Hune
St. Paul
Miquelon Is.
Fortune B.
Dist. Pierre
Bank of St. Pierre
Green Bank
Gt. Bank of Newfoundland
PR. EDWARD I.
CAPE BRETON
Sydney
ISLAND
C. Breton
Northumberland St.
Bay of Fundy
NOVA SCOTIA
Cape Canso
Sable I.
Bay of Islands
Halifax
Banquereau
St. John
Mall Bay
Port Dauphin
Fortune Bay
Burgeo
Rencontre
Fogo I.
Badham Is.
C. Freels
Greenspond
Bonavista
Catalina Harb.
Trinity
Trinity Bay
Bacalieu I.
C. St. Francis
St. Johns
C. Spear
Avalon
Placentia Bay
C. Race
St. Mary's B.
St. Shotts
Ferryland
Torbay
Holyrood B.
Labrador
Hudson
Baffin

CHAPTER V.

THE LABRADOR.

Sunday, 31—Air 42°, water 37°—9 A.M., cold and cheerless.—The first view of the Labrador coast is very like the west coast of Scotland; for instance, the Sound of Mull without the high hills; but one strange contrast is the ice. Large masses were stranded everywhere in the offing, and along shore. They looked pale and ghastly in the yellow morning light. There were patches of snow on the hills, and great wet pillows of mist laid on their sides and tops. These hills are not above three or four hundred feet high, and all of one round pattern, except a square hill of columnar basalt, beside Henly Harbour.

Now, this place is about the latitude of London, the Bristol Channel, and the south of Ireland. The water is 37° in July; at the other side it is never so cold, even in the dead of winter. The reason of the marked difference in vegetation is the climate. The climate results from the direction taken by the Arctic Current, which brings a flotilla of ice. It never ends. As fast

as one island of ice grounds and bursts, another takes its place, and in winter the whole strait is blocked up by a mass which swings bodily up and down, grating along the bottom at all depths. Bay-ice a few feet thick, pack-ice, and broken bergs of all sorts and sizes, with anchor-ice below, all moving bodily through a rocky channel, must work notable denudation at the bottom of the sea in this strait. Steamed on to Cape Charles. All the low rocks in the straits are rounded and smoothed, as if by the constant wear and tear of ice moved by the current. Many bergs were aground in the centre of the strait, and one seemed to contain stones, but it was too far off to make sure, even with the glass. Got to Cape Charles at 8.30, after passing Battle Harbour. The rocks are pink gneiss, or, perhaps, syenite, contorted, with dark slate interstratified. They are all rounded. There are very few shells at the water-line, very little sea-weed even in the most sheltered corners ; but though these harbours are all frozen every winter, the rocks at the water-line are not striated. Picked up a scratched stone on the beach. Lumps of ice, the fragments of broken icebergs, are everywhere, aground and afloat, in all depths; but these big engines can only hit the rocks at the water-line where the coast is steep, and the coast shelves everywhere ; only thin

ice can touch the water-line at present. About 400 inhabitants are scattered about here during the summer. Their houses are mere wooden camps perched upon rocks. A few men stay all winter. The fishing-stages are long piers made of small fir-poles, and reach out into deep water, where boats can come to the end. The waves wash through the piles, and the floor of the stage is made of round poles, between which the water shines. A roof of poles, with fir-branches for thatch, covers the whole, and there is little provision for light. On this dark stage the fish are landed from the boats with pitch-forks, which are stuck into them as Highlanders fork peats. After the fish are cleaned, split, and salted, they are dried on "flakes." Made *Murray's Harbour at noon.* This harbour was blocked with ice on the 20th of July. The water-line is rubbed, and in some places striated. The beach consists of broken stones, and seems to differ in no respect from like beaches elsewhere. Many rocks are shattered as rocks are by waves alone, but all points are ground off within the influence of the ice. In this respect this beach differs from the other side. Some of the bergs had curious shapes in this neighbourhood. When their ways were better known these shapes were easily explained. Granite veins abound in the rock.

St. Francis' Harbour, at 2 P.M.—This is a small hole amongst the rocks, with a merchant's establishment and salmon-fishery attached. They are now catching about fifty a day, and complain that they are doing very ill. They have caught as many as 800 in a day. There is a river about thirty miles up the country at the head of a bay. These fish are working along the coast, and they are caught in a bag-net. The river is said to average a quarter of a mile in breadth. There are long still reaches, then a portage, and more still reaches. But it is very difficult to get anything like certain information, and no chart of Labrador is worth anything. Landed with two chums. A fog had come on, and the captain said he would stay all night; so we walked over a hill, and called at several houses to seek shelter from passing showers. One belonged to a hearty old native of Dorsetshire, who offered us tea, and all manner of luxuries. He said that he had once started from St. John's for Carbonere in a small vessel, with a cargo of rum, and a barrel and a half of water on board. It came on to blow from the westward, and they were blown off to sea. The first land they made was Falmouth, and there the whole country came to see them and their tiny vessel. The custom-house officers came on board, and they made them all roaring drunk with

the rum. He cut that ship and went up the Mediterranean, and now he has squatted here with his wife and family. They fish in summer, and in winter go up to the head of the bay lumbering. Fell in with an Indian, a half-breed, and an Englishman, who work the salmon-nets. Two of them had never seen a steamer, so we asked them to come on board, and fed them on tea and bread and butter. They described the interior of the country, which they frequent in winter, furring and shooting deer. It is well wooded; the trees are large and well-grown. The old sailor had said, 'There be trees there if you take a chalk in each hand and mark, you won't get more than half round.' Twelve feet round, is four feet through. There were plenty at 'the room' a foot through, but none of this size. In these woods the 'furrers' set their traps. 'It's awful work, sir,' said the Englishman. 'It's no use saying, This is a bad day: we won't travel. Travel you must, and the cold is fit to burn you. You have to carry all you want; and what with gun, and axe, and grub, and skins, it's a heavy back-load. It's a hard life, sir.' The Indian was an Esquimaux—a little, broad, fat fellow. The half-breed had a mountaineer for mother, and he was very good-looking, dark, with a hooked nose and marked eyebrows. He had the bearing of a gentle-

man, the absence of restraint and awkwardness—an instinct which told him how to avoid vulgarity or coarseness. How many a man who ranks himself a gentleman is but a spoiled savage, with his loud, rough, vulgar polish of town vice. The great fur prize is a black fox, worth £20 here, but the Indian had never seen one. The next prize is a silver fox, worth £15 to £20. These also are rare, but they can be got occasionally. Black, silver, and red may occur in one litter. The rocks are contorted gneiss, with many quartz veins. The hill-tops are all rounded and much weathered, so much that it is not possible to make out the direction of glaciation. The water-line is much rubbed; smooth, but not striated. There are few perched blocks at this place. The highest hills are about 400 or 500 feet high. The coast is a maze of lochs and islands, arms of the sea running in amongst the hills in every possible direction; there seems to be no symmetrical denudation. Icebergs are everywhere: a procession of large ones is passing outside. These break up, and the bits are carried in by wind and tide. These bits in their turn ground and break, and the little bits drift into the bays. A large block was hard and fast, close to a steep rock at the entrance of the harbour. It was far larger than the hull of a first-rate, and

the size under water was nine times as great. From this mass, fragments as large as ships' boats had fallen, and some dozens of bits as big as hogsheads were bobbing about in the land-wash close to the wharf. In the harbours to which we walked were bergs peering over the hills and low points. According to a man who lived in a small hut beside which one of these bergs had stranded, it had turned over several times, and dropped a load of stones where it lay. Sketched this one, but could not detect a symptom of a stone or a grain of sand in the ice. It was easy to trace various water-lines on the sides of the berg. The mosquitos would not let me sketch; it came on to rain, and then the sun came out, and shone right in my eyes. Found another berg aground close to the rocks. Levelled the top with a spirit-level, and measured the height with the aneroid; made it 45 feet from the water-line. This was a peaked berg, and a mere baby to many which we have seen. It was aground, and the fishermen said there was from 15 to 20 fathoms (90 to 120 feet) at the place (120 below and 45 above = 165 feet of ice). There is then a powerful engine at work here, and its marks are seen even at the water-line. Ten days ago men were walking on ice in these bays, and now that the bay-ice has disappeared, the broken bergs have come in.

The bay-ice works at the water-line ; the bergs in deeper water, where they are driven by the tide. The soil is a brown peat, very thin. The vegetation like Scandinavian ; but gray mosses and lichens are not very abundant. Birds are scarce : no game was seen all day.

In the bottoms of the bays, away from the cold stream, trees are '100 feet high.' The soil is deep and free of stones : turnips grow well, but 'the mosquitos are so thick that you can't see through them.' In winter, the snow is '6 feet deep in the woods straight up and down ; and 40, aye 50 feet deep in drifts and gullies.' So say the inhabitants.

The latitude agrees nearly with that of Cardigan Bay, Waterford, Yarmouth, and such-like places in the old country ; and the climate evidently results from the cold stream which flows down the coast. The air is now far warmer than the water below it, and the temperature rises immediately on leaving the coast. The immediate coast-line is bleak and barren ; the sheltered bottoms inshore are well wooded and comparatively fertile.

August 1, 1864 — *Monday*, 9 A.M. — Air 47°, water 37°.—Started early. Fine, northerly wind, and clear weather. Coast bold and rocky, with hills rising 500 or 600 feet. About Cape *Bluff*, patches

of snow were low down on the hills, within 100 feet of the sea. Called at Venison Tickle. On Thursday fortnight people crossed this sound on ice. The captain was in a desperate hurry, dropping the letter-bags into fishing-boats, and stopping nowhere. Watched the rocks with a telescope, and failed to make out striæ anywhere; but the water-line is everywhere rubbed smooth, and the rocks for a considerable height are perfectly bare. No sea-ware, no shells, no limpets, nothing but a few barnacles in clefts. The fishing is bad, but improving since the ice departed. A theory that ice has driven the fish off the coast prevails here also. At 9.30 the landscape was magnificent; to seawards five enormous bergs loomed like islands through a haze; they looked like familiar stacks and islands in the old country—the Bass, Ailsa, and such-like. The sun shone brilliantly in a blue sky streaked with fleecy clouds. In the foreground were great masses of old green rotten arctic ice, all water-worn; landward was a rough iron-bound coast, with small bergs dotted about close under the hills, and far up in the fjords; and these sparkled and glittered at the water's edge like Pentelic marble. It is very difficult to get a measure of these large distant bergs. A small vessel passed about half-way to one of them. The apparent height was about thrice that of the vessel,

distant about three miles. The mast being about 80 feet high, the berg must have been over 300. The steamer going six miles an hour in one direction, and the vessel going about the same in the other, we took two minutes to clear the berg on the horizon. Judging by hills at about the same distance, the berg must have been fully 300 feet high, and perhaps 900 long: at one-ninth out of water, it was 3000 feet thick; and yet old hands said it was small to bergs which are seen here in the spring. At 10.30 dropped letters at *Seal Islands*, and during the pause watched a small bit of ice polishing a stone. It seemed about the size of a hogshead, and it was resting aground in a small bay. The waves rocked it slowly like a white cradle, and it seemed to rub against a large round stone in the land-wash. This polishing movement could never produce striation, and no striæ are to be seen at the land-wash in these sounds, or on open sea-coasts near the present water-line. It is sufficiently evident that glacial striæ are not produced by thin bay-ice, but the tool-marks of this part of the engine are everywhere conspicuous in the rounded form of the stone. Striæ must be made in deep water, by the large masses which seem to pursue the even tenor of their way in the steady current which flows down the coast. It here moves at a rate of from two to three

knots, fastest in spring and fall, and it moves south-east. It is remarkable that up to this time we have only seen a few doubtful stones on bergs which we have passed. They are all worn, and from their numerous water-lines at all angles they have all been capsized, or they have heeled so far as to capsize any loose deck-load, such as a moraine, but fellow-passengers have seen stones frozen into bergs, though we have seen none to be sure of so far. All along this voyage it has been said that the land is rising.

The banks of Newfoundland are said to be getting shoaler.

At Bay Roberts, in Conception Bay, according to a gentleman who lives there, a rock which was barely awash when he was a boy—say twenty years ago—is now far out of water. It was marked in 1822, and in 1854 it had risen 42 inches (32 years at $1\frac{1}{3}$ per year). At King's Cove noticed a raised beach or bar, which first called my attention to the fact. There was a small fresh-water lake behind it, and it was manifest sea-work about 18 feet higher than the sea-level. Houses and stages were built on it. Asked an old man if the waves ever came over it in storms. Answer, 'Never.'

At Fogo, asked a man, who was mending his nets, if he had noticed any change in the sea-level. 'Yes,' he said; 'I have. The harbour rock there used to be very

rarely seen at low water spring-tides. It is now so much out of water that you might build a room upon it.' It is a broad flat rock, and it was two feet out of water when the steamer passed outwards. A merchant, who was with us, pointed out a fresh-water marsh, and said that they used to catch sea-fish in it not very long ago.

At Toulinguet the church is built upon a raised beach of rolled stones.

Near the River of Exploits, recent sea-shells occur in a raised beach.

At St. Francis' Harbour, asked a man, who has worked the salmon-nets for fifteen years, if he had noticed any change. 'Well,' said he, 'fifteen years ago, my boat used just to ground at the end of the stage at low water, with the nets in her. Now she grounds when empty, and that's a solid rock. There is a difference of a foot at least.'

Say an inch a year, and that comes near the measured rate at Bay Roberts.

Further north, at Holton Harbour, a man had noticed that the bay had got shoaler; but it was a sandy bay, and he thought the sand had drifted in.

Thus, for a distance of 600 miles, the coast-line is rising about an inch a year. Of former rising, there is abundant evidence in terraces and raised beaches. At

this rate of rising, all the hill-tops were awash not long ago, and in deep water at some time or other. It is on the hill-tops that marks of glaciation by large bergs ought to be found.

August 1.—*At* 2, *passed Bateaux*, a settlement amongst a lot of islands. Men were catching fish close to the rocks. One was working four lines at once. At 3 passed *Domino*. A great many boats fishing, but catching few. The wind cold; a few deep snowdrifts close to the sea. These islands are about 200 feet high, and rounded; the rocks veined with pink granite. Ran in to *Indian Island*, and anchored for the night, 5 P.M. It is about the latitude of Westport and Drogheda, Preston and Hull. It is at a corner in the coast, and if the hill-tops were sunk deep enough, they would be in the run of the large bergs. Landed, and set off for a walk. The low grounds are covered with a terrace of boulders, on which are pools and bogs. The highest hill is of black igneous rock, 400 feet high, and on it are stones which look like beach-stones. No shells were found. The whole of the high grounds are *roches moutonnées*, but much weathered. Numerous large blocks of light-coloured granite were perched on the tops, and strewed about in the lee of the dark black rocks. Striæ were made out here; direction, N. 35° W. magnetic, or nearly N.

½ E. true. Twenty-two bergs were counted from this top; the largest, far out at sea, moving southwards. One of the blocks of granite measured 6 × 5 × 4 feet. Another, of very coarse granite, gray, with large crystals of felspar, was twelve feet long. The rock on which these blocks were perched is a kind of hornblende (?), of which a specimen was taken. Made a sketch at 135 feet. The prevailing wind, as shown by scrubby bushes of spruce, growing like juniper, is N. 22° E. mag., or N. 62° E. true. Numerous deep snowdrifts were lodged on the sheltered or south-west side of these hills.

The lookout from the top of this island was a wide one; no higher ground was in sight. Far as the eye could reach, on a fine evening, the same rolling sea of low rocky hillocks and ridges extended landwards to the blue horizon, with gleaming sea-lochs and fresh-water lakes shining like polished mirrors set in a granite frame. There could be no higher hill in that direction for 50 miles at least. Three parts of the circle were bounded by a sea-horizon, studded only with islands of ice. The striæ on the rocks under foot, and the axis of the island, aimed north. The perched blocks stranded on the hill-top might have come from any distant place in that direction; at all events they were wholly foreign to the black glittering igneous saddleback on which they

rode in long procession. How came they to the top of the highest point of a promontory, thrust out into a circle bounded only by the horizon? Seated beside them, and looking out on this arctic landscape, near the latitude of Wales, the answer appeared to be clearly given. Though no bergs, with stones on them or in them, have been approached during this voyage, many on board the 'Ariel' have been close to bergs heavily laden.

Mr. Drysdale states that, a few years ago, a large island of ice drifted into Conception Bay, in Newfoundland, and ran aground there. It was covered with large stones, which lay *on* the ice; it broke up in deep water, and dropped the load. A large berg was seen by Mr. M'Donald, somewhere off St. John's, with a very large stone frozen *into* it. The bay-ice continually picks up stones about the water-line in winter. The main current which carries all this ice moves southwards, and trends westwards, hugging the coast; but every promontory turns it eastwards, off the land, and makes an eddy in the lee. In winter anchor-ice forms at the bottom, even in deep water; it must also form about the base of stranded bergs, and these may thus gather heaps of gravel, sand, and stones. When bergs turn over they often lift stones, according to the fishermen.

In deep water, high points only are touched by the base of heavy bergs of the largest size; but bergs of all dimensions fit shallower water. If any point rises towards the surface, high enough to escape the bergs altogether, it is then washed by waves in summer and attacked by rafts of bay-ice in winter. This part of the engine carries everything portable from the rock. If a rivulet has managed to build a small delta of sand during the summer, it turns to stone and gets fast to the end of a raft of sea-ice in winter. On a coast-line of some hundreds of miles there is scarcely a sandy beach. On a sea-bottom rising through a sea affected by such a climate, no stones could remain but blocks of large size, able to resist waves and bay-ice. Accordingly, on these island hills few patches of gravel remain, but large stones were seen on every hill-top that came within range of a powerful telescope throughout the voyage. Rocks awash and rising are touched by heavy bergs on the sides only. Many rocks were seen in this condition, awash with stranded bergs around. But if a whole tract of country ground down to one general level, and fifty miles wide, is rising to the surface bodily, the main current is thereby turned, and the action of ice islands transferred to deeper water at once. If glacial striæ be marks of sea-ice, they ought to coincide with the direc-

tion which the current would follow if the place were submerged. Here the striæ do point up stream.

If this country were submerged and rising, the current would flow over this island in the direction of the striæ found on the hill-top; and small bergs would touch the hill-sides after the top had risen, as small bergs touch the sides of rocks in the sound; finally, rafts of bay-ice might gather and drop, and pack in flat layers, the terrace of large boulders, which rests on the shore side of the scored rock, as bay-ice now packs the beach. If this land goes on rising, the sound through which vessels and small bergs now sail and drift will become a terraced isthmus of drift, crossing the run of the stream, joining a peninsula of glaciated rock to a rolling country of like nature. In Scandinavia and in Scotland similar forms abound at high levels. It is a case of 'crag-and-tail,' but in this case the tail crosses the stream. Where the sea has full swing and the rock is brittle, this coast-line breaks into cliffs; but these are exceptions. The top of the country is very like the top of Dartmoor and Cornwall; the edge of it, as a rule, is unlike the broken water-line of the British coast. The cause is the climate, which results from the course now followed by the Arctic Current. Because a stream of cold water now passes along a rising coast, waves

only beat upon it in summer. In winter it is protected by a breakwater of ice; so cliffs are rare. But the floating breakwater is a moving engine which saws rock whenever it moves: the edge of it is armed with the stone-dust which it wears off, and picks up every frost, and the mark of it is conspicuous in the Bay of Fundy, at Cape Breton, and on harder rocks along the coast of Labrador at many exposed spots. In sheltered nooks ice forms and melts, rises and falls, and does not even stir the legs of fish-stages. Looking out then from this advanced post, part of a great denuding engine was seen at work. On the horizon were bergs of the largest size, probably 2000 feet from base to crest, moving steadily southwards at a rate of two or three knots; nearer in were smaller bergs in the eddy—some moving, some aground. Still nearer were smaller islands of ice, 40 feet out of water, and aground amongst the islands; and in the sound were a shoal of 'growlers' as big as sloops and boats and casks, bobbing in the waves, and all moving one way with the stream, against the wind. Surely the spoor of the Arctic Current was under foot, and surely the stones at the shore-line and at the base of the hill were the chips of the engine which ground the flat rocky country on the western horizon.

But the movements of solitary icebergs at this particular season appear to be too erratic to account for glacial striæ which keep one general direction over whole tracts of country. Floating hills, even though 2000 feet thick, must give way to fixed rocks, and turn aside; but striæ often run over considerable hills.

The engine here working appears to be the only one in existence able to do such heavy work. The spring and winter drift has passed down this coast for countless ages. This year it was one vast solid raft of floes and bergs. It was more than 150 miles wide, perhaps 3000 feet thick at spots, for some bergs were 300 feet high; it was probably more than 300 miles long. It has been driven by a whole current bodily over one definite course, year after year, ever since this land was found. Nobody sees it in winter, so no one knows its full power; but the sealers who work their perilous trade about the broken edges of the shattered mass, in spring, know to their cost how terrible is the march of this marble country of hill and plain, which grows together and breaks up into scattered mountains every year. If Ireland were shaved off at the sea-level, turned upside down, and set afloat in a shallow sea, the highest mountains would about equal the dimensions of the largest bergs, and the area would not exceed that of

the ice-drift which passed from Cape Harrison to Cape Race in 1864. Islands of ice, with bases of frozen drift, hemmed in by such a mass, driven on by a whole sea, moving at two or three miles an hour, seem to be engines of greater power than any glacier yet seen or described, and amply sufficient to account for European glaciation in similar latitudes. Like an army advancing in line, each part of the raft must take a line and keep it; when the mass joins. The spoor of this current must be a wide one, with a general direction, and a depth equal to that of the largest bergs. Off this coast it may extend 3000 feet below the present sea-level, and 300 miles from the coast, with a general direction from N.W. to S.E.

The stream begins at Spitzbergen, lat. 80°, and ends about lat. 36°, and its general direction is from N.E. to S.W., wherever land does not turn the stream.

Tried to return by the shore, and stuck fast in a cliff. Scrambled up again, and got down on the other side at a place where a boat was hauling caplin. They shot a seine in a rocky bay, and hauled it into the boat. They ladled the fish out of the bag with a landing-net, and got a vast haul. Another fellow was heaving a casting-net, and got a great many amongst the stones. These little fish come to land in myriads. They go in shoals

of males and females. One haul will hardly produce a female; another boat will be loaded with females only. They run ashore to spawn, and it is said that two males and one female run side by side to land, the males helping to press the spawn from their mate. This is commonly asserted by soi-disant eyewitnesses. Joined company with a small imp of a boy about twelve years old, who had been fishing all day, and had all the bearing of an experienced old man. He asked us to come in to the house where he lived, and when I gave him a quid of baccy he stuck it into his cheek, and began to chew with all his might. Picked up several chalk-flints, with chalk adhering to them. They looked strange in this land of primitive rocks. Went to the house of Mr. Warren, who keeps a register of temperature, and a journal, and who lectures on Labrador. He says that in winter the temperature is sometimes −37°, and varies from 70° to 18° within twenty-four hours. His glass is placed against the southern wall of the house. At the bottom of Sandwich Bay, turnips and potatoes grow well, but cucumbers will not. On the islands nothing grows. They keep a few sheep and goats, and some cows, but these are brought in the vessels in spring, and are slaughtered and eaten in the fall. Here are some quotations from Mr. Warren's

journal for 1864, which was kindly placed at my disposal :—

Monday, June 11th.—Ice coming in again.

14th.—Cove and harbour full of ice. Between the pieces of ice the water froze so hard, that the seal-boats in the morning with great difficulty forced their way through. Keen wind.

16th.—Thermometer in shade 68°, 9 A.M. ; 95° noon.

28th.—Iceberg grounded in cove, and broke up, having capsized.

The journal chiefly relates to fishing, which was 'very bad indeed' at first, and to the behaviour of the men, one of whom seemed to be continually 'drunk and abusive'—a state by no means rare in these regions. About 1000 sail passed this station, according to Mr. Warren ; one of these, a Yankee yacht, has gone north, and means to get as far as possible.

Went to see the splitting process. It was a strange scene. The stage, a long low building of fir poles and branches, is perched on the rocks, so as to project over the sea. It is like a long windowless house on a wooden pier. In this long room a number of double-beaked tin lamps hung flaring from the roof. The day's take—perhaps 1500 fish to a boat—had been thrown up with pitchforks and lay in a heap at the sea end, where there is a

double door for the boats. At the word 'Fish up,' a shower of cod-fish was thrown from the heap upon a table, where stood a mermaiden clad in sailcloth, and covered with blood and slime. Seizing a fish by the 'skruff' of the neck, she stuck a long knife into his innocent dead throat, and at one slice she ripped him up from stem to stern. A turn of the wrist and the fish slid to a dark-browed dame called the "header," who tore his inside out, broke his neck, and twisted his head off. The body slid over to the splitter, an old rough bearded, brown-faced, gory mariner; the head and offal slipped through a hole into the sea, and the fat liver fell with a soft oily plump through another trap-door into a vat. Seizing the headless trunk with his left hand, one long tearing slice by the splitter cleared the backbone on one side, and then with a flourish of the knife a second slice from tail to head cleared it out, and down it went through the table, after the head, into the sea, plump. The split body slid off the table into a wheel-barrow, and by that time a second headless trunk was ready to be boned. In one minute 7 bones were cut out by one artist, another extracted 9, and a third 10; three gangs at this rate split 1500 fish in an hour at one stage alone. The barrow when filled was wheeled along a plank, and the load stacked, back downwards, with layers of salt shovelled over each bed

of fish. After about ten days the salt-fish formation is quarried, and laid out on stages made of branches and poles, called flakes, and on beaches of dry stones rudely arranged. In the fall they are sent home 'green,' to be cured and dried on flakes at St. John's and elsewhere. In rainy weather the green fish are piled and thatched with bark and old sails. After this bloody exhibition, stumbled over the poles, through the piles of slain, and went through another stage to the boat and on board.

August 2.—Crossing *Hamilton Inlet*, about the same latitude as the Isle of Man—Air 42°, water 37°.—Passing through a scattered fleet of broken bergs with fresh fractures and strange shapes. One was like a marble monument with a gigantic figure laid out on the top, and a leopard's head looking out to the sea at the end. This strange sculpture of wind and weather was 40 feet high at least. Another was like a giant bust of the Duke of Wellington, 50 feet high; in five minutes it had changed into a tall obelisk overhanging its base. Another was like a couchant hind. The glassy sea was dotted with these strange white marble edifices, telling sharply against low blue hills and distant islands; and here and there a dark round black rock peered above the water like a sleeping whale. It was a strange wild landscape, and very beautiful in its

own peculiar way. Ran into Indian Harbour, and then, after visiting Mr. Norman, and jawing cod-fish for half an hour, got a pilot. Steamed on to Holton Harbour, and anchored for the night, having sighted Cape Harrison. Landed and walked up the country. Found a series of bogs and low round rocks, a shallow sea, and large stones everywhere. The vegetation is peculiar: the forest consists of a stunted scrub of spruce, betula nana, juniper, etc., cut over by the wind. It is sometimes less than a foot high, and spread so that it is easy to walk on the tree-tops; it is sometimes six feet high with thick stems. In other respects the country was very like Hammerfest. The prevailing wind is N.W. M—— fished in a lake, and hooked a char. At night the sky burned with a magnificent aurora. It seemed to rise from a point on the horizon towards the magnetic north, as from a volcano, up to the zenith; and it streamed southwards, wavering like a great downy golden feather of yellow fire.

Our Indian Island pilot came into our berth to sleep. The missionary cross-questioned him for a full hour, while the rest of the inhabitants dropped sleepy remarks plump into the conversation, and the old pilot snored like a south-west storm. This pilot speaks Esquimaux as well as English. He did speak the French language, but now he mixes it with Indian. At the head of Ha-

milton Inlet, about 150 miles up, is a large 'room' (that is to say, house), and a station of the Hudson's Bay Company. The Indians cross the country in about a fortnight, to Musquarra, near Anticosti, where is another station. The route is a canoe-route. Each man carries a blanket and a 'stand-by'—to wit, some food. They hunt, by the way, deer and partridges. There is a settlement in the inlet. The man has been here for fifteen years, but he has never been up to the end. The missionary's list of animals inluded lemen and marmot (whistler), white owls, and no end of birds and beasts. At a short distance from the sea-coast, the country is hilly, wooded, and marshy. Trees grow to be 'three feet through.' There are pines, 'aps,' and birch, but no hardwood. The hills are very rocky. There are a great many mountaineer Indians, who work for the Hudson's Bay Company. They are tall well-made men, unlike the Esquimaux, who are short, broad, squat, brown, and fat. Most of them read and write.

So the interior, beyond the influence of the cold current, has a different climate, and a vegetation less arctic and weatherbeaten.

On the 24th of July, the mouth of Hamilton Inlet, latitude of Donegal and Morecombe Bay, was full of heavy drift, 'pan-ice.' The outer limit of it could not be seen

from the highest hills. On the 1st of August no clear water was visible, except inside the islands, and this day the inner edge was still visible, while the ice-blink in the sky marked the place where the pack had gone. Outside of Holton Harbour, and to the north of the Esquimaux Islands, large bergs were seen at sea. Below the islands small broken bergs only were seen ; but many were aground, and some in contact with the rocks. It seems that the ice here works south and westwards, and is broken and shot off eastwards at corners. In the lee of capes and clusters of islands, small bergs abounded in the eddies ; but the large ones were at sea, on the weather side or far off. The effect of this heavy ice on the water-line is here conspicuous. A berg, about 40 feet out of water, was aground, at the back of one steep island. It seemed to have taken the form of the rocks, against which it was ground by a heavy swell. The ice was actually rubbing the stone for that height above water, and for 400 feet under it. It was moved by all the power of an Atlantic wave. Along the whole coast, for a height of from 40 to 50 feet, an irregular zone of rock is thus scoured bright and smooth. No seaweed is at the water-line; no lichen colours the rock near it. It is raw stone, smoothed and ground. Higher up, a stunted vegetation begins suddenly, but luxuriantly.

The stone is blackened with lichens, and hollows are filled with peat, covered with cloudberry, crowberry, rhododendron, and Indian tea, as thickly as a Highland moor is clad with heather. Gray reindeer moss makes a soft carpet for the feet, and hides the soil, which is the debris of this arctic vegetation. For a height of 50 feet, the rocks are polished by the ice-foot, and by fragments of small bergs; beyond the actual mechanical wearing of ice, the vegetation is nipped by the cold; but beyond the immediate influence of the cold stream, the vegetation struggles with the cold, and successfully. The climate of lat. 71° is carried to 55° at Cape Harrison, and to 47° near St. John's, and 45° near Halifax; but inland, the cold breath of the Arctic Current fails to blight, and the sun's rays have power enough to force the earth to wear a coat of shrubs and a cloak of forest trees. At Hamilton Inlet trees grow to a large size; at Colinet, in Newfoundland, the climate is better than it is at Holyrood, 30 miles away, for trees are twice the size; at Windsor, in Nova Scotia, the western fields are worthy of the old country; at Halifax, 40 miles off, the eastern forests look like Sweden, and the land has 'too much bare bone' for farming.

At Washington pines grow near the coast. In the same latitudes in the central district, no pines grow in

the forests of Ohio and Kentucky. The same thing is repeated everywhere on the Atlantic coast. Wherever the Arctic Current flows, it carries an arctic climate. Wherever the Equatorial Current lands, it carries heat. Cape Harrison is in lat. 54°, and therefore corresponds to Achil Head, Carlingford Bay, the Calf of Man, Lancaster, York, and Flamborough Head. An arctic current may explain glacial phenomena in these regions.

Cape Race is about the latitude of La Rochelle, in France. One is a sunny fertile land; the other is only fertilised with fish-offal, and scarce got a glimpse of the sun in 1864.

August 3—Air 42°, water 37°.—Fine day, N.W. wind, bright sun, and clear sky. Passing southwards across the mouths of Hamilton Inlet and Sandwich Bays. At 11.30, off Partridge Harbour, a small nook crammed with fore-and-afters going north with salt to fetch fish. The Mealy Mountains, the highest land yet seen, were in sight to the westward. The range seemed to be about 1500 feet high, and a few patches of old snow were dotted about. At about 10 or 15 miles from the coast the low hills are covered with trees. The whole coast is a maze of rocky islands set in a blue sea studded with broken white bergs. At any moment a dozen or more could be seen from the deck; many of

these were stranded on rocks; and they were scattered in clusters where large bergs had newly broken up. The shapes were fantastic in the extreme; the new fractures angular, like white sugar; old water-lines rounded and smooth, and pitched at every possible angle. Stopped at *Pack Island*. The rocks are about 180 feet high, and consist of a black hornblende (?) which weathers easily. No striæ could be found at the top; but the water-line in a narrow sound was polished and striated in the direction of the sound about N.N.W. This seems to be fresh work, done by heavy ice drifting from Sandwich Bay; but, on the other hand, stages, with their legs in the sea and resting on these very rocks, are not swept away by this ice. If this be old work, done by extinct glaciers, bred upon the Mealy Mountains, then the sea protects the old work, and the air destroys it. Thermometer on shore, 62° at noon, and the sun very hot on the rocks. The captain took it into his head to start an hour before his time, and having started, to make our boat row half a mile in his wake. General growl from those who wanted to go and those who wanted punctuality. At 4, stopped at Long Island. Went to the top. The sand is decomposed granite; ripple-marked by the wind; the prevailing wind N., magnetic—say N.E. The rock is light-coloured granite,

with lumps of dark mica-schist enclosed. Thermometer, 70° on the rocks ; 60° on the hill-top ; mosquitos abundant and bloodthirsty.

The rocks at the water-line are all smoothed and ground, the tops rubbed off horizontally. As the land is rising, this form is the result of marine glacial denudation.

Passed a berg near Greedy Harbour, and when the busy and thirsty crowd had landed, went with two chums to see it. It was aground in 90 feet of water (15 fathoms), the height was about 18 feet, and the shape out of water very irregular. A progeny of small 'growlers' were bobbing about near the parent berg. Got alongside one and tried to capsize him, but he was too much for us. The surface was barely a foot out of water, and the mass was larger than our boat. The proportion of ice above and below was about as much as if the boat were floating on end, with a square yard of the bow out of water. Broke off a lot of ice, and with great trouble hauled about a cart-load into the boat. It was like glacier-ice, full of hollows and bubbles, and very hard and cold. When melted the water was good to drink. Cut out a cube and floated it in a tumbler of salt water, and carefully measured the depth and height with a pair of compasses and a fine scale. The proportion was 9

below to 1 above. The mass visible is therefore one-tenth of the whole mass. A cubical berg 300 feet high is 3000 feet thick; but peaked, prismatic, pyramidal, and jagged bits may be far higher than this visible proportion, which depends on the mass and its shape. Many people on board assert that ice occasionally sinks. Off St. John's, and far south, one man was in a perfect jam of pan-ice when he went to bed. In the morning not a morsel of ice was to be seen anywhere, and the watch said that they had seen the ice founder. If a jam of rotten ice breaking in water at 37°, came suddenly into water at 69° or 70°, which is the temperature in the Gulf Stream at the tail of the banks, it might well crumble and melt in a few hours without sinking bodily. Green says that he has seen ice go down beside a wharf. Many others assert that bergs founder and sink. We had hardly left this berg when it gave a loud roar, and sank considerably, but it was much worn and split, and it only slid down and took a new position. If it fell on a point of rock it must have smashed it. A strong tide ran in the sound, and this great mass must have pushed with great force upon rocks and stones at the bottom. It was but a small fragment, but it was as big as a large warehouse. Greedy Harbour earned its name that night: thirst was

quenched. A noisy stoker was thrust into the coal-hole, where he cursed himself to sleep. The missionary put his head out of bed and said mildly, 'Is not that most awful! Did you ever see such a disgraceful scene in your life, sir?' I never did, and that's a fact.

August 4.—Fine day, N.W., strong breeze. The bergs sketched on the way up are in the same positions. Many of them are aground ten and fifteen miles from the shore, but some have departed. The force which worked on these rocks is the pressure of a whole current of three or four knots upon the area of ice submerged, perhaps 2000 feet square. Landed again at Indian Island.

Looking to the places which were visited on the way north, evidence of the rise of land is plain. Close to the water's edge are raised beaches of boulders, and they have a definite shape. Terraces of erosion, though very much weathered, are also seen high up, and the shape of the land at the old sea-level is that of rocks awash and under water. On the top are perched blocks, where they must have been dropped. Terraces generally are not so well marked as in Scandinavia.

Stop at American Tickle, a small island with a sound full of vessels. Rock, pink gneiss or syenite, with bits of blue gray micaceous schist altered and

inclosed. A raised beach is near the sea. A good-sized berg was aground close to the rocks. Beaches on this coast are rare : they are short, and rest in hollows in the rock, and they consist of very large stones of many kinds. In low islands these beaches do not occur near the tops. In higher islands they seem to occur here and there at nearly the same distance below the top, and they recur elsewhere at a short distance above the sea, forming narrow necks of boggy land, points, bars, terraces, and occasionally an isthmus. They seem to be deposits made in deep water, and preserved only in spots which were partially sheltered from heavy seas when the land was rising.

Friday, August 5.—Warm southerly wind, bright sun, mosquitos in clouds. They came on board at the harbours, and took their passage and meals on board, paying with a fine nasal performance on the horn. Called at several ports. At Hawkes Harbour is an isthmus of boulders and a raised beach. Bergs seen on the way north are in the same position with reference to each other and the land ; so these are aground. Some of the most distant have departed, so they were afloat. The water-lines have changed in many cases, so the whole have moved and worked on the sea-bottom. Many of these, at the rate of $\frac{1 \text{ above}}{9 \text{ below}}$ water, must be as

large as Arthur's Seat. One was fully 250 feet high, and if squared, it would still be fully 100. At the measured rate it may have been 900 feet deep. It was in contact with a rock nearly awash. Here is a hill of ice beating upon the side of a submerged hill of rock, and driven by the whole force of the stream which carried the rest away; and in spring and winter the force of a raft of ice hundreds of miles wide is added. Near Venison Tickle—air 60°, water 44°. To seaward were banks and masses of cloud and low fog. These had a definite shape, and lay in the direction which the bergs must have followed when they drifted southwards. Damp S.W. wind at 60°, in contact with ice at 32°, must condense. So these distant clouds probably contained vanished bergs. Passed Cape Bluff, where a cod-seine was at work amongst a lot of hand-line fishers; and a lot of bergs were bobbing about and resting aground. On the hill-tops large stones were perched. The water-line here is a broken cliff. Ran in to Dead Island, passing between a stranded berg and the shore. A number of boats were fishing close to the ice. Stopped to ask the way, so took an opportunity to make a rapid sketch. The boats gave a good measure of size, and when this mass was left behind, distant bergs could be measured by it. Many must be over 200 feet. Ran in to Ship Harbour, and

anchored for the night. This is a quiet calm sea-loch, with high hills rising steeply from the water's edge. The flakes and huts are upon a well-marked terrace of boulders. Two small bergs were sailing about close to the flakes. Sat down to sketch them under an umbrella, and found that they were moving slowly at about a yard a minute down wind and across the loch. The wind does therefore act upon bergs; but very slightly. Many of our crew landed and went off to other harbours. Some fell into difficulties—over rocks and into bogs; but they all appeared at various hours of the night.

Saturday, August 6.—At 9.30 stop at Murray's Harbour and sketched a stage. Got some fish from a shore-boat. This bay is studded with small bergs. Thermometer—air 42°, water 37°. The sea like oil, and the sun bright. The sea-ice is evidently working westwards in-shore as far as it can. The harbours are full of small pieces, the creeks full of little bits. Further off are clusters of larger broken bergs—some higher than the masts of small schooners which are becalmed near them; some twice the height. In the distance are larger bergs, some with the light behind them telling dark as hills and islands of trap; others glittering in the sun's rays like wet chalk or polished marble. Yet even these are but ruins, for they are split into peaks

and obelisks which look like the Mer de Glace as it is on the way to the Col de Géant, at the great ice-fall.

In the distance was a fine double refraction, a second horizon with a second fleet of inverted bergs. As the vessel rose and fell on the swell the two horizons met and parted, and their bergs rose and fell. A stratum of cold air lay on the water, and the layer above was a mirror to rays falling at a small angle. Air 42°, water 37°.

Ran in to Battle Harbour, and found a large berg close to the stages. Began a sketch, but the steamer as usual set off in the middle of it. This, the entrance to the Straits of Belleisle, is crowded with bergs of quaint shapes.

At this place a boat manned, or, it may be, womaned, by Esquimaux, came alongside. They were dressed like other fisher-folk, rowed like sailors, and were steered by a sturdy, rosy merchant, who looked very like a Scandinavian descendant of the Vikingr out on a cruise in a whale-boat. The crew had never seen a steamer before, and the steersman was kind enough to explain the wonder in Esquimaux. That mellifluous speech is not taught at English schools; but the expression of the auditors' faces, their looks and gestures, and Saxon words introduced into the lecture, made the meaning pretty clear. The yellow-bearded commander was telling his brown dependants that the 'Ariel' was alive, and

those on board were summoned to help to prove it. The black-haired, half-tamed students of natural history were very much amused, but they were too clever to be gulled, if there be truth in human expression. When the 'Ariel' wagged her tail, and swam out of the harbour, panting, they seemed ready to caper with delight. They were a people of very quaint shape—beardless, brown-faced, black-haired, blubbery, flabby, seal-like, fish-eating, sleepy, good-natured, savage Christians. They are not like fisher Lapps in Scandinavia, who are bonnier, soft-looking Christians, with similar complexions. They are very unlike mountain Lapps, who are tough, wiry, hardy little mortals. These follow Banting's rule unconsciously, feed upon flesh and milk in mountain air, and can walk like wild-cats and other carnivora. Like them, the 'red-skins' and 'mountaineers' of this side, who live by hunting, and feed on flesh, are tough and stringy, well-featured and bright-eyed. Fisher Lapps and Esquimaux, who feed on fish, are somewhat fish-like; and the last grow up within natural fat greatcoats, like seals of the glacial period in which they live.

The architecture which we have seen is very like that of cranoges and lake-dwellings in Ireland and Switzerland. Though a very large, highly-civilized population is busy on this coast, scarce a yard of

masonry exists in Labrador. Wooden buildings are placed as near the water as they will go. They are chiefly built of rough fir-poles, with the bark on; and many of them stand upon stilts in the sea. Beside them are 'kitchen-middens:' piles of severed crania and vertebræ of marine species, mingled with gnawed bones of terrestrial mammalia, amongst which Bos Salinus and Porcus Chicagensis Americanus predominate. A few circular bone and metal ornaments, to wit buttons, some glass beads worn by the mermaidens, and some broken bottles, might be found amongst cods' heads and beef-bones. A few remnants of fur-bearing animals, egg-shells, old rags, nets, dry biscuit, and such-like, might be preserved, with some rusty iron; but as sea-water had almost eaten up a trowel, used to build the Skerryvore lighthouse, in about ten years, the few iron tools carried to Labrador have small chance of preservation. Very little crockery finds its way to land. Human remains, and implements buried with them, indicate a very low state of development and civilization; shells and scratched stones demonstrate the existence of severe cold and a glacial period far south. The Esquimaux still use bone instruments; the Indians bows and arrows, and stone implements; and these men are buried where their savage ancestors lived and

died; but very few of the 50,000 strong healthy Caucasians who people the sea in summer leave their bones in Labrador. Their remains are buried near stone churches and flourishing seaports in Newfoundland. In similar latitudes are civilized communities, who speculate on stone hatchets and human skulls. The present state of things between lat. 60° and 54° may throw light on the archæology of Denmark and Switzerland.

Ran in to Henley Harbour, and anchored for the night. Here is a large raised beach of big stones, about forty feet above the sea. It rests on slaty altered gneiss, which splits easily, and on this rests a square block of columnar basalt about 250 feet high. It is part of a sheet of which another block rests on a neighbouring point, and the sound and harbour are 'denuded.' In the warm evening light the view was very fine. Belle-isle and the low coast of Newfoundland beyond the blue strait might have been the coast of France seen from Dover, but the blue strait was everywhere dotted with islands of ice. Thirty-six large bits were counted; the small bits were numberless, and the temperature of the water was 37°. The ground was clad in an arctic dress of mosses, and Indian cup and berries; but inland a few forest trees showed that the climate was better within a few miles of the sea.

Examined the beaches and rocks at the water-line, especially in sounds. Found the rocks ground smooth, but not striated, in the sounds. Where the waves break on points, the brittle rock is broken here as elsewhere. The beach-stones are like beach-stones at home; mussels, coral, and whelks, are the shells. The crowd sent a dog into the water after a stone. The dog's master pursued him with boulders, and belaboured him with a board. He explained that he was a sporting-dog, who would be spoiled. Got on board and went to sleep. Provisions reduced to salt beef and salt pork, both hard and high.

Sunday, August 7 — *Red Bay.* — Landed half-dressed and found some striæ perfectly fresh at the water-level, but weathered out a short distance inland. A great number of large stones were in the water, and they were of many kinds—granites, and such-like. The direction was E. half N. mag., or nearly N.E. true. There are no high hills, and by the chart this direction accords with the run of the coast, and cuts diagonally over a point. The tail of the Arctic Current has therefore made its mark, where it is now moving S.W. In winter this whole strait is frozen. It is possible, though dangerous, to pass it on the ice. The bergs are numerous; many of them bring stones in the spring; many of

them ground. The whole mass moves S.W., and with the tide N.E., but most to the S.W., and the striæ are found aiming S.W., while the land is terraced, and rising slowly from the sea. Got to Lans-a-loup; anchored, and landed. The cliffs are sandstone, and terraced. The strata are nearly horizontal, and the weather has broken out fantastic doors and windows. The sailors find out a resemblance to forts and castles. The prevailing wind seems to be N. mag. N.W. On the hill-tops are numerous large perched blocks of stone, like the rocks further north. The cliffs are crumbling with frost. There is a marked difference in the vegetation; grass abounds. Mosquitos are furious. Found no sign of any means of getting up the coast to Quebec. So, *nolens volens*, stick to the ship, and go back to St. John's. Salmon are to be got here, but there is no large river. A sporting parson has caught a few small ones with fly. Our priest held a congregation, so attended. The first part was a sensible lecture to the men ordering them to work for their master, who reported that some did not do as much as they ought. They are all working on credit, paying with labour for food and gear advanced by the merchant or planter. A man who does not work is therefore robbing his creditor. As merchants thrive, these men must be honest workers,

though they are poor. The second part was a series of short prayers, repeated a vast number of times, very rapidly. The father's mission is to give the faithful a dispensation to fish on a coming saint's day if they will give their earnings on that day to build a church in St. John's, and so 'bring a blessing on their own labours.' There is precious little to be got here now for church or layman. After church set off again, and steamed up the straits amongst the bergs once more. As night fell, the old pilot pointed out to the captain that Belleisle was on the starboard hand, whereas it ought to be to port. The captain laughed him to scorn. In the night the vessel ran stem on to a cliff in Newfoundland; but happy go lucky they saw it through the mist, stopped the engine, and got round the cape all safe. This is the most experimental of navigation. Twice we have almost touched the cliffs with the bows; we have shaved rocks, of which we knew nothing; we have run into wrong harbours; we have stopped to ask the way; we have groped through dense fogs, without a chart, to places where no one on board had ever been; but somehow we have got out of the mess, and clear of Labrador, and now it is straight running back to Newfoundland. Our captain deserves infinite credit for his unwearied care of the ship and crew.

CHAPTER VI.

THE LABRADOR.

Monday, August 8.—According to experienced men on board, the currents in the Straits of Belleisle are uncertain and vary. When the wind is from the eastward the flood-tide runs three or four knots an hour to the westward, and during the ebb it is about slack water. The rise, full, and change, is about six feet. When the wind is from the westward the current from the gulf and river St. Lawrence overcomes the ocean-current; but generally there is a constant set from the ocean westward. The same current passes down outside of Newfoundland, eddies round Cape Race, and has caused many wrecks at St. Shots. Beyond the eddy the outer current meets the current from the straits in the gulf, and the two flow together down the coast of Nova Scotia, while the Gulf Stream flows the other way outside. So say captains who know the place; so say the chart and the sailing directions. The water is getting shoaler on the banks of Newfoundland. As the coast is rising, the sea-

bottom is probably rising also. In the fall of this year, off St. Shots and St. Mary's Bay, the sea retired suddenly to a great distance. Several wrecks were uncovered, and the bottom was dry for several miles. When the sea returned, it came with such violence that the people were terrified and fled to the hills. Boats were swamped, stages destroyed, and generally there was a grand disturbance. No shock of an earthquake was felt, and there was nothing peculiar in the weather, which was fine. This looks like a submarine eruption. A man on board says that he noticed flying fish and gulf-weed off Cape Race this year. These are marks of the Gulf Stream, and were several degrees farther north than usual. The summer has been very bad, cold and misty. An unusual quantity of ice has been on the coast. It seems that a shift in the warm Gulf Stream has dislodged enough of arctic ice to bring down a fresh charge of cold. In Canada, away from the ice, the season was unusually hot, dry, and clear. A man who has had some experience of ice has never seen a stone on a berg in these latitudes. Captain Anderson, of the 'Europa,' who is a geologist, has never seen a stone on a berg in crossing the Atlantic. No stones were clearly seen on this trip; but bergs do bring stones to the straits frequently, according to men who live there. At Lans-a-

loup, large blocks of granite and other hard stones are deposited on sandstone hills at 200 feet above the sea-level, and there is no high ground from which a common glacier could come.

A fair take of fish for two hands in a boat, during June, July, August, and September, is about 200 quintals hereabouts.

Thermometer 48°, wind N.E., strong breeze, all sail set. At sea passed some large bergs in a haze at 7 A.M.

In the evening the wind changed to a N.E. gale, cold, rainy; ship rolling, and many sick.

Tuesday, August 9.—Twillinget or Toulinguet. Fine day, strong breeze N.E., bright sun. The highest hill about this place is 270 feet. Walked up, as the captain did not like to face the sea. The landscape is a wide stretch of low rolling hills, points, islands, straits, lakes, and fjords. There is vegetation in plenty, and some trees, chiefly small spruce, grow. The marshes and low grounds are thickly covered with rhododendron and Indian tea, berries and wild flowers, amongst which are wild roses and blue bells. There is a great deal of cultivation, and the potatoes, etc., look well, and are good to eat. The main difference in the vegetation here and in Labrador is the absence of reindeer moss. The town is built upon a raised beach. The hills have the form of

glaciation ; but the rocks are so weathered that no ice-marks were found away from the water-line. In the spring of this year, about 150 sail of sealers were beset off this harbour. They were frozen in from Easter Sunday (March 2) till May. The crews, 1500 men, used to walk five or six miles over the ice to shore, and the inhabitants were obliged to feed them. Adventures were numerous, of course. A great many vessels were crushed and wrecked. When the ice moved south, they were smashed and ground up. One vessel was forced up on a large pan of ice, and floated past St. John's ; a steamer was sent after her, and she was rescued near Cape Race. Few men lost their lives. They are so used to ice that they skip on it like two-legged seals. Boats are launched and hauled over ice, and so the crews escape though the vessels are lost. In 1848 the ice did not leave this harbour till August. This year it did not go till June. Walked three or four miles to a station with shop and warehouse. The man has built his wooden house on a low rock in the sea, and a bridge to get at it from the shore. He built one which the ice carried away ; this one has stood the brunt so far. The ice is 18 inches thick near the shore. This fellow had a fight with the sealers, about grog of course. His son, who is a kind of giant, thrashed the rioters, and they in revenge

damaged the famous bridge with axes. Returned to the appointed time, and found the captain with his mind made up to stop all day, as the sea outside was breaking heavily, and Fogo is before us. Some of the crowd went to a picnic : I went to bed. Thermometer, 48°.

Wednesday 10 — Air 50°, water 46°. — Off Fogo. Gray sky. No bergs in sight. The coast about Little Fogo Island is all rounded; there are no cliffs here. The weather this day is very curious. At one moment the air is clear and the sun shining. A low bank of fog is seen ahead, and the vessel's bow disappears when she enters it. A thin fleecy veil comes first, and then she plunges into thick darkness. In a couple of hours or less she plunges out again into bright light and clear air, and the fog bank is seen like a wall on the horizon astern. It is a purple cloud on a dark-blue rolling sea. A large shoal of porpoises came alongside, rolling and leaping like mad things. Some of the party fired at them, and missed of course.

Picked up a boat with a heavy cod-seine and four hands in it, gave them a tow with a very long rope, and dragged their bows under at every sea. It looked very dangerous, but no one seemed to care. These fellows were blown off, and have not been in for three days ; they were cold and wet and tired. Cast them

loose off their harbour, when they hoisted a rag of a sail and made for shore. Some parts of this day's sail required good pilotage. The course lay between two long reefs apparently on the strike of the rocks. The long heavy sea of the late gale roared and thundered over these sunken hills, making a fearful din. Watched the breakers, which made the most extraordinary turmoil, as there was a cross sea running two ways at once. About 40 miles outside lie the Funks. Here used to be great numbers of Geyer fogel.* Their skeletons are now brought to St. John's with guano. Anchor at Green's Pond for the night. Stayed on board while the crowd went on a spree.

Thursday 11*th*.—Set off early. Strong breeze, heavy sea, air 48°, water 47° ; took nine hours to go 30 miles to King's Cove. Barometer fallen half an inch, heavy rain. Two men who went foraging for the mess were left behind, but they can walk overland. Steamed to *Buona Vista* and anchored. Barometer still falling, nearly an inch down since last night. The wind suddenly lulled, and changed from S.W. to N.W., when it blew harder than ever. It came howling and singing a shrill chant amongst the rigging, while blue and yellow lightning flared and flashed, and thunder rattled a terrible bass. The rain came down in bucketsful, and

* The great auk.

there was a regular storm. It seems as if we had got into the middle of a small tornado. Stayed on board. The crowd had a rough time of it coming off in the night. One man tired of salt junk went to a dozen houses knocking up the natives. When the sleepy mortals came to their windows the question was, 'Have you any lamb?' There was none, but a man had some chickens, so they were brought off alive and crammed into another fellow's bed. Then came a shindy, which subsided towards morning. Then the chain-gang began to heave. Truly sleeping is a feat on board this ship.

Friday 12.—Ther. 48°, barometer down, sea rolling every way at once. There are two tame wild-geese on board, a box of live rabbits in the fore-cabin, a cat in the men's berth, three sick men in the hold amongst the coals, a wet dog running about the deck and seeking refuge in the berths. There is a sick woman crammed into a hole above the screw; all our long-passage crowd and several new hands, including the M.P. for Toulinquet and the Speaker of the House. Had some eggs brought from the Funks; they were good. Ran into Catalina and Trinity, where we picked up a doctor, who was sick immediately, and so continued. Ran across the bay to Old Purliken, and took in another sick woman and her daughter. The water at Trinity was 52° in the harbour.

Ran in to Harbour Grace and anchored again, as it was blowing a whole gale. The crowd went on shore, and some of them tossed for champagne till the small hours; one drank a pint with a seidlitz before breakfast. Several very damp cheerful men warmly shook hands with me in bed; but I have a very dim recollection of the evening, having acquired the art of sleeping under difficulties.

If any of these shipmates happen to read this and recognise the writer, let them accept his cordial thanks for their kindness during the voyage.

All on board felt and constantly mentioned their high approval of the captain's skill and unwearied attention to his very arduous duties. Fair or foul he was at his post; day and night he was always awake, bright and cheerful; and on such a voyage he had to keep his wits bright. With thick weather, no good chart, and such a coast, he had a hard time of it.

The way of our life of late was thus:—At some unknown hour, a steward, housemaid, cook, and housekeeper—a man with a powerful Newfoundland-Irish brogue, who had been a sealer, and a traveller—announced that breakfast would be ready 'directly;' and accordingly, in due time, those who slept on tables and chairs in the main cabin were turned out, and the rest tumbled in. A single cabin-steward, who probably never

had washed himself, and whose hair would always curl over his nose into his mouth at the most interesting moments, appeared bearing *the* salt beef, and shortly afterwards *the* salt pork; and by diving through the cabin floor the same official contrived to extract a supply of biscuit. Tea, with or without milk, and salt butter, completed the breakfast. Dinner was the same; pork and beef, with cask water instead of tea. Tea was ditto repeated, the pork and beef being cold for a change. We who lived forward had a bowing acquaintance with the beef and the pork; they lived together in a barrel of salt water, and bobbed about us cheerfully as we climbed out of our den. In the happy, luxurious days of our first start, when we had fresh meat for dinner, the mortal remains of a tough sheep, and the *disjecta membra* of an ancient cow, lay swathed in an old sail on the top of our companion-hutch. Whoever put his head out to see how the weather looked, risked 'colliding' with sheep or cow, as mutton or beef; but no one seemed the worse at dinner-time. On Fridays we had salt fish, and occasionally soup and pudding. Arrived opposite to some landing-place, and the captain having announced that he would stop 'two hours,' the passengers and the good-humoured crew lowered the boats, and scrambled into

them. At first we went anyhow; but finding that method objectionable, the port and starboard tables took separate boats and raced.

Having reached the land, those who had business in the place clattered and slid over the rocks and fish offal into the nearest house, and the rest followed. We were a goodly company—a priest, a missionary, several clergymen of various denominations occasionally, and ten or a dozen hardy, active, young merchants learning their work thoroughly by doing it themselves. Crammed into a wooden room, we filled it. The converse was fishy. How many quintals a man? How many had we heard of? Where was the best take? What would be the price? It was a keen encounter of wits between buyers and sellers, debtors and creditors, capital and labour, all eager for intelligence to be turned into gold; and yet the 'Ariel' is all that Newfoundland turns out in the way of steam-power applied to mails.

Questions and answers dry throats, and ere many minutes had passed a bottle usually appeared. He was often the last of his race, and he bled for his country freely. For half an hour the clergy did their duty, while the merchants transacted their business, and the only real idler on board used his eyes. By that time the captain had generally blown the steam-whistle, and

the boats had to return. It was a hard race to get a boat hoisted first; and it often happened that the two short hours allowed were grievously curtailed. Sometimes two hours lengthened into half a day, but the passengers were tethered to the ship by this uncertainty. When a gale or a fog came on we knew what to do, and broke loose accordingly. At night some went to bed, but some one always had business which kept him awake, and many walked great distances in the dark. At any hour a stream of damp mariners, headed by the representative of some firm, might pour down our hutch, pour porter down their own throats, chew, spit, and smoke, while they talked fish on boxes in the forehold by the light of a tallow dip. When they came, they stayed till the ship was ready to move, or the porter expended. Great, strong, rough, sturdy, hearty, wet mariners they were. It was pleasant to watch their weather-beaten, brown faces, and listen dreamily to their long yarns, and then gradually to drop off and kick the bald head of the old snoring pilot in the next bunk. When the ship was about to move she let us know. First the crew turned out, and they were only a plank off next door; then the engines began to rumble in their insides, and then to scream; then some one rung a furious big bell at the open hutch, and then the whole crew dashed

the whole iron chain, with all their pith, upon the deck immediately over this abode of peace. In another hour a place, an iceberg, an island, a whale, or something else, made it absolutely necessary to get up and go on deck. At first it *was* difficult to sleep, at last we all slept like tops and enjoyed the noise amazingly. No one ever really enjoyed the pork, but constant foraging only produced a very little edible fish, a dozen or two of gulls' eggs, and one brace of small chickens. Those who had brought strong liquor consoled themselves, and while the stores lasted they offered fluid, solid, and vaporous consolation to those who had none of their own. May their shadows increase! Those who did not drink strong liquor did as best they could with strongly-coloured water, which lived in a cask beside the larder, near the hatch of the fore-hold.

We were the admirals and merchant-princes of these seas, the very cream and top oil of St. John's, and the best of bay-men, and so we fared in the best mail-boat in the colony, specially chartered to visit the most important of her fishing-grounds, and carry news for 119,304 anxious people. Steamers, regular as clock-work and comfortable as yachts, run round the North Cape of Norway once a fortnight, and a telegraph spreads news of herring along the whole of that northern coast.

The ice which does so much harm appears to have congealed the energies of the British colonists.

On the other hand, there is energy enough and to spare somewhere in the people. In March they fight seals and the pack, and it is a desperate battle. As soon as the ice will permit, they flit northwards to 'the Labrador' to fish cod. There they fight the battle of life with cold and hardship, waves, ice, storm, and mist. They go to their ground in small vessels crammed as the hold of a slaver is crammed. When they get there they live chiefly in open boats, or camp on bare rocks, in rickety wooden shanties that look as if a puff would blow them to sea. Norwegians who fish in darkness, in the dead of winter, within the Arctic Circle, have better lodging and warmer weather. When the short summer of Labrador ends, the men put the boats into the ships, and pile themselves and their fish into the holds. Men, women, and children, sick and sound, ship and gear, off they go down stream to Newfoundland, and there they spend their winter in running up a fresh score, to be worked out in seals and cod, blubber, liver, and men's lives, in March. No one knows the number of this floating crowd. The fixed population of the Labrador was about 1650 in 1857 ; the fishers come from everywhere, and must exceed 50,000.

Such a strange herd of migratory amphibious creatures—men and seals—exists nowhere else; to see them was worth the trouble of this trip; but why that trouble should exist in a rich British colony in 1864, is incomprehensible. There is no direct mail communication with England or Canada, though the imports and exports of Newfoundland exceed a million sterling, and the port of St. John's is very famous for imported port wine, which is earned in Labrador. Still in my dreams there comes a loud drawling shout of—'PLENTY OF FISH AT BRIG HARBOUR.'

In 1863 the Straits of Belleisle were crammed with cod; so, in 1864, lots of vessels went there for cargoes. 'When they got there the cupboard was bare;' so the fore-and-afters went prospecting up the coast. Each crew, as the steamer passed down, hailed for news. It so happened that BRIG HARBOUR was near the furthest point reached, and the first ship met on the way back was told to go there. Thenceforth it grew into a habit, and finally it became a joke. Every ship that hailed was sent to BRIG HARBOUR, and every one altered course and set off at once. There must have been a large fleet there in August.

There were 'plenty of fish in Brig Harbour,' but quite as many at other spots, and some of the vessels

were sent a fool's errand as far as from Dover to Newcastle. Surely it would pay to run a proper mail up that strangest of strange wild coasts, 'the Labrador.'

Saturday 13.—Off at daylight. Ther. 48°. Blowing very hard, and a heavy sea on. The vessel rolled so that I had to hold on in my berth and jam myself against the ends. One man, being very sick, fetched way, rushed headlong over the cabin in his shirt, and plunged into the priest's berth ; his fist took him under the ear, and nearly brained him. The next lurch sent him sprawling on all fours, feet foremost, back to his own side, apologising with all his might. In another minute he was successfully sick, and back again to bed quite well. Rose at 8, and watched the sea, which was very grand. Reached St. John's at 9.30. It has been a curious trip, unquiet and uncomfortable, but good fun on the whole. Spent the rest of the day in eating and washing, and reading the *Times* in the newsroom, to which a shipmate introduced me a stranger.

CHAPTER VII.

AVALON.

Monday 15.—Walked round the harbour down to the lighthouse. The rocks at the point are a very coarse sandstone, made up of pebbles of granite, white and red quartz, jasper, and sandstones of sorts, in a matrix of hard red sand. Joints in the rock pass through these pebbles, and are filled with white quartz in crystals. No fossils to be seen. In some beds, the round water-worn pebbles are worn smooth, and to an even surface, as if the beds had slid one upon the other in the process of upheaval. The dip 50° N. To the north and westward are slates underlying the sandstone. The valleys and lines of hill correspond generally to the strike; and in this case the slate has been more worn than the sandstone. The narrows are made by a gap crossing the sandstone, and the glacial striæ come from the high grounds behind the town, and rise up and over the range of hills which make the coast-line. Ice now comes in from the sea. On the 2d of June 1863, the harbour was filled

with it, and the sea in the offing was covered to the horizon. Every winter the harbour freezes to 18 inches or more ; and in March vessels are cut out. This is the glacial period at St. John's. The rocks at the water-line are ground smooth, but not striated. When a heavy sea comes rolling in from the Atlantic, heavy breakers beat over this point, and the narrows are filled with the broken water ; but the water-line is unlike the cliffs of the opposite coast, where rocks are broken by such breakers. Close above the water-line the rocks are weathered by frost, so that hard ribs project half a foot beyond the surface, and pebbles stand out like stones on a beach. There is nothing in these ice-marks of the present like the fresh sharp striæ which run over the top of Signal-hill, 540 feet above the sea-level, and which have resisted the weather so as to be perfectly clear. Walked up to the hill-top. Levelled the top of Signal-hill, and made it 540 feet. The highest point on this side is 630. The highest ridge inland is about 800, distant about 4 miles. Looking down from this point, the shape of the country generally corresponds to the run of the currents, N.E. and S.W. magnetic, about N. 12° E. true. The glacial striæ can only be accounted for by supposing that the hollows were filled with ice, so as to overflow seawards. The heat very oppressive—78° in the

sun, 70° in the shade. Sprang three reiper 'partridge.' Lay under the shadow of a big perched block, panting and smoking, and rejoicing in a breeze of north wind. Lots of women and girls were gathering partridge-berries on the hills. The tops are bare tors, but weathered. Every hollow contains a marsh or a small pond; every one of these has a fringe of scrub, thick and tangled. On trying to return, got into one thicket, and nearly stuck there. Struggled through, and got hold of the end of a path which led to a small cottage with a potato-garden and a flock of goats. The owner was an old chattering Irishman, with lame legs; and he and three girls were seated on a rock basking. Joined the party, and basked for half an hour, listening to the old man's account of himself and his ailments, and his family history. Asked him if he paid any rent. 'Faith and I do; one shilling; and I pay it over there at the office every year regular.' On leaving, found some rocks newly laid bare in the path. Striæ, not well marked, seem to run parallel to the harbour—E.N.E. mag., or nearly at right angles to the striæ on Signal-hill. There seems to have been no general direction of movement here. Made a hurried sketch of the harbour, and got back at dark. Wrote till bed-time, and smoked hard. Walked about 10 miles only, and felt as if I had walked 30.

Tuesday 16.—Walked about the town in the morning, and hired a man, and his horse and trap, for £1 currency per diem, to go to Colinet, and wherever else I chose. Got under weigh at 2, in a small double phæton, with a chestnut nag; driver, Ned Breenan, in a steeple-hat, looking as if he meant to be a regular woodman for this trip. He was a dark-haired, hook-nosed man, in a loose gray frock, and generally he looked like work. Ther. 53°, wind N., the air feeling sharp and chilly after the heat of yesterday. Drove over the hills and down to Topsail, 630 feet, by this road. The whole country is covered with glacial drift, the rock gray and yellow slate; the hill-tops are bare and much rounded. Farms are numerous; oats still green; lots of raspberries ripe in the woods. The valleys are clad with a dwarf forest of spruce—black, red, and white. The descent to Placentia Bay is in a glen, with glaciated rocks, moraines, and all other ice-marks, striæ excepted. These were not conspicuous; at least none were seen from the trap. Walked on ahead 7 miles from Topsail; the country is a mass of boulders of large size, heaped, and piled, and spread about everywhere. Drove on to Holyrood—30 miles in all. Stopped at a little roadside inn, with a large chimney in the kitchen. Two good-looking girls and an old woman were the inhabitants, and pigs and poultry came

toddling in as if the place were their own. Supped with the driver, and slept in a small closet of a room, from which I could hear all the rest of the people going to bed. Had a long jaw with an old skipper who owns the house: subject, the Labrador seals and cod. One subject started was the 'sea-cow.' Throughout the British Isles the Celtic population firmly believe in the existence of an amphibious and very uncanny creature, which, according to their account of him, is a little gray water-bull. He lives in fresh-water lakes, comes on shore, breeds with tame cattle, and does no particular harm; but he has something supernatural in his nature, and no one likes to venture at night to places haunted by the Tarabh uisge. He frequents sea-lochs and the ocean, where no large or deep fresh-water lakes exist. This belief is so genuine, and stories told about the appearance of 'the bull' are so very circumstantial, that many Saxons have adopted the popular creed. English sportsmen have watched beside Scotch lakes for a shot at the monster; proprietors have tried to drain ponds and catch him, and, when that scheme failed, they have whitened the water with quick-lime to kill him by foul means. An English nobleman, distinguished for his learning and accomplishments, once took the trouble to write down all that he could learn about this mysterious

creature, and the evidence collected by him would have gone far to prove a case in any court. The belief is not peculiar to any one branch of the Celtic population of the British Isles; it seems to pervade all who dwell near the Atlantic coast. The very same notion prevails in Iceland. A few years ago a farmer described a water creature which he had seen in a lake there, and some English sportsmen set off in pursuit. It was not a horned specimen, but it was as big as a cow. In Newfoundland the same story is told, with more details and circumstances. On board the 'Ariel' our male housemaid positively declared that he had seen a creature in the ice which had the head and front and forelegs of a cow. It rose beside 'a pan,' and scrambled half out of water close to a lot of sealers armed with guns and pikes and clubs. They were afraid to use their weapons, and after a time the water-cow, horns and all, subsided and disappeared. The hinder end of him seemed to fall away something like a seal; but he was neither seal nor walrus, for he had little crooked horns on his head, and feet like a cow. With this yarn reeled up, the old sailor-landlord was set to spin another, and he spun it 'right away' directly the bait was offered. He knew all about the beasts. Many of the sealers had seen them in the ice, but they did not like to meddle with

them, and no one had ever killed a sea-cow, so far as he knew. If this Tarabh uisge be a creation of Celtic brains, he certainly is the most material 'tarradiddle' yet born of human imagination.

Wednesday 17.—Up early, and walked down to the shore. The drift of yesterday seems to be a vast terrace, rising to 150 feet along the hill-side, for 15 or 16 miles along the shore of Placentia Bay. The rocks in the land-wash, where sea-ice now works in winter, are striated in the direction of the bay, but this seems to be old ice-work not yet destroyed. The rock is slaty, gray, and much weathered where exposed to the air. The hill-tops are great tors, all rounded and quite bare; the low grounds are covered with thick forests of small trees; the coast only is cleared and settled. All the able-bodied are up at the Labrador. Got under weigh at 10.20; drove down to one of these quaint raised beaches which abound in this bay. They are large ramparts of rolled stones, about as big as small turnips, which run along the coast in sweeping curves; sometimes they cross the mouths of small harbours and rivers, and make brackish lakes. These have no sort of resemblance to the terraces and heavy drift on shore. Rose the hill again through fields manured with fish-guts, and redolent thereof. Cabbages, carrots, potatoes,

hay, fine grass, and grain of sorts, growing well. Climbed to the top of a great bare tor which rises at the very end of Placentia Bay ; it is 600 feet high. The rock seems to be felspathic ash, too much weathered for striæ ; but this hill is a tor. Looking down, it is manifest that a glacier slid towards the magnetic N.E., down into this bay from the hills, which here make an isthmus about 25 miles wide, and only 550 feet high at the watershed. Hills 1000 feet high are seen, and from these the ice came. In short, though no striæ are preserved, the whole evidence points to large glaciers following the general slope of the land down the hills and into the bays on the east coast. The piles of drift are the moraines. In passing along the road the loose stones change. At one place granite abounds, and granite is in the hills ; at another, slate is the prevailing rock in the drift, and the hills are slate. On this tor numerous very large blocks of coarse sandstone are poised on the bare hill-top, isolated from all neighbouring hills ; but the hills inland are sandstone, and higher than this hill. The last glaciation of Newfoundland was certainly effected by a local system of glaciers, which were high enough to cover hills now 600 feet above the sea, and to grind the glens below them.

Drove on up a very bad road into a forest, which got

gradually thicker and higher, as the cold sea was left and the warmer sea approached. The weather very hot, and flies in clouds. Vegetation changing rapidly. Rubus arcticus, dog-rose, raspberry, strawberry, sweet gale, rhododendron, larch (called juniper), and a thick luxuriant scrub of other plants, hid the ground: the trees grew so thickly that a man could hardly force his way edgeways between the trunks. The lakes were fringed with trees growing almost in the water, and covered with yellow waterlily and water-plants. The open leads which occurred here and there were wet marshy muir. Stopped at the half-way house, and sketched as well as the flies would let me. Hearing music, went in and found a wandering mason droning out a reel or a jig, and a driver dancing with a pretty wild-looking girl. He handed her over to me, and to please them rather than to gratify myself, I also capered. The old landlady, who looked like a bolster tied in the middle, sat in an arm-chair made of an old herring-barrel, and applauded. Drove on down-hill to Colinet, stopping for a few minutes at the bridge at Salmoniere. This river is a succession of shallow streams and deep weedy ponds in the forest. It was vain to fish there, so drove on, getting gradually out of the forest into a more open country. The driver

proposed fishing in a weedy loch by the road-side. Would not insult my tackle by putting it into such a hole. Got ferried over the Colinet river by two pretty little girls, and took up quarters in the house of Davis, a noted deer-hunter and poacher, who was away 'in the country' with a party of deer-shooters. Asked the old dame, and Helen Davis, her pretty daughter, to get some tea, and walked a mile to the other river, where is a fall about which a piece of work is made. It is pretty enough—a stream tumbling over the edges of some slaty rocks, the beds making water-slides of great regularity. The last slide is into salt water, but fish come up nevertheless.

Thursday 18.—Up early; fine bright day. Went a-fishing with Ned Breenan, who pretended to know all about the rivers and the country. Went first to the fall, and tried all the holes, catching one little par. Gave that up, and tried the other river, which was a mere rill in a wide bed of stones. It was full of par and char; killed 100, and lost a great many amongst the stones, and while wading. Dined on the bank, by the help of the kettle. Late in the evening went up about a mile and found some deeper holes, Mr. Ned having informed me that there were none. Hooked a small salmon in one of these pools, and broke the casting-line, which had got

worn amongst the stones. It was evident that all the salmon had gone up as far as they could. On returning found the hunters come home blank. The sportsman is a schoolmaster at Placentia, and had come to Colinet with an attendant to spend his vacation in the woods. They went about twelve miles inland to the second pond, and there camped. When their fire was made the salmon came plunging about in the deep water close to the land-wash, 'large salmon a yard long.' They thought they were deer, they thought they would leap on shore, etc. In short, there were plenty of fish in the upper pond, where I wanted to go, and where Ned Breenan did not, as it now appeared. They had seen a great many deer-tracks and one deer. He was in the river, but before the sportsman could make up his mind to fire, the deer had leaped into the forest, and there was an end of him. Sat over the fire jawing till late. Old Davis is a manifest poacher, but a nice old fellow.

Friday 19.—Set off for the first pond to try for a salmon. Ned Breenan retired to the stable, and, as it transpired, slept all day. Old Davis shouldered my basket and his own gun, which was two yards long at least. I shouldered my rod, and we marched off into 'the country.' Our way lay through 'leads,' marshy land overgrown with rein-moss, multiberries, and such-like. It

was muggy and hot, and misty and rainy; and at every step my feet sank over the shoes in something like a wet sponge without the spring. The old man, with broad-soled shoes and his lighter body, scarcely sank where I went far above the ankles at times. It was very hot surely, and the flies were bloodthirsty, venomous, vicious, and numerous exceedingly. They were as bad as in Sweden, and that is about as bad as can well be. The armies were headed by horse-bees, creatures half an inch long, with daggers in their noses. Then came smaller pests, as big as large bluebottles; then gally-nippers or mosquitos, which bored holes in the skin through stockings and trousers; and the rest of the flying squadron was made up of small midges and black flies, which bit and stung, and sang and buzzed, and tickled every scrap of bare skin. Put a handkerchief under my hat, and got along tolerably. Deer-tracks were pretty numerous and fresh, but there was not a bird to be seen for six miles of this plodding, neither bird nor feather. By turning and twisting round points of forest, we kept in this ground till within a mile of the pond; here we dived into the wood, following a path. It was merely a track in which a few branches had been lopped off to make head-room, and no stranger could have kept it. The old man kept it, and led to sundry trunks laid over

deep streams, which we scrambled over by the help of poles. He and his sons come here for birds and eggs, and this is their path, used for many years, and still a wilderness. Arrived at the pond, found a weedy hole, with waterlilies close to the bank, so did not fish. All this country now swarms with beaver, and we had reached a settlement. A large pile of branches and mud, about the size of a hayrick, was made at the water's edge, and in the water. It was an old beaver-house, and I sat down on the top, and heard the old man hold forth, while we munched biscuits and smoked turn about. Opposite to us was a second house, and at the end of the lake, in a flat meadow covered with rank green grass a yard long, was the top of a third house, now building. It was on an island in a creek, and could not be reached without a boat. All round us, in the soft turf of the banks, were beaver-roads : canals, a foot wide, dug into the land ten or twenty yards, and ending in a path cleared to the trees. The canal had furnished mud for the house, the path was the road for food and timber, and food and timber were piled on the house. The food is 'white wood' and birch, about a couple of inches thick. The branches had been neatly nibbled into portable lengths, and they were piled on a turf opposite to the house. The old branches had been

neatly peeled, and the marks of the tools used—to wit the teeth—were on every stick. Beaver-root—the root of the yellow lily—was nibbled and left about in scraps. Followed the shore, and went to the forest to look at the work there. A couple of birch-trees had been felled for the bark ; one stump measured two feet in girth, and not a scrap of the trunk or branches was left. The other lay where it fell untouched, and it was a goodly birch-tree. It had been felled late in the fall, and the frost had come on before they could move the prize home. There were the tooth-marks and the peculiar chips of these strange little carpenters. We left their work, and went off back to an upper lake where they had a dam. It was made, like the house, of small branches and mud piled at the end of the lake, and piled in the very shape of Plymouth breakwater—broad below, narrow above, with the water oozing slowly through it, so that no stream moved it and no fall undermined the base. Now, is this instinct or design? Long ago a boy made a dam in a similar position, in order to sail boats in a pond. It was a wall made of turf, and when it was pretty high the water cut a hole in the top, which enlarged, till the wall-dam went off with the rush. A second attempt failed also. After working all day, the first difficulty was mastered by placing a plank on top of the

turf wall for the water to flow over; but when the head of water gathered and began to fall, the fall dug out the foundation, and the whole fabric was swept away in a moment. Engineers of experience lately failed to dam a lake effectually, and so drowned a town. The beavers succeed; their plan is the very best that could be devised; and the youngest beaver works on the old plan which the young human animal does not inherit from his ancestors, but learns from them, or puzzles out for himself. But here is the difference between men and beasts:—No beaver can do anything beyond his own trade, but a man may be jack-of-all-trades, if master of none. Meandering about amongst the woods, we came to a place which these little engineers had flooded. We had to grope about for a passage, and finally cut down a tree to get over the old river-course.

It was queer walking amongst long drowned grass, old stumps, fallen trees, branches, and scrub, with water up to the knees, and deep holes hidden somewhere. Old Davis found his way, nevertheless, and we scrambled through another thicket to a new beaver-house, which he knew to be inhabited. We danced upon the roof, and shook it; and out dashed the people under water, leaving the long train of bubbles which also marks the bolt of an otter. Presently the wave of the sunken

navigator was seen nearing some long grass, and then the grass itself waved as the brute worked along the shore. Old Davis spied him more than 200 yards away, making for another old house on the opposite side of the lake, but I never got sight of him. So there we sat down, and smoked and prosed, in a damp, warm, foggy, gray, still atmosphere, with steaming lead-coloured water before us, and a dank, dripping, half-drowned forest of scrubby birch and pine all around. The only cheery creatures about the place were a family of chattering jays, who seemed inclined to taste the flesh on which gallynippers were feasting royally. The house is so built that the door is under water. If it were not deep enough, they would be frozen in ; therefore they make the dam after the house is made, so that the ice may form a roof over the hall-door. If the walls of the house were thin, the frost would freeze up the water-way ; therefore they pile up such a heap that the frost cannot penetrate, and having prepared for winter, they dive out and dig waterlily roots under the glass roof of their winter garden. The inside of the house has an anteroom for shaking wet jackets, and a bedroom neatly plastered with mud, with every projecting stick nibbled off. The bed is of bark, and dry as a bone. It seems a foul murder to slay such wise brutes ; but ' they

are very good, and the tail makes first-rate soup.' To trap them, a heavy trap is laid on the house in the water, with a long chain. When the creature is caught, he springs into deep water, and the weight drowns him. An easy way to shoot them is to spoil the dam, and watch the place. As soon as the water begins to ebb, the colony go off to mend the works, and the enemy can take them unawares. Old Davis once spoilt a dam, and went away. When he came back, he found a log laid in the breach, and a forked stick, with the root down-stream, planted against the beam. 'You see, sir, the bayver thought it was de wAter that pushed down the dam, and he put the stick that way to stop the force of it.' I have no doubt this is quite true, for many of the old fellow's yarns stood the test of examination: houses, dams, canals, roads, trees, beaver-meat, and deer-tracks came true. It was harder to swallow his yarns about deer. He spoke of killing five or six at a shot with single ball. But here again others told the same tale; and it is possible that a gun six feet long, loaded with three or four fingers of powder, may drive a bullet through five or six bodies in a large herd crowded thickly together. The deer are the reindeer, better grown. In summer, they migrate northwards to the barrens: wide tracts of bare ground strewn with pebbles, where scarce a tree grows, and

mosquitos are not abundant. In the fall, they return southwards, crossing the isthmus at Placentia, and elsewhere. When a grand drive is organized, three lines of men, armed with sealing guns, are stationed inland, and the herd is startled near the shore. In running the gauntlet they lose first their heads and then their lives. They get huddled together in dense crowds, and the sealers' guns commit sad havoc. It is a point of honour to kill nothing that is not wanted, and to carry out every scrap of venison. Some Englishmen who killed deer wantonly, and left the meat in the forest, are still mentioned with strong disapprobation. The taint of carrion drives deer from the ground, and to kill them in scores for the mere love of slaughter was not a sportsmanlike act.

Saturday, August 20.—Drove back 60 miles to St. John's ; start 6.20, stop 9.20, at half-way house. Another driver came with us, and having once run a hare down in winter on this road, he was wild when a poor little hare appeared. He set off at full gallop, but the hare left the road and vanished. The old woman at the half-way house was very fat, and seemed to spend most of her time in the old barrel, into which she had crammed a cushion. When she rose the barrel was apt to stick to her, so she had removed an extra stave ; the drivers made a great row, measuring the old lady with a

tape. Got to Holyrood at 1, stop till 2.45. An old fellow who had been out seeking for minerals here produced his store ; he had specimens of lead and copper-ore, and one stone which he said contained minute specks of gold ; he had been employed by the American companies, and was getting gradually drunk by constant drams. A tall well-grown Newfoundlander overtook us here, and asked the old woman about a strange bird which was sitting beside the road. She had no strange bird she said. Then it must be a wild one, said the new comer ; 'it's sittin' dere under de trees.' Away went the whole lot immediately, miner, drivers, and passengers, helter-skelter down the road—the big man, with his coat off, leading. Having reached 'de tree,' he paused and pointed to a long-necked, brownish-yellow, shambling young bittern, sitting with his head laid back on his humpy shoulders, gazing out at the high road. He had just walked out to see the world for the first time. The ruthless coat was over him in a moment, and the long sprawling green legs were speedily kicking out of one end, while the sharp dagger-like beak and the bright eyes peered savagely out from the collar of the blue jacket. We carried him to Holyrood, and presented him to the queen, who was frying eggs and bacon in the kitchen. The poor debutant was very shy, and

tried to hide himself anywhere and everywhere, especially where he ought not to go. Finally he was packed into a box, with a handkerchief tied over his head to keep him in, and by the time he got to the capital he was a stifled corpse.

It appeared during dinner that weasels in Newfoundland are peculiarly wise and vicious. A man who was mowing in the neighbourhood found a nest of young ones, and carried them off. The man and his mate had a pail of milk for their special benefit, and the mate, who was wiser than his partner, noticed 'de ould weasel come up to de pail and spit into it three times. 'Ah,' said he, 'you had better take de young ones and put dem back where you found dem, or de ould one will be sure to do us some hurt.' Well, de man took de young weasels and put dem whar he found dem, and dey went on wid dere work. When de ould one found de young ones all right she came back to de pail, and she never stopped till she overturned it, and spilt de milk. You see she had spit into it, and she did not want to hurt us since we had not hurt de young ones.'

Thereupon followed a whole cable of weasel yarns of the same kind. Got to St. John's by dark, having stopped at Topsail for another hour. It was a long drive for a single mare, but she did it well and easily.

CHAPTER VIII.

NEWFOUNDLAND, ETC.

Sunday 21.—After church dined with a friend and fellow-passenger, who is also a good sportsman, and with him and a colonial magnate of like tastes walked to a hill-top. Thick mist.

Monday 22.—Air 58°, water in the harbour 50°, air near the hill-top 64°.—Walked to Quidi Vidi over the hills. Thick mist, and a very heavy sea rolling in against the cliffs. Made a sketch. Heat oppressive.

Tuesday 23.—Air 58°, St. John's Harbour 50°, air near the hill-top 64°.—Walked to the top of a hill to the westward beyond Quidi Vidi. Sprang some reiper, and found a lot of boys and girls gathering berries. Made a sketch and some rubbings, and walked home again. The stench of the fish-manure in the fields was portentous. People hay-making busily. These hill-tops are all ice-ground, but failed to discover striæ, though the rock is the same as on Signal-hill. In the lower grounds found marks running up-hill in the old

direction, or nearly. The result of all the observations points to large local glaciers passing seawards from the watershed.

The fish-stages at Quidi Vidi are very good specimens of their class, and exceedingly picturesque. One is perched beneath a steep hill of red sandstone, which is bare enough to show the edge of every bed in it, but sufficiently clad with plants to make it a decent respectable sea-cliff. The building is upon a low stage in the cliff where the sea has broken the sandstone, and worn the broken edges into strange clefts and dark green hollows and humps. On this uneven base a scaffold of rough firs makes an intricate pattern. Some few sticks are upright, but the most of them lean, and have to be propped and stayed, bound together and thrust apart, and jammed against the broken red stone. On this maze of poles of uneven length, a burnt-sienna network of withered fir-branches is woven and bound, and on it rest piles of fish and nets, old barrels, oars, sails, and marine stores, piled in admirable confusion. At one end of this edifice the fish-mansion is placed. It is of the same material, and nothing but a photograph could ever convey any idea of the battered collection of sticks and boards and branches, which are nailed and woven into the shape of a house. The floor of it may be thirty feet

above the sea, and from it rickety stairs and ladders, and stages of smaller dimensions, creep down to the water. The last stage is in the sea, and is a rack of poles for men to climb out of the boats. The particular narrow cove in which this stage was built is open to the Atlantic, and when a heavy sea comes rolling in amongst the broken sandstone reefs and points, it makes a wondrous din and turmoil, and lights up the picture gloriously. Flakes of snow-white foam settle in the dark sea-green shadows, and fly up and over the house, to settle upon the red sandstone and amongst the grass. With sterns almost touching the rock, and bows fast moored to heavy stones and rings, morticed into the rock outside, the sharp fishing-boats struggle in the green seething whirling water, which comes roaring in as if to tear the boat to bits, and toss her into the fish-stage. But long practice has taught the men to moor their boats so that no harm comes to them. They rush in and charge out, rock and plunge, like living things chained in a den. The figures are in keeping : wild-looking pretty Irish girls clustered round a handsome dark-haired mother, hang over the rail ; and a battered old Triton father below ought to have webbed feet and a forked tail, if he has not got them somewhere in his waterproof overalls. They do not live in the stage, but they pass most of

their time about it in all the perfumes of the sea. All this seen through a luminous haze, which veils every near object and hides the hills, but lets the hot sunlight filter and flicker through so as to make the sea and the rocks glitter and shine, with bright lights and brilliant colour, makes a very pretty object of this strange maze of rotten poles and slimy boards which is called a flake in Newfoundland. The town of Quidi Vidi is but a larger flake. It stands at the end of a long creek, into which a small river brawls from a neighbouring lake. Heavy rollers cannot get to the end; they are broken up to make ripples before they get so far. The rivulet purls quietly into a quiet still sea-pool over a beach of bones and mud. The stages are over all. Carts and carriages and pedestrians move about on the beach under a broad roof of fir-branches, slated with salt fish. The pillars of the arcade are tall fir-trees, and they are painted bright green and brown with lichens and slimy things which only grow in dark corners upon wet rotten wood near the sea. Through the dim twilight of this long arcade, the bright sea and the boats and gear in the pool seem to shine, and the sunlight leaks in through the basket-work overhead to make sparks flicker upon wet stones and fish-scales, and all the wet slimy oily things that come raining down with the light through

the stage. When this queer place is seen from the road, it makes a picture unlike any that is to be found in Europe. The tangled confusion of lines ; the houses, scaffolds, and stages ; poles, boxes, and boats; stones, sea, and cliffs ;—all mingled and jumbled together in a Newfoundland fog, must be seen and smelt to be appreciated.

The city of St. John's is but a larger specimen of this peculiar style of marine architecture. In St. John's East and West there were 30,476 people in 1857. They live about a larger pool of the pattern of Quidi Vidi. With some notable exceptions, the houses are wood ; the foot-pavement is a floor of boards, and it is by no means unusual to mount a house upon rollers, and move it to some other street. The wharfs stretch out far into the sea, and hide the beach along the whole face of the town. (*See Frontispiece.*)

Instead of small boats, the larger port is full of large ships ; on the opposite side are the large flakes on which the Labrador take is finally dried. These cover many acres, and it is possible to walk for some miles under and over the roof, which is tiled with cod-fish in good years. Planted amongst these flakes are the seal-vats, into which blubber is tossed to melt into oil by natural chemistry ; and from all these perfumeries a gale of tangled smells sweeps over a still sea to the fair city of

St. John's. While wandering along this sea-shore, how strange was the old familiar tinkle of a Spaniard's guitar, and the swift ride back on the sound to the orange-groves of Granada!

Wednesday 24.—The steamer from Scotland in, but sailing uncertain, so telegraphed and took the mail to Halifax. Start 2.30 P.M., with a strong easterly breeze, and a very heavy sea rolling in. The sea was breaking heavily right across the narrows. The air was 60° in the harbour, and fell to 53° on running out; water 48°; thick fog, cold and chilly. Thus, for a distance of about 600 miles, the water is cold, and it carries a cold misty climate wherever it goes. The cold stream was crossed in the 'Europa,' and followed from Halifax to Cape Harrison. The warm stream was also crossed in the Atlantic, and it was followed round the North Cape of Norway some years ago. The vessel behaved well, and we plunged out into the haze, leaving Newfoundland in its robe of perpetual mist. It is agreed by all that this has been the coldest summer on record; it was agreed by all Canadians and Englishmen that it was the hottest.

It really is a phenomenon to find a country of this size, in such a latitude, and settled for so many years, so completely unknown to those who live in it. An Indian war was going on a few years ago. This year it

is rumoured that a tribe of Indians have migrated from the Labrador. A few of the fierce old redskins are believed to survive; but no one knows anything certain about the interior. It is far easier to travel in Iceland and Scandinavia. One or two men have crossed on foot or in boats, and they are wonderful men to the rest of the people. The sea is familiar, the coast a danger, and the land a myth. The old 'Avalon' was scarcely more mysterious than 'Avalon' in misty Newfoundland.

Thursday 25.—Air 66°, water 55°—Hazy, and thick, heavy rain, and muggy. Off St. Pierre Miquelen, nothing worthy of note.

Friday 26—at 10 A.M.—Air 61°, water 59°.—Off Sydney, Cape Breton. The difference in climate between these two places is then due to the Arctic Current. A small stream only gets through Belleisle, and it is mixed with the warm water of the St. Lawrence. Off St. John's the water was 48°; here it is 11° warmer. A tired water-rail came on board and was caught. The fog still very thick, but the captain sighted the lighthouse and steamed ahead. At last, having run as far as he dared, he went slow. Presently, without any warning, the vessel ran on a rock, and bumped heavily three or four times. The engines were lifted three or four inches. The captain shouted 'Back her!' The mate, a Frenchman, shouted

that if he went ahead she would go over, so the captain shouted 'Go ahead, full speed!' and we went ahead and got off without damage. We were past the harbour, and close to some coal-pits, where the people heard the steam blowing off, but no one on board had a notion where we were. The women on board behaved exceedingly well. The boats were cast loose in a moment, and as the weather was exceedingly fine we were in no danger; but it was a very unpleasant feeling, and if there had been any sea the steamer would have left her bones there. Stopped the ship, fished, and caught a whole lot of cod and haddocks, which were very good for tea.

Saturday 17.—At 6 A.M., got into Sydney, and out of the fog, which kindly lifted about daybreak. Coaled, and sketched an Indian camp. The 'Delta' in the harbour. She had been to the West Indies, and two passengers had died on board of yellow fever. Weather fine and warm, with occasional showers on shore, thick haze on the sea. Ran out into the fog, and lost sight of land. The captain, being nervous after his bump, ran outside Scateri so far, that by noon we did not know where we had got to; so ran in for shore, sounding as we went. Found land in the morning, and made our course for Halifax.

The beach at Sydney is strewed with large boulders

of granite and other hard rocks, like those of Labrador and Newfoundland. These are now brought from Labrador in the coast-ice every winter. Ice formed about Prince Edward's Island is easily known by its red colour, due to the mud which it picks up along that shore. My informant, a clever engineer employed about the coal-works, has seen boulders in the bay-ice, and thinks that they are frozen in along shore and floated off by the tides. Amongst these are coarse conglomerates and striped gneiss; the latter like Lawrentian rocks, the former like Newfoundland rocks. A very short time ago this ice demolished a very strong wharf. It was made of pine logs nine inches through at the small end, planked outside, strongly bolted, and filled in with large stones. 'Clumps of ice weighing tons and tons,' were hurled against this structure by the waves, and it was smashed and demolished: 80 feet of it went in a single tide during the storm. This is the work of ordinary shore-ice, and the sandstone rocks at the water-level record it.

28*th.*—At sea all day in a mist.

29*th.*—At six A.M. made Halifax. The captain, who is one of the best officers in this hard service—a gallant little man, decorated with a great gold watch for saving a ship in the Gulf Stream—nearly fainted from sheer exhaustion and want of sleep when he got to

land. The navigation of this misty gulf and the neighbouring wintry coast is no child's play for those on whom the responsibility rests. It is much to the credit of all concerned that no serious accident has happened to this line of steamers during twenty years, though other lines have suffered many heavy losses. Landed, and sought letters and breakfast. Returned to the 'Osprey' after calling on friends. Ate some biscuits, and at 3.30 started by rail to Truro. The watershed along this route is less than 200 feet high. The land at the head of the Bay of Fundy is a deep red soil, exactly like the mud in the bay, and near the river it is terraced. It is well cultivated, and the villages and farm-houses look very flourishing. The forest contains birch, pine, spruce; and the prevailing wind is S.W. In some cuttings the mud is full of large stones, and in other places are beds of gravel water-worn. Ther. about 80°. The sun very hot and the weather very oppressive after the cold of the summer in the north. A large party of pleasure-seekers slept at the same hotel, bound in various directions.

Tuesday 30.—Walked out in the morning. The land is flat and well cultivated. Indian corn is in the gardens. Ridges of water-worn stones rise up amongst the soil; these pebbles include granite, slate, and other rocks. Ther. 75°, sun out, haze in the morning. Thus,

directly the cold water is left, the climate and vegetation change. Start at 10 in a queer-looking antediluvian stage that looked like an insane Lord Mayor's coach. Met some soldiers and their wives who were on board the 'Osprey,' and a Newfoundland lady; the former going to London in Canada, the latter going my way in my stage. Observed willow, poplar, and apple trees flourishing. Passed over a salmon river which runs into the Bay of Fundy. Low hills to the north. The most of the soil is red, like mud in the bay; but large stones, blocks of granite, and other hard rocks, abound. At Londonderry passed a rocky nice little river. Thence the road rises; the rock red sandstone, dip E. Here is a mine of brown hematite. In some specimens the ore hangs in stalactites, as if it had been so fused as to drip. It is worked and smelted with charcoal on the spot, and is very valuable. Gold-mines are worked near Halifax, and are said to pay pretty well. The hills are very pretty, clad with hardwood forests, including yellow birch, maple, and beech, ash and oak. The lady had never seen anything of the kind in her native Newfoundland, and exclaimed, 'Well, they do not look like wild trees in the woods at all; do they now? they look as if they had been cultivated.' But still on this road sledges run till May. The watershed is 900 feet above

the sea. Oats were green in the clearings at the top. The view from the inn where we changed was very fine. The sea and Prince Edward's Island were in the distance ; and the foreground was a wide slope of forest-land, with a clearing here and there. The bright corn and flowers growing amongst the black stumps, and charred trunks, and zigzag fences, looked strangely foreign. The new driver spoke Gaelic, and was called MacLellan. Away towards Cape Breton are numerous Gaelic settlements, where no English is spoken. At the last stage we picked up a couple of girls, and for the rest of the way we sang songs. Got to Amherst about dark. The aurora was flashing to the north, and lightning gleamed as if some cruiser were blazing away at sea. At Amherst found the town in excitement about a concert which was going on. Got some food, lay on a bench for a few hours, and then started at 11.30 in another strange stage—this time alone. Tried to sleep, but the bumping was fearful. The isthmus at the head of the Bay of Fundy is low marshy land well cultivated ; the people are Gaelic, old-country folk of all kinds, and negroes. As the tide on one side is the highest in the world, and on the other only six feet, this seems to be a dam made by ocean-currents or by a rise of land. Its removal would alter the climate of Nova Scotia and New Brunswick for

the worse. At dawn a tribe of very large and exceedingly vicious mosquitos awoke and attacked me ; mist was hanging about in patches, creeping over the mud flats of the Bay of Fundy. In the midst of green meadows the masts and hulks of new and old vessels rose up beside solitary trees and houses. The forests are far from the sea now, and as every river is a deep muddy drain V, the people build their vessels as far up as they possibly can, and launch them in these creeks. Glacial boulders abound on the hills, prevailing wind S.W. according to trees. Got to Monkton, a large town on a big river of red mud, houses and ships mixed in the strangest manner. Got some breakfast in a cloud of flies, and got into the train for St. John.

Distances.			
Halifax to Truro—rail			60 miles.
Truro to Amherst—coach	108	66	,,
Amherst to Monkton, 9 A.M.—coach		42	,,
Monkton to St. John		(?) 110	,,
Total		278	,,

Up to a height of 270 feet the stones along this road are chiefly red sandstone. In mud near Monkton, and low down everywhere are large blocks of granite. These are foreigners, and probably came over the isthmus. The rail has very few cuttings. In one of these red

sandstone appears, and it seemed to be ground from N.E. to S.W., parallel to the course of the railway. Farther on striæ are very clearly seen in a valley through which the line passes. The hills on each side may be from 800 to 1000 feet high. Moraine stuff and drift abound ; the valley has terraced sides, the rocks everywhere seem to be conglomerates and sandstones, the drift granites and hard primitive rocks. Arrived at St. John's at 1.30 P.M. ; went to the Waverley Hotel and dined. Found striæ in the town pointing up into the glen whence I had just come, direction N. 15° E. true. So this hunt has proved successful thus far.

CHAPTER IX.

NEW BRUNSWICK.

As shown above (p. 107), lines worn by ice upon rocks awash in the Straits of Belleisle point from N.E. to S.W., and coincide with the run of the Arctic Current, which there enters the Gulf of St. Lawrence through a channel 250 feet deep, and 10 miles wide at the narrowest place. A depression of 250 feet about lat. 46°, long. 64°, would sink the Shediac and St. John Railway line, and make a sea-strait equal in depth to that of Belleisle, which is only six degrees further north. According to theory, the current which is shunted in the Gulf of St. Lawrence would flow on south-west, through the Bay of Fundy, if the way were open; and would carry bergs as far south as it now does. According to the chart of 'Dangers in the Atlantic,' heavy drift abounds about lat. 46°, between long. 45° and 50°, and there it moves from N.E. to S.W. At St. John, New Brunswick, the ice-spoor is perfectly fresh. The grooves are as sharp as mouldings

newly chiselled on a pillar by a sculptor, and the direction is from N. 25° E. to S. 25° W. at the Suspension Bridge. There is no apparent source for a local glacier; the great polar glacier ought to have moved from north to south; near the same latitude in Nova Scotia, ice moved over the hills from N.W. to S.E., as shown above (p. 46). The only known engine left to account for these various marks is the current which was seen at work on 'the Labrador.' Thermometer about 75° most of the day. So went to bed considerably tired with heat and dust and want of sleep.

Thursday, Sept. 1.—The next step in spooring systematically was to cross the ice-track near the same latitude, and seek it on the highest grounds. The chum, who was left lamenting at Euston Square on the 9th of July, was rejoicing in a telegraph at Fredericton; so to Fredericton 'I had to go,' as the Yankee phrase is.

The day was very fine and bright, the temperature about 68°. The steamer was neat and clean, and fast, and the contrast in travelling very marked and very pleasant. Having scrambled up several ladders through various well-found cabins, I got to the highest deck and foremost place; looked out for a shady corner, where the coolest wind would blow the strongest, lit a pipe, pulled out a telescope, and prepared to enjoy myself on the

river St. John like a civilised traveller, for once in a way.

The river and the country about it are exceedingly like the Christiania Fjord in Norway; the hills are not so high, but they are of the same figure, and clothed in the same dress. The strata are nearly vertical. The whole country is glaciated and terraced. The river is a chain of branching brackish lakes, in which a tide of forty feet ebbs and flows. The area of this fjord is enormous, and the passage through which the water enters is narrower than the Menai Strait. The neck of this big bottle can only be passed in safety when the sea-level outside nearly coincides with the mean level of the branching fjord within. So long as the tide-level is above or below the mean, water falls in, or out at the narrows, and then makes a rapid like that which falls past Connal Ferry, near Dunstaffnage Castle, in Loch Etive, in Argyle. The river-steamers therefore set out from a point above 'the falls.' The tidal wave is felt at Fredericton, distant sixty miles as the crow flies. In following this sea-way the steamer passes through a gap in a series of parallel ridges, whose general trend is from N.E. to S.W.; and till these low hills are passed, the banks are picturesque. Beyond this barrier of hills, the banks are low, flat, rich, and

uninteresting; the river narrows, and it winds about through plains of drift. The shape of this country is then a repetition of Newfoundland and Nova Scotia. The eastern coast is guarded by ramparts of folded crumpled beds of stratified rocks, with long grooves and ridges running from N.E. to S.W. on the strike, and with occasional passes crossing the folds at right angles. Through one such breach the tide ebbs and flows at St. John's in Newfoundland; a second is at Halifax in Nova Scotia; a third is the neck of the bottle which holds the river St. John. The north-east and south-west grooves hold large open bays in Newfoundland, the Bay of Fundy, and endless sea-lochs, lakes, and glens further south.

Having made out the shape of the country so far, and having exchanged apples, sketch-books, and other civilities, with a gentleman in a buggy on deck, retired to fraternize with an Indian. He was a good sample of a wild man, and this is what I got out of him :—

A TRAVELLER'S PHONETIC VOCABULARY.

1. Neckht	10. Tleñ	11. Udanko
2. Tabo	20. *Neshens*	12. *Nisanko*
3. Sist	30. *Tsinsk*	13. *Insanko*
4. Naown	40. *Naoinsk*	14. *Naoanko*
5. Nän	50. *Nänsinsk*	15. *Nänanko*
6. Gamachtshin	60. *Gamachtshin* ga sinsk	16. *Gamachtshinanko*
7. Loeganek	70. *Loeganek* ga sinsk	17. *Loeganekanko*
8. Ogamuchtshin	80. *Ogamuchtshin* ga sinsk	18. *Ogamuchtshin* ge sanko
9. Escunadec	90 *Escunadec* ga sinsk	19. *Escunadec* ge sanko
100. Gudacht		1000. Gudankskuacht.

These numerals, except Tlen, cannot be borrowed from Europeans, and they are on a system which is capable of extension in any direction. It is as easy to make 9000 as to make 9 and 10—say 19.

Good . .	Gloetz	A chuckling guttural, like gulping good liquor.
Bad . .	Matjegen	A set of rattling dentals, like shutting the ivory doors.
Give me .	Meelee	Weeops . . Meat.
„	„	Nemess . . Fish.
„	„	Squit . . Fire.
„	„	Geooxukle Wood.
„	„	Samaguan . Water.
Sun . .	Gesochks.	
Moon . .	Nebouksetgesochks.	
Man . .	Skedap.	
Woman .	Ehpit.	
Girl. . .	Spilsquaseasig.	

Expecting to see more of the instructor, no more words were learned; but with this to start upon, a traveller need not starve amongst these Indians.

It is evident from this one short lesson that this language is unlike Gaelic and Lapp. The Escuarra or Basque has some points of resemblance in sound and

rhythm, and these black-haired dark-visaged mortals are not unlike some of the Basques who live in the Pyrenees over the water.

Found my chum waiting for me at Fredericton.

Friday, Sept. 2.—Thermometer 62°. Gray cloudy weather. Paid my respects to two bears, one beaver, a coon, and some flying and ground squirrels, who live happily in a garden. The bears eat chokecherries when they can get them, and prowl round trees describing circles with their neck-chains. They are apt to howl and groan lugubriously ; they sit up on their sterns and beg like well-trained dogs, and make hideous mouths to attract notice and gain the sour fruit which is out of their reach. The beaver devotes his talents to nibbling tunnels through his house, and he too sits up and eats carrots out of his clasped fore-paws with gravity and decorum worthy of a great engineer ; and when he has settled any bit of new work about his tub, he gives it a finishing flap with his trowel-tail, like a great freemason who taps the foundation-stone which he has been summoned to lay in state. The coon looks like a foolish fox, and is an idiot. The squirrels are the frisky matrons and dancing damsels of the society, for they frisk and dance in their cages all night, and sleep all day in cotton wool.

After breakfast drove up the river, and up to a hill-top scratch-hunting. The whole of the low grounds near the river are thickly strewn with drift. Amongst the stones were various kinds of greenstone and granite in blocks three feet through, polished and grooved. These were of the same size and pattern as blocks on the shores to the north. There were also large masses of conglomerate and great cubical blocks of sandstone as big as a cottage; one, by no means the largest seen, was more than ten feet square. Amongst these were large rounded boulders like the fixed rocks of Labrador: quartz, and granite with broken fragments of other rock enclosed. It would be too much to assert that these stones came from Labrador and Newfoundland, but they may have been carried thence.

On the top of the hill the rock is thinly covered with earth and laid bare in newly-cleared fields. The ice-spoor was plain at spots, and the grooves aimed N. 35° W., at a height of about 300 feet above the sea. In that direction no higher ground was visible.

Laid down on a map the line passes near Lake Temiscouata, distant more than 140 miles as the crow flies. It leads directly into the pass through which a railway will some day join the Grand Trunk on the St. Lawrence, at Riviere du Loup; and beyond the St.

Lawrence, the line passes close to the deep groove which holds the Saguenay. Spring Hill at Fredericton is composed of contorted beds of sandstone-grit, ground into the form of roches moutonnées. On the top near the striæ, at about 300 feet above the sea, are large boulders of horsetooth-granite, pink and gray granite, quartz and other crystalline rocks, which are said to occur *in situ* amongst the Tobique Mountains. These rise to a height of 2000 to 5000 feet, and are distant more than 100 miles. If these marks were made by a glacier it was a big one, and it may have come out of the Saguenay groove.

Laid down on a map, together with lines found at St. Johns and Halifax, these high grooves seem rather to indicate the windings of a broad ocean-current flowing into the St. Lawrence groove, and bursting out through breaks in the edge of the trough in a south-easterly direction. In any case, grooves in this district cross each other at right angles, and on this hill-top small cross systems occur within a few yards.

Having finished this hunt and sacked the game—to wit, a rubbing taken from the rock—we drove back and launched a birch-bark canoe on the river. A great many years ago a friend sent one of these primitive arks to a Scotch boy, but he was never allowed to enter it.

The Dumbarton youth now embarked for the first time, and with another unskilled hand to help him felt very like a cat in a washing-tub. But patience and perseverance had their reward, and the river was crossed by elegant sweeping curves. We run aground frequently, and had the cramp in our legs most of the way, but we got to the Indian village at last. The men were working silently at various jobs. Canoe-building, carpentry, and basket-making, were their chief employments. The women were making pretty delicate nick-knacks of shavings and embroidery. The work, and some of the workwomen, were very pretty ; they are broader, and cast in a larger mould than Lapps. Tried the vocabulary, found it act, added a few words, and acquired a basket which could not possibly travel without the protection of a strong box. The cost was Neckhtshillingandgamachtshinpence, and it was left behind for lack of luggage to stow it in.

It was very aggravating to see a girl stand upright in her canoe, and shoot straight over the wide river, while we punted, splashed, panted, and whirled about in vain efforts to show off. In course of time the slow boat got safe back; it was lifted tenderly, carried up the bank, and laid bottom upwards on a shelf, and then the rowers rolled on the grass and watched the sunset. As the light

faded away, the hills turned orange and darkened to purple; a fleet of gray clouds, hard and sharp as real ships, anchored themselves in a cold yellow sky, and black boats and dark canoes shot over a stream of orange and gold, leaving trails of light behind them. Tempted by the stillness and twilight, a bevy of nymphs completed the Claude landscape by bathing as nymphs used to bathe. When the twilight and the nymphs were gone, the northern aurora broke out of the cold northern sky like a fiery fountain, and the Great Bear waded through the pale light of the 'merry dancers.'

This river, which nearly corresponds in latitude to the Garonne in France, is obstructed by ice during five months of the year. The whole fjord is sometimes frozen, so that sledges drive on it from the hills to St. John. When the ice 'goes,' there is wild work on the banks.

The following description by an eyewitness of the breaking up of a river in Hudson's Bay, agrees with the New Brunswicker's account of their southern spring :— 'On the 12th of May, Hayes river, which had been covered for nearly eight months with a coat of ice upwards of six feet thick, gave way before the floods occasioned by the melting snow; and all the inmates of the fort rushed out to the banks upon hearing the news that

the river was 'going.' On reaching the gate the sublimity of the spectacle that met our gaze can scarcely be imagined. The noble river, here nearly two miles broad, was entirely covered with huge blocks and jagged lumps of ice, rolling and dashing against each other in chaotic confusion, as the swelling floods heaved them up, and swept them with irresistible force towards Hudson's Bay. In one place, where the masses were too closely packed to admit of violent collision, they ground against each other with a slow but powerful motion that curled their hard edges up like paper, till the smaller lumps, unable to bear the pressure, were ground to powder, and with a loud crash the rest hurried on to renew the struggle elsewhere; while the ice above, whirling swiftly round in the clear space thus found, as if delighted at its sudden release, hurried onwards. In another place, where it was not so closely packed, a huge lump suddenly grounded on a shallow; and in a moment the rolling masses which were hurrying towards the sea with the velocity of a cataract were precipitated on it with a noise like thunder, and the tremendous pressure from above, forcing block upon block with a loud hissing noise, raised as if by magic an icy castle in the air, which ere its pinnacles had pointed for a second to the sky, fell

with stunning violence into the boiling flood from whence it rose.'*

In this description nothing is said of the work done by this ice-engine ; but after the flood, islands in mid-stream were covered to a height of twenty feet with huge masses of ice, forced up-hill by the stream, and the banks were strewn thickly with similar heaps.

River-ice carries stones into Hudson's Bay, and into the Bay of Fundy. The Arctic Current carries floats down the coast of Labrador. Perhaps the stone which the river St. John now digs out of its own clay banks was first dug from a hill near the river Hayes; and carried thence through the Straits of Belleisle, over New Brunswick, to the governor's garden at Fredericton.

Saturday, Sept. 3.—A great deal of information about this colony may be gleaned from two recent books. One is a small handbook, written by M. H. Perley, H. M. Emigration Officer at St. John, N. B., and published by Edward Stanford, Charing Cross, London, in 1857 ; the other was written by the Hon. Arthur Gordon, the present governor. Both are well acquainted with the wilds ; and the first quotes Professor Johnston, the well-known writer on agricultural subjects, who was em-

* Everyday Life in the Woods of North America, etc. By Robert Ballantyne. Blackwood, 1848. P. 168.

ployed by Government in 1849 to inspect and report. The professor was struck with the resemblance to Scandinavia, which is sufficiently remarkable; but he also points out that many parts of the interior are admirably fitted for husbandry. The country is well wooded and watered; accessible by great rivers and by good roads: it is rapidly improving; and when railways join it to Nova Scotia and Canada, many of the evils of winter will be overcome. At present, each colony is shut up and isolated by ice. The St. Lawrence is closed in winter; but the sea-way is open at Halifax and St. John, N. B. There is much sea-fog on the shores of the Bay of Fundy during the summer, far less a few miles inland.

Temperature has ranged at—

	Max.	Min.	Range.
St. John, Bay of Fundy, coast . .	88°	−18° =	106°.
Richibucto, Gulf of St. Lawrence, coast	90°	−20° =	110°.
Fredericton, interior . . .	95°	−24° =	119°.

Nine inches of damp English snow, when melted, produce one inch of water; it takes seventeen inches of cold dry New Brunswick snow to produce the same amount. The climate here in the latitude of southern France is excessive. While the sun is high, and warms the land, the summer heats equal those which ripen good

claret; when the sun is low, the cold breath of 'the Labrador,' which is always felt at sea, chills the land, covers it with a thick white pall, and seals the rivers. But the Bay of Fundy acts like warm water in a hot-house, by storing part of the summer's heat for winter use. The water is not chilled by a northern current, as water is in the Gulf of St. Lawrence, and some of it comes from the Gulf Stream. The effect of this climate on forest vegetation is to produce flourishing pines, birches, and beeches, but stunted oaks,—trees which, in Denmark, were associated with the stone, bronze, and iron periods of ancient human art. Pines predominate in New Brunswick now, and are associated with the rudest human implements in Danish peat. The ancient climate of the Danish stone period is therefore carried south to latitudes in which reindeer lived in ancient France. It is a healthy enjoyable climate—one to favour hunting and fishing, and life in the open air. Natives and settlers, governed, governor, and guests, civilians and soldiers, savages and civilised, run wild and live in the woods every year.

If the Arctic Current which chills Newfoundland got through the isthmus, the climate here would suffer. It is proved by a profusion of recent marine shells and plants buried in level tracts, at many places in the

colony, that it was submerged; but to what depth is not ascertained. A very slight depression, sufficient to sink the shells, would convert New Brunswick into an archipelago of long rocky islands, and join the St. Lawrence to the Bay of Fundy in the deep lake of Temiscouata, whose upper end is 18 miles from the St. Lawrence, and 317 from St. John. The shells prove that the land was an archipelago, and ice-marks indicate a glacial period, like that of the present sea on the banks of Newfoundland.

For statistics, solid information, and amusement, the books above mentioned should be read.

Started at 9. Thermometer 65°. Barometer very high, and weather delicious. With nothing to sketch, and little to do, a good steamer to do it in, a good book, and a good dinner, this is an idler's paradise. Watched the first step in colonial farming, which consists in burning weeds enough to pay for the land, if the timber were in England and the land here. Surely this 'wilful waste,' which makes 'woeful want,' according to proverbial philosophy, might be avoided on the banks of a river which leads to a great ship-building town. In every direction were vast clouds of rolling smoke, each the funeral-pall of a forest; and near at hand the red

flames could be seen and heard, as they roared and crackled about their prey.

Arrived at St. John ; drove to the Suspension Bridge and watched the ebb and flood contending in the narrows. The great broad whirling rapid gradually slackened as the tide rose to meet it, and ships and boats began to creep under the bridge till the stream turned and the rapid flowed rapidly in. The bridge is 70 feet above high-water mark, 100 above low-water, and 600 feet long ; the piers rest upon cliffs.

At this spot, if anywhere in the world, river-ice ought to produce striation. The whole drainage of a wide basin, and one of the strongest tides in the world, here works continually in one rock-groove, and in winter this water-power is armed with heavy ice. There are no striæ about the water-line. The sides of the trench are shattered cliffs, with fresh fractures at many parts. Up to a height of 50 feet the limestone surface, where it has been long exposed to the air, is weathered as usual, and worn into pits and hollows. But on the top of the cliff, at a spot where a bed of drift-clay was removed in making a foundation for one of the piers of the bridge, the old surface of glacial denudation is perfectly fresh. The grooves point N. 27° E., true. The force which produced the movement crossed the present run of the

tide in the broken trench below. It follows that the narrows were lately broken through an old ridge of glaciated rock, and that heavy ice moved from N.E. to S.W., 70 feet above the present high-water mark of the river St. John. The direction coincides with that of the Belleisle stream. If not the spoor of a polar current this must be the spoor of a polar glacier. Nothing like it is now produced at the sea-margins visited further north, the sea-bottoms are out of reach, so ample room is left for a glacial controversy.

Sunday 4.—Returned to the bridge and watched the tide, smoked and loafed about, went to church, and smoked and loafed again, visited friends who had shown hospitality to strangers, and finally went to bed.

CHAPTER X.

THE STATES.

Monday 5.—Embarked for the first time in a Yankee steamer. The general outward semblance of the vessel was that of the Noah's Arks which delight English children; and the contents were as numerous and various. All the stewards and stewardesses were 'free coloured citizens of the United States,' and they were of every shade, from yellow ochre to burnt-umber and ivory black. They all spoke remarkably good English with little accent, and the head cooks and commanders were infinitely better dressed than some of the swell passengers. Of these, a motley crew, all anxious for state-rooms, crowded round a window where the captain dispensed keys. Having procured a key through the kindness of an American gentleman, we took possession. The room was the very neatest clean white wooden box into which a traveller ever was packed. The berths were broad and high; the beds of the very best; the sheets snowy white, and tucked in with consummate art and neatness.

Of these neat double boxes there were more than a hundred, ranged along a saloon as white and clean as the rest of the ship, and fitted with sofas, stoves, tables, plate, and a piano. The engine-room positively shone with the polish of oil and elbow-grease. The inside of the ship looked like a new ivory toy with ebony dolls in it. When feeding time came we walked down stairs like gentlemen, instead of 'tumbling down the companion' like sailors. We got to the third storey under water, and found a bigger saloon with three tiers of lofty berths curtained off at the sides. It was lighted with lamps, and a well-found table would have groaned under the load, if it had not been too well made to creak, and too well bred to turn. Here was no watching for the beam overhead, no diving for salt pork and biscuit. We walked in with the upright carriage of free men, and sat down to table like enlightened citizens. A sable youth, like a Rubens' nigger, presented a sparkling goblet of pure water with a little iceberg in it, and then we dined. We did not bolt our food, we dined 'longuement, largement, et copieusement,' as the French epicure did. No strong liquors were sold on board, but those who cared for them carried a supply. One gentleman who had forgotten to bring a store, landed at the first port in Maine, and returned triumphant with a fat

glass flask. Like a well-conditioned traveller, he offered to share the contents with his friends and neighbours. Some declined ; others accepted ; and having filled their glasses, proceeded to sip the illegal nectar. But as they sipped, their mouths began to tell a tale of woe, and ere long their tongues began to utter it aloud. 'The darned old cuss of a pothicary had sold five dollars' worth of doctor's stuff for Hollands,' so after one more sip it went overboard, followed by expletives.

The most of the passengers drank iced water, and were content, as they might well be with such cool sparkling drink. Amongst our crew were a lot of blockade runners; men who talked openly of their exploits. One who looked very like an ill-dressed stage sailor talked loudly, chewed, 'turned his quid,' 'hitched his trousers,' and did the whole business to such perfection that he seemed a sham. He was an Englishman, and it is just possible that he was a crimp, or some other predaceous fish in disguise. He was always asking questions, scraping acquaintance, and getting up political and other discussions.

'Such a crowd as we were on board that ship, I never did see ; all old man-o'-war's-men, darned if we wouldn't have robbed a temple and eat the plunder.' So said the sailor.

With such queer comrades time passed merrily. The day was very fine and calm, the sea like glass, and stained with drifting Gulf-weed here and there. The Gulf Stream does eddy into the mouth of the Bay of Fundy occasionally as it appears. The coast was in sight all day. It was low and forest-clad, extremely like the Swedish coast of the Gulf of Bothnia. Boats loaded with fish to the gunwale passed close to us, and in the distance, canoes under sail with an Indian crew, were made out with the telescope. It was hard to believe that we were near the latitude of Bayonne. At Eastport, in Maine, the steamer stopped and kept her time to a moment. Landed, and doffed my cap to Uncle Sam, having planted my foot on his territories for the first time.

Went scratch-hunting with a clever Yankee engineer first met with at Cape Breton. The rocks are sandstone with veins of ironstone. The whole country is glaciated; the hills are about 200 feet high near the town, and from the highest point no hill more than 500 feet high could be seen in any direction. Striæ were found on rocks in the town, and near it; the direction N. 55° W. true. Laid down on a map this line aims at the common water-shed of a lot of rivers, and so favours the glacier theory, but it also passes near a gap in the hills which may have been a sea-strait.

The hunt ended, we turned to the place and people. It is a clean, flourishing seaport town, with captured blockade-runners, and battered, rusty ships, who hunt such game anchored in the offing. Could not help surmising that the 'blockade-runners' on board had been to Halifax to pick up a trail. Such things are done in hunting.

The number of maimed men in the streets savoured of war. Many strong young chaps, short of limbs, were walking or hopping about on crutches. With this exception there appeared to be no marked feature in the Yankee population. All the names on the shops were familiar old-country names, the faces were familiar faces, the accent very like neighbouring accents. If these Eastporters were poured into Scotland or Ireland, or Nova Scotia, or New Brunswick, and well stirred up with the people, it would be as difficult to separate the mixture, as to get hops out of beer, or doctor's stuff out of Hollands. They do talk through their noses, and reckon and guess more than other people, and as they chew so, they spit continuously; but these slight peculiarities would have passed unnoticed if they had not been dinned into these ears. The maimed men attracted notice as a new feature in society.

The steamer kept time to a moment, and set off for Portland. The sunset was magnificent. The clouds, sea,

and hills were dark purple, and a wedge of orange and yellow fire blazed behind the hills. While striving to find some colour bright enough to imitate the darkest light in the sky, a voice behind observed : ' I saw that behind an iceberg this year.'

The answer was ready : ' So did I.' ' Where ?' ' In the Labrador.' ' Were you there ?' ' Yes.' ' So was I.' ' You don't say so ?' ' Yes, SIR.'

And so we fraternised. The other Labradorite was a Bostonian, one of the yacht crew who had passed Cape Harrison to go north. Tempted by a flaming bogus advertisement of all that was to be shot, and seen, and got, and learned in the Labrador, they started with an artist, in a fore-and-after, and rued the day. They shot nothing, got nothing, saw nothing worthy of note ; fed ill, slept worse, and cursed their captain. They were blocked in ice, battered by storm, tossed by waves, forced to work the ship themselves, and generally they had a ' very bad time in the Labrador.'

They were smart, active, good-looking fellows, in shooting-coats of English cut. It proves our common origin and taciturnity, that we have been meeting at table for the last few days, and that neither suspected the other till the spark of fire from the western sky loosed the English tongues, and set them wagging.

Thursday, Sept. 6.—The sunrise was if possible finer than the sunset. Stirred up by attentive niggers with loud bells, we rolled off our luxurious shelves after a few hours of rest; we dressed comfortably, walked through the drawing-room, and out on to the balcony of our floating house. There was nothing like a common European ship about it. Inside, the unfortunates who had not found shelves for themselves were perched on chairs and sofas, blinking drearily at the fires. They looked like people watching for the morning train at a station, or London sparrows watching for crumbs in a frost. Outside, sea and sky blazed with fires brighter than any of human contrivance. We were gliding swiftly over a calm sea of glass and fire, through a crowd of coloured ships to a city of purple and gold. The first step on the first foreign shore is never forgotten. Each following stride in a march over the world leaves a fainter trace; but the first step in any new country leaves the deepest footprint in each separate tramp.

The picture of Portland is hung up beside a picture of Vigo, which, though painted long ago, is still fresh. In one picture are crowded wharfs, a glassy sea, a bright sun, mantillas, black eyes, donkeys, green fruit, old battered picturesque houses, old trees, old churches, old dirty delightful pavements and rocks, creaking carts of ante-

diluvian shape, black priests with shovel hats, breviaries, fans, cigars, and sundries. In the most conspicuous place there stands a postillion in yellow leather gaiters, tight breeks, and a short jacket, on the back of which a red cloth flower-pot, with embroidered flowers, blooms luxuriantly. Near him is a diligence, a triple two-storied edifice on yellow wheels drawn by some ten or a dozen mules; and the diligence drags out another mental panorama, which rolls out till it stretches over Spain. The Portland picture is a contrast. The sun and sky are as hot and bright, but there is an end of the resemblance. On the pier stand a crowd who might be Britishers, many are in fact Irish; there is nothing strange about them. A custom-house officer of the common domestic breed, civil and polite, chalks the luggage; it is handed to a bus-man, who put it on the top of big bus, and off we drive into a new town, with new rectangular streets, new houses, churches, and trees, no hills, few rocks, no picturesque slovenly taterdemalions. But with everything span new, nothing is new to the old-country traveller at first.

In the most conspicuous corner there stands a one-legged man, and he *is* a new feature, happily. The bus lumbers up the street, and bumps over new-laid rails; they are new features too. The old horse-carri-

age goes jolting on, and meets the newest feature of all. It is a live locomotive of large proportions with a long tail of cars. Puffing, roaring, screaming, rattling, and ringing a thing like a small cathedral bell, the fiery monster toddles slowly up the middle of the street amongst the other passengers, quite tame and harmless.

As all Spanish mental pictures contain old slow picturesque things like those which were seen at Vigo, so tame locomotives walking about streets amongst new houses, maimed men, and new rapid unpicturesque flourishing people and things, characterise new mental pictures of Yankee-dooledom painted in 1864.

The bus landed the human freight at a new hotel, and the bus-man demanded a certain number of cents. The Britishers had no paper cents, but they had some silver coin, and the driver kindly proposed to take his fare in silver. An old hand who had paid his way through Austria, and read the papers, was not to be done in this fashion ; but the driver would give no change, and the clerk of the hotel was in bed. A fellow-passenger, scandalized at this "sticking," paid the fare, and could hardly be persuaded to accept repayment. The old virtue of hospitality has not become extinct in the new land. To avoid this bother, changed some English gold and got 1186 cents for 20 shillings. At this rate a

dollar is worth less than two shillings, and the result is highly advantageous to the owners of English gold. 'It is an ill wind that blows nobody good,' and English travellers profit by the war, if no other class do. Prices have not risen in proportion to the fall of paper; hotel-bills and railway-fares are paid in paper, and a man lives at the best hotels for seven or eight shillings a day.

Having settled these preliminaries, went in search of something old, and found it. Close to the landing-place a likely rock was marked down, and on closer inspection the ice-spoor was found upon it. The old surface had been newly exposed in making a quarry, or in digging the foundation of a new house. Above it, where it passed underground, was a layer of rolled gravel and gray sandy clay, stratified and water-washed. Large blocks of stone were scattered about, which had been moved from the gravel; nearly all of these were finely polished, and striated along the longest axis. These included granite, dark limestone, and many other hard rocks.

The direction of movement at the spots examined, was from N. 14° W., and N. 28° W. The White Mountains bear N. 57° W., distant 90 miles. The striated surface is fine enough to make good rubbings with paper and heel-ball. The rock is a crystalline lime-

stone in beds nearly vertical. According to Dana's map, the age is unknown; according to Professor Rogers of Boston, and Keith Johnston's atlas, the rocks are 'metamorphic,' somewhere about the Lower Devonian. No fossils were found.

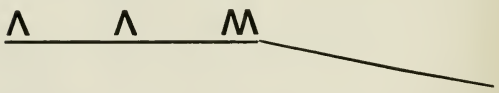
Having prospered thus far, walked up town to see the shape of the country and the lie of the land, and fell in with some Irishmen who were digging drains. They had never found any shells amongst the sand, not they; did my honour think there was any gold in it? No, there was nothing but greenbacks in this country; and then it appeared that cotton garments had risen if hotel-bills had not. After a word about Galway and Connemara, and a phrase or two in Irish, we blessed each other and parted. Walked on through streets planted, like some European towns, with elm, plane, ash, and other trees, and found out the highest point in the neighbourhood. It is about 250 feet above the sea, and a favourite promenade, to judge by walks and benches. Here was another gang of Celts, who were making a road of rolled stones dug from banks on the hill-top. They had never found any shells either, but they too had found war prices unpleasant.

Phrenology will never teach where the shoe pinches. It is hopeless to go to the heads of departments, to

learn practical, popular, political economy. The people who suffer most know most of the ills of the republic which stands upon the wills of the people; so here it appeared that her new fighting-boots pinched Miss Columbia. Wages are paid in paper; wages have not risen very much, but paper has fallen desperately. Home produce has not risen much in nominal dollar-value; food is cheap; but wicked obstinate foreign foes of the republic, and home shoddy traitors in Wall Street, will not give gold for greenbacks without a ruinous premium. Because of the war, the foreign manufacturer cannot get cotton cheap, and must raise the price of his cotton goods; he will have dear gold for his dear goods; and they are taxed into the bargain, to pay for the war. The American carrier and merchant must have profit to pay for Irish or German substitutes, if drafted for the war. Celts used to run naked in the days of Queen Bess, if all tales be true; but here they wear cotton shirts, and navvies' striped smock-frocks, socks, and other such cotton gear. Because of the war, the Irishman (here synonymous with labourer) has to pay cotton-famine, taxed, import, retail prices, and pays dear for decency when greenback wages are converted into muscular force. Moreover, he is liable to the draft, and may be dragged off handcuffed to

fight for emancipation, against the repeal of the Union, and in fighting he may chance to be maimed or amputated. If the Celtic feet be so pinched, they will kick some day, unless their nature is changed in the New World.

Though distant 90 miles, Mount Washington was clearly seen from the hill above Portland. The chief cluster of hills on the horizon was very like Ben Lomond, as it appears through a gap near Dumbarton, in steaming up the Clyde. To the right of the pyramidal White Mountains was the Atlantic slope of the State of Maine: 55 miles from the sea it is only 650 feet high. To the left was Maine, with more New Hampshire hills in the distance. The landscape seen from Portland is a flat rolling base line, with several blue pyramids planted upon the wedge-shaped block which makes the Atlantic slope of America.



The foreground beyond the harbour is a rich cultivated farming country, dotted with houses and trees, and ending in woods. The whole is very like some parts of England: the Vale of Chester, views in Staffordshire, and such-like,

where the main features are rich plains and isolated conical hills. Portland, about lat. 43° 40′, is opposite to Corunna, and in the latitude of Marseilles. Glacial striæ are perfectly fresh ; they do not aim at the high hills, but 29° and 43° to the right or north of them. They do not aim westwards at the Alleghanies, or up-stream into river-valleys ; they aim at a distant lake in a gap in the ridge of mountains which leads to Quebec and the Gulf of St. Lawrence. To get thence, land-ice must have travelled along the Atlantic slope, slantandicularly from the • to Portland. If these be marks of a land-glacier, the other side of the glen which held it was about Vigo, in Spain, where the rocks have the form of glaciation in the old mental picture painted more than twenty years ago. If these be marks of icebergs, tools fit to do the work are now moving in deep water over the sea-bottom between Corunna and Portland.

The next stage was to get to the top of the conical pile of hills on the long rolling horizon, and seek the spoor there.

In returning to the hotel, replenished the cigar-case and tobacco-box. A notion that baccy is cheap and good in the States has long prevailed at home. It may have been so in former times ; now, war has been made on the Southern States, and baccy has been taxed. A

common cigar costs ten cents, amateurs sometimes pay a dollar. Twenty, thirty, and forty cents are commonly paid. 'Baccy is riz,' like cotton and broadcloth, so Paddy the labourer is not so well off as he was led to expect when he became an emigrant. Dined well and set off for the station where the puffing monsters are stalled. Here was something quite new, and really good; to wit, the American luggage system. The story of a portmanteau is briefly told, and may here be told once for all. The passenger goes to the office of his hotel, and tells the clerk there that he means to go at such an hour by a certain line. The clerk strikes a bell, and the first of a row of niggers or Irish call-boys attends. He, or a big porter, brings the portmanteau to the hall, where it is stacked with other luggage. At the hour specified a bus appears; a porter shouts 'All aboard for the west,' and the traveller departs, while the luggage follows in a van. The owner has nothing to do with it; he pays the porter in his bill, unless he is generous and chooses to give him sixpence (fifty cents); the transport is in his bus fare. Arrived at the station, he takes a ticket, if he has not already taken one at some office in the town, and, ticket in hand, he presents himself at the baggage-office. On showing his ticket and pointing out the goods, a porter hitches a brass ticket to each trunk

with a leathern strap, and hands a brass duplicate to the owner, who goes his way, jingling his brass for lack of silver coin. If he chances to turn his eyes towards the luggage-van, the dismayed owner may see brittle goods flying through the air; for Yankee porters play catch-ball with light and heavy parcels, and are apt to miss the catch. The best plan is never to look, and to hope for the best. On approaching a large town, a man generally appears from somewhere in the train and walks through the moving street, pencil in hand, muttering 'Luggage'—'Luggage.' The traveller holds up his hand and the wandering chief of porters stops. 'What hotel?" 'The best; which is it?' 'The Linnel House.' 'That will do.' 'Cheques.' 'Yes, *Sir*-REE.' The brass is handed out and exchanged for paper, a slip with a note of the number. Arrived, the traveller gets into a bus, gets out at the hotel, writes his name in a big book, gets a key and becomes a number, gives his paper equivalent for brass and boxes to the clerk, and, if so disposed, liquors. He has nothing earthly to do with his luggage; when he goes to his room he finds it there, or he may leave it in the hall. He pays the transport in his hotel-bill.

With some slight variations this system prevails all over America, and works well. A broken desk with fifty sovereigns in it, and a portmanteau without a hasp,

travelled together independently from Portland, through the States, and never paid a red cent as extra luggage till they got back to Liverpool. Then they paid dearly, passed through all sorts of dangers, and were very hard to find in London. A large and conspicuous bundle of rods and tent-poles, booked and paid for at Halifax, clearly directed to London, and sent home without the owner, was taken to the Adelphi Hotel in Liverpool, and there remained till a friend who knew it chanced to see it in a corner, carried it off, and took it home. There it was found, but after a long correspondence with the carriers, who had forwarded one of two bundles, but who were 'unable to find any trace of the other' which had the same direction. Loose packages of like nature travelled alone from Chicago to New York, cost very little, and were found waiting for the owner at the proper office.

In the matter of steamboats and baggage-cheques, Dame Britannia might learn from her big daughter, Columbia; though she has not got used to wear butcher boots, and pay taxes for the fun of fighting her right hand against her left.

If the Noah's ark coasting steamer "New England," was unlike a European steamer, a Yankee train is equally strange at first. A long car is a house upon

eight wheels; it is about fifty feet long, ten wide, and eight high. The seats are in pairs, on both sides of a passage two and a half feet wide. There is generally sitting room for fifty people. Stoves and a washing-cabin, a filter and iced-water, are in corners. The seats are of many kinds, but all are comfortable. The commonest kind have a back, which is fixed to a T iron, turning on a nail in the arm of the chair, so as to fit both sides ⊢ - ⊣ of the bench. Four people can sit together, and sometimes a table lets down for playing at cards or reading. In some cars the seats are made with S irons, which turn on a pivot in the centre, so as to lean at any angle; and when the back retreats above, a foot-stool advances and rises below. To all these luxuries spittoons are added on some lines, and sorely needed where they are not provided.

The eight wheels are disposed in fours, and the frames on which they are fixed turn on pivots near the ends of the car, so that the machine turns easily. In consequence of the great length, there is very little side-long movement, but considerable jolting, especially near the ends. In the centre the spring of the long beams makes a long car like a see-saw. The doors are at the ends, and open upon railed, roofed platforms, with side-steps. Between the platforms of two carriages an open

space of a couple of feet leaves room for turning, and on some lines a drawbridge spans this narrow gulf, while a valence of boards hangs outside the wheels to keep down the dust. According to theory, everybody ought to have a comfortable seat, and 'passengers are not allowed to stand on the platform.' Practically, all who can squeeze into the space inside, hang on to the rails when the platforms and steps outside are full, and as many as will sit or stand or lie on the roof, do travel. On some of the western lines a hundred noisy men occupied each car in a long train, and the writer spent most of his time in America on railway platforms.

The object of the journey was to see the country. Accordingly a seat was chosen near the door, if one could be got, or standing room was occupied outside the door. With a small pocket aneroid in hand, the elevation was easily read; a small note-book served for journal and sketch-book. It was easy to see and smoke, and enjoy the air; possible to write and sketch, and the guards took a lively interest in the proceedings, and shared the baccy. At first there was a strong mesmeric or other attraction which fastened the hands to the iron rail; at last, by force of habit, the platform came to be the most agreeable walk in the street upon wheels, and the hands returned to their native pockets.

This railway system has many advantages, but all that is new is not gain. A tribe of itinerant booksellers and fruit merchants wander about, and sometimes loose parcels are carried off. According to the newspapers, in October 1864 a crowd of New York rowdies took forcible possession of a whole train, and robbed the passengers in open daylight. Meeting a return train at a station on the Hudson, they took it by storm, and returned by it, robbing their new fellow-travellers as they went. The authorities telegraphed to New York, but the roughs were too cute for the police. They seized the guards, worked the brakes, slowed the train some miles short of the depôt, leaped off, and went home with the swag.

If single men are occasionally murdered at leisure in English carriages, it would be impossible for a hundred roughs to scramble into each fortress, and each man might defend his own Thermopylæ by pulling up the glass.

Whether this tale be true or not, travellers are forced to consort with all who use the cars, rough and smooth, and all persons are not equally fond of studying the masses. One who is not over nice must enjoy the fun of a Yankee car.

Women have a car to themselves, and extra comforts. No man, unless he is accompanied by a lady, may enter the sacred car-ess, and even 'brutes' of hus-

bands cannot smoke there. Elsewhere there is a freedom and independence about the proceedings which has its charm. Everyone is at liberty to break his neck, or be left behind, if he thinks fit. Men jump off and on while the cars are moving, and no guard interferes. The engine stops and goes on again without the concert of station bells which proclaims the fact elsewhere. It does not whistle, but it tolls the big bell hung round its neck, and roars a strange variety of notes and tones. There is no fence. It is common for cattle to use the path, and when a cow is seen ahead, the engine performs a whole gamut of howls and snorts and roars, till the terrified cow is driven away. If she does not go, there is a provision on every engine for shunting cows, and as Stephenson said to the M.P. who suggested the event, it is very disagreeable for 'the coo' to be shunted. In the prairies a dead 'coo' was seen in a ditch with her heels in the air, where she was laid prostrate by the iron horse. If the cattle won't go, the engineer don't care, and he goes on.

The first day's journey was a sample of a lot.

The railway crosses from Portland to Montreal, running 293 miles about N. 55° W. To Gorham, 91 miles, it passes through a well-cultivated drift country; the soil is yellow clay, containing large boulders of sand-

stone and hard azoic rocks. The rock-foundation shows occasionally in cuttings and elsewhere; the surface is glaciated, and it includes beds of mica-schist and sandstone. The prevailing wind, shown by the inclination of trees, is S.W. At a height of 655 feet, near West Paris, about 50 miles from Portland, is a large and conspicuous deposit of rolled stones about the size of small turnips. These are in a rocky hollow near a small burn, and the rocks in the groove are strongly glaciated up to a height of 800 feet at least. Boulder-terraces are equally conspicuous at 800 feet further on, in the same hollow. The rock near a very pretty mountain-lake is a gray granite. At Bryant's Pond, 62 miles from Portland, 835 feet above the sea, the shore of the lake is fine sand, but the terrace above the lake is made of stones like those which form sea-beaches in Newfoundland. At Locke's Mills, 65 miles, 900 feet, beds of shingle and sand are packed in flats, which look like water-work. Here the high mountains are approached, and the outline changes. They rise suddenly from the shingle-flats, like a bold coast with steep headlands jutting out into fjords or sea-lochs with rocky islands. At West Bethel, 70 miles, 810 feet, are terraces of gravel on the banks of small rivulets. Near Gilead, 80 miles, 900 feet, the rail cuts through a bank

of gravel and sand, 50 feet high at least. It is a terrace above a considerable river. Near it similar water-drift is packed in shapes known as 'kames' in Scotland, and 'osar' in Sweden, and these rest upon glaciated rocks in hollow grooves. The river is the Androscoggin, which here flows due east. At other spots in this neighbourhood, shingle and sand are packed above coarse drift, which rests upon the glaciated rock.

At Shelbourne, 86 miles, 900 feet, the shingle is packed in flats beside the river. At Gorham, 91 miles, about 900 feet, the same arrangement recurs.

Here is sufficient evidence of the action of water, but the glens and hollows were not made by rivers, because the rocks are glaciated. Ice in the form of glaciers does not so pack loose stones; but the fjords of Newfoundland, where sea-ice drifts, and waves act on the beach, closely resemble these elevated glens.

With note-book in hand, the aneroid in a waistcoat pocket, a railway-map, and a fresh mental picture of coast scenery in Newfoundland and Labrador, it was easy to put the sea in the glens of the White Mountains. It was not easy to fill them with glaciers, for lack of moraines.

This system of spooring at railway speed was pursued throughout this tramp. After fixing directions of

glacial movement at Fredericton, St. John, Eastpoint, and Portland, an evening's drive of 90 miles up to the watershed of Eastern America taught more than a week's plodding.

This being occupation, fellow-travellers afforded amusement. The majority were 'like ither folk.' They got in and out, ate apples, and talked to each other, and left no trace but baccy-juice when they went away; but amongst this crowd were soldiers on furlough, and recruits going to be drilled. As the first of their class, they left a permanent impression. The soldiers—officers and men—were ruddy, healthy, strong, and active; roughly dressed, but fit for work of any kind. They seemed on terms of familiarity that would amaze Old-Country soldiers; but all were quiet, sober, and well-behaved. They smoked; as one of them remarked, 'I am used to smoke, and I am going to do it;' and he did it too, and spat into the bargain; but he meant no ill, and offended no one. One recruit was a strong contrast. He was 'tight,' as the saying is, and very talkative. He wanted to make a third on a bench where two well-dressed civilians were established, and tried to wedge himself in; the others quietly resisted, so he sat on the arm and swayed about while he held forth. 'I am a Queen Victoria man,' he said, with a very strong down-

east twang. 'I am a rock—in the ground,' with a very lugubrious quaver at the end. 'I drove Jeff Davis in a stage; I reckon I'll give him hell; I am a rock in the ground. That darned old cuss, Abe Lincoln, can't manage this war; I reckon I'll give him hell too. I am a rock—in the ground, I tell you. These rebs must be shot down; we won't have old Abe for President. Hurrah for MacLellan! I am a rock in the ground.' And then the 'rock,' who was about eighteen, and rather small of his age, chumped his quid, and spat with great dignity and force to show his manhood. Steady on his pins, but maundering in his talk, this self-styled boulder wandered to and fro, and perched upon odd places, till the train whirled up to Gorham. The last audible words he said were, 'I am a rock—in the ground.'

He was a sample of the raw American *tourlourou* and the text upon which the following letter was written after a longer experience:—

One phase of this American war strikes a wanderer very forcibly; it is the change in the bearing of those who are engaged in it. 'It is not good for man to live alone.' Young swells in the Old Country are sent to school to take the conceit out of them, and they soon find their level in the crowd; but in this vast country

men live much alone, and solitude works ill in their human nature. Those who have trod the bypaths of Europe know the manners of the people; the ways of a German beer-house, of an Irish whisky-shop, of an English country tap; and here in the west, a country devoid of graveyards, a German boor from some wide plain, a Norseman from his solitary glen, a Swiss, an Italian organ-grinder, a Connemara man, a Scotch peasant, or an English labourer, takes up his abode in a forest, or on a prairie, becomes a farmer, and lives alone. With all his native roughness he settles down where his nearest neighbour is miles away, and he learns that he is a sovereign personage, one of the sovereign people, owner and monarch of all he surveys. So he rusts and rusticates for some years, or for half his life; and so his children grow up, good stuff, but rusty blades. Once in a while this country class travels. A son who has swarmed from the parent hive sets out to visit his parents, or a parent to visit a prosperous child. From Rome to Vienna, from Milan to Paris, from Hamburgh to Madrid, or from the Land's End to John o' Groat's house, are distances scarcely equal to many of these visits. With travellers of this class a vagrant in the Western States must associate, and so he learns their ways. They are rough country kings, right good stuff, independent, well-fed, well-clad, prosperous,

and good humoured; they come of the class who in Norway say 'thou' to the king, but they are very rough diamonds here. In the old country they were used to kick up their heels, smoke, chew, and spit freely; they have done the same more freely in their new-country home, and when they are jammed together, 100 in one car, they continue their home practice and spit pools. Recruits are not the most polished members of any society, and a crowd of recruits sifted from such a class is a rough lot. In the State of Maine I fell in with a recruit. He was a lad of eighteen or thereabouts, and was rather 'tight.' He spoke of 'Old Jeff Davis' and 'Abe,' and what he would say and do to them. He had once driven one in a stage, and he would tell the 'darned old skunk' how to rule the nation and conduct the war. Every fresh burst ended with the same chorus, 'I am a rock—in the ground.' He was a very rough geological specimen, but he was on his way to the mill. Some weeks later a vagrant friend happened to meet the same youth, and found him sad and sober; all the crow was taken out of the game chicken; he had found his level in the ranks, and his stiff neck had learned to bow to authority; a drum-major, more despotic than Jeff Davis, had dethroned the sovereign, and he was tamed. Later I was crammed into cars with soldiers returning from the front, and their

bearing was different; the 'rock in the ground' becomes a granite boulder by dint of hard knocks, and the soldier gets hacked and chipped into form. In a crowd of recruits men struggle for life and elbow-room; the weakest go to the wall, and the strongest only holds his place by sitting sturdily in it; but in a crowd of soldiers it is not so. One upright bronzed man, with stripes on his well-worn jacket, rose unasked to let two friends sit together; another rebuked a waiter for keeping an old man waiting. In endless nameless ways camp manners outshine the country manners of rank and file, for the civilian is civilised by discipline.

The way by which the change is wrought is plain as the change itself. An army of autocrats could do little in the field, so Liberty has to whip her naughty boys. She does not flog them, but she finds ways to tame her rebellious cubs. The schoolmaster in *Midshipman Easy* had found out that one caning was worth two floggings, and the most stubborn Yankee scholar has to yield when hung up by his thumbs for a good spell. This change of demeanour appears in all grades. Many green officers are noisy roystering blades, full of very strange oaths, and bearded to their full power. Some 'Captains' and 'Colonels' are like escaped counter-jumpers; but the old hands are generally quiet, silent, courteous men,

with the open steady eye and fixed gaze which men earn face to face with death. The majority are old hands, though young in years; they dress the part ill, but they act it well, nevertheless; their clothes may be threadbare, torn, and dirty, but they have the bearing of gentlemen who are good soldiers. Surely this adversity has done some good. The traditional, cute, nasal boasting, drawling, impudent, long-haired, offensive being portrayed by Mrs. Trollope and Dickens, appeared last night on the boards of a Yankee theatre; but the real man, if he exists anywhere, has not yet crossed the devious path of—Your obedient servant.

St. Louis, Missouri, October.

CHAPTER XI.

THE WHITE MOUNTAINS.

Arrived at Gorham, a vehicle appeared which was something quite new. Very few people in the Old Country seem to have heard of the White Mountains; but nevertheless Gorham is the landing-place of a large crowd of tourists. A map of routes to the White Mountains is like a lattice-window of railroads, laid upon the Yankee side of the frontier, between the sea and the St. Lawrence. It comes to a sudden end in the British Possessions; for the Grand Trunk is the only main line north of Maine: it looks like the handle of the gridiron which reaches from Quebec to New York. But the New York corner is joined on to a larger lattice-window, which opens America between the sea and the Mississippi. The class who in England would visit 'the lakes,' here visit the White Mountains and similar resorts; and for their convenience great hotels grow up in the wilds, roads scale mountains many thousand feet high, and stages are provided to fit the traffic. The new vehicle was a 'stage.'

It was yellow, with openings like those in the Queen's state-coach, hung with curtains to keep out the rain and let in the view. It hung upon very large C-springs, with long leather straps and large buckles, and generally it looked like the thing which a coach used to be in England. It was driven from the box, and drawn by three pair of prancing, long-tailed, good-looking gray horses. As the train drove up, the driver performed a kind of circus evolution round the Gorham Hotel, and he afterwards explained that his horses would stand anything but 'Indjuns.' 'When they scream and smoke, my horses will not stand still, I reckon.' I had seen no Indians in this part of America, but on consideration it seemed that Jehu meant engines, and his manœuvres were explained. Mounted on the top of the stage, with a falling twilight rapidly settling down, we drove into the glen which leads westward to the Glen House. The driver managed his team admirably; they stepped out well, and at first it was pleasant going. The road was good, and the first plank bridge, over which we rattled merrily, was sound, though it had no parapet or hand-rail. But as the night fell the road became abominable. By force of jolting and C-springs we were thrown half a foot into the air, and dropped down again with grievous bumps. Having travelled much in many lands, I never was so jolted anywhere.

It further appeared that some of the plank bridges ahead were rotten, and broken into holes; so a halt was called to light the lamps and take the fares: one dollar each paid for the whole turnout. With lamps lit, and a volunteer running-footman ahead to look out for holes, we got on well till a turn of the road showed a couple of lamps advancing to meet us. To the right was a burn brawling amongst boulders, which I knew to be hard though I could see them clearly; a thicket of birch-trees rose to the level of the road, and a felled pine laid lengthwise was the only parapet. To the left was a steep bank of red clay. 'I reckon it's a bad bit,' said the driver. 'That's Tom with the other team. Go along!' So saying, he gathered up his handful of straps, stamped his foot, and, taking the outside, went along, touching the prostrate tree, as it afterwards appeared from the wheel-marks. Tom, on his part, was driving another empty Lord Mayor's coach with four pair of bays. So fourteen horses and two stages met and passed in the dark with scarce an inch to spare. There is a Highland legend which portends woe and disaster from gray horses, and it rose up like a warning ghost in these American highlands; but the day of the gray horse had not come. Jehu took the compliments showered upon him very composedly, and we got to the Glen

House safe, sound, and chilly. A bright hall, full of well-dressed quiet people, an excellent meal, and good quarters were ready, ordered by telegraph by a provident comrade, who had heard much of the crowds at the Glen House. So here we landed safely, at 1632 feet above the sea, in the midst of an American forest, 100 miles from the steamer, in a mansion worthy of the great cities whose tourists here delight to abide. Delta, Ariel, Osprey; huts in Labrador and hotels in the capitals of Newfoundland, Cape Breton, Nova Scotia, and New Brunswick, even the 'four-in-hand club' are sadly eclipsed by coasting steamers, cars, country inns, and eight-in-hand stages in Yankeedoodledom.

Sept. 7.—An adventurous American company have constructed a road to the top of the highest peak of this high cluster of mountains, christened by loyal citizens after their greatest men. From various 'public houses' in the district, stages, carriages, pony-phaetons, country cars, ponies, and pedestrians, start for the 'tip-top house' at all hours. The stables at the top are crowded with cavalry in fine weather. An electric telegraph orders dinner above, in proportion to the number who start from below. Vehicles are drawn up by four, six, and even eight horses.

The American cockney travels by rail from his Lon-

don or Liverpool to the foot of his Ben Nevis, or Beinn-na-muice-duibhe; drives to the top in a coach-and-six; dines, drives down again like a gentleman, and pays in greenbacks.

The distance from the Glen House to the top of Mount Washington is 8 miles, the average grade is 12 feet in 100, the ascent from the plateau on which the hotel stands is 4653 feet, according to the measurements given. The road was begun in 1855, finished in 1861, and is a very creditable tourist's promenade. It is, in fact, good solid engineering, worthy of an Alpine pass. Sketching and scratch-hunting are best pursued on foot, so we scorned the coaches and mounted 'shanks' nagie.'

The mountains are not very remarkable for beauty of outline, but they are grand big hills. The ridge opposite to the Glen House is of the shape which is called a sierra in Spain, a scaur in Scotch, a scaw in some parts of England, scarn in Gaelic. It is scarped, serrated; in short, it is like the sharp-toothed instrument whose name comes from the same root,—a saw. The points of this saw are named after men who helped to shear the States from their English root, and the top-sawyer is Washington, of course. He is 6285 feet high.

These family portraits may be expressed by Lord Dufferin's shark-tooth diagram of the Loffoten Isles.

'Mount Clay, 5400, rising over the Gulf of Mexico; the stout, square-shouldered Jefferson; the symmetrical, sharp, and splendid pyramid of Adams, 5800, and Madison, 5361, who completes the staff of Washington,' make a respectable old saw, but the teeth are blunted when compared with Alpine aiguilles, Norwegian spik, and Highland cathair.

American scenery is very grand, but the grandeur is horizontal not vertical. The nursery rhyme tells that

> There was an old woman
> Lived under the moon,
> And all that she wanted
> Was elbow-room.

She might have found it in America. There is so much space, that land is spread out in plains; but in the Old Country the land and the people are piled in heaps for want of elbow-room.

If the peaks of this North American sierra be like a blunted saw, the back of it rests on rounded hill-shoulders. Up to a height of about 4000 feet, the outlines are curves ⌒, and the ground is hidden by dense forests of tall trees. The foundation of the pile is rock, of course,

but scarce a bit of rock is visible from below. Trees need soil and a certain average climate, so the vegetation registers the climate and betrays the nature of the hidden soil. These records are marked in horizontal lines of green and gray; they come out conspicuously in sketching, and in good photographs the forest limits are clear as ruled rays and horizontal washes of brown sunlight can make them. The pedestals on which 'the staff of Washington' stand have mouldings of boulder-terraces, flights of giant steps, on one of which the Glen House Hotel is perched at 1632 feet above the sea. In the morning the sunlight creeps down from the bald bare sharp heads of the fathers of their country, to their round shoulders, and it leaps from step to step into the corn-fields in the wide strath. In the evening the blue shade of Washington stalks out of the yellow corn, up the steps of the green amphitheatre, into the forest; mounts over the ridge of Carter, and wraps up his New-England children in a robe of blue for the night. This in fine weather. As a rule, the ancients wear damp sheets of mist and night-caps of snow, and sit behind cloud curtains, with their feet in cold water. What colds they must have in their poor old stone noddles! Surely it is better to call old hills by old native sonorous names, which

have a natural or mythical meaning. 'The Abode of Storm,' 'The House of the Mist,' 'The Bear's Hill,' or 'The White Mountain,' suggest appropriate trains of thought; but men's proper names, improperly used, suggest twaddle to those who write guide-books, and to those who read them.

John Nokes, the father, or Jonathan Styles, the son, is right to inscribe his name in Westminster Abbey, or the Capitol at Washington; in the Pantheon, or Whallalla, or on Mount Parnassus—if he can get there; if he does not, no one else will. But George Washington has no need to be advertised in the highlands like PLANTATION BITTERS. His name is conspicuous on the page of history, on the map of the world, and in the temple of Fame.

Up to a height of about 3000 feet the soil on the hill-side appears to be drift. Stones are rounded, and packed in a matrix of clay. In this region the trees are tall and well grown. Above 3000 feet the trees diminish to the size of a Newfoundland forest. At 4000, or thereabouts, they dwindle to the size of a forest in Labrador, crouch down and crawl along the ground, as if crushed by snow, scourged by wind, and cramped by rheumatism. They point their blasted arms and crooked fingers at the upper region, in which Jack Frost abides.

In this zone all the loose stones are angular and natives; the vegetation is like that of the coast near Cape Harrison in Labrador, near the North Cape in Norway and about the perpetual snow-line everywhere. There is a belt of berries and bushes, which fades into an upper belt of mosses and lichens. This belt is very like the low coast country in Lapland, Iceland, Labrador, and Newfoundland; and the highest hills in Scotland, drift excepted. The glacial period can be reached by mounting, by moving north, or by seeking a sea-coast near polar water.

The shape of the lower ground is that of the amphitheatre of boulder-terraces which surrounds Conception Bay in Newfoundland: the materials also are similar. The terraces are made of large heavy hard rounded stones, gravel, clay, and sand, and they do not seem to be natives. It is clear that water had much to do with the packing of the terraces, for sand and pebbles are laid in beds and arranged about the larger stones, as water only can pack such materials.

The highest point in the glen is at 'the Notch,' where two rivers part. The ground there is a ruckle of loose stones arranged in flat beds by running water, possibly by streams which flow out of 'the Gulf of Mexico,' or whatever the name of the highest corrie

may be. The streams are insignificant in summer, and their rock-denuding work, measured at falls and such places, nowhere exceeds a few vertical feet or yards of rock-cutting. The drift at watersheds looks like foreign drift arranged at spots now 2000 or 3000 feet above the sea. Hitchcock calls this an ancient sea-margin, and it looks very like a 'tarbert' at the end of a couple of long sea-lochs—a place like the Labrador isthmus above mentioned (p. 79).

Three hundred and ninety-eight feet lower than this watershed, a couple of miles from it, in the bottom of the glen, at the level of the hotel, and 1632 feet above the sea, glacial striæ near the burn point N. 35° E. and S. 35° W., allowing 9° for magnetic variation.

If these were made by a local glacier, it came out of the highest corrie, and went down-stream to Gorham ; its depth is to be found by marks on the sides of the glen V.

On the flank of Mount Washington, beside the new road, at 1992 feet above the sea, and 38 feet lower than 'the Notch,' the striæ point N. 30° E., and they are perfectly horizontal.

Higher up, beside the same road, at 2307 feet above the sea, 675 feet higher than the hotel, and 277 feet higher than 'the Notch,' striæ perfectly horizontal by spirit-level aim N. 30° E., or S. 30° W.

All these are so fresh that rubbings were taken from the rock-surface.

If these marks were made by a local land-glacier, familiar pictures of glaciers elsewhere make it easy to map out the old ice. It must have come out of the high corrie; it was at least 700 feet deep opposite to the hotel; it must have gone after the water to Gorham, and thence along the Androscoggin river-course to the sea-coast, 25 miles to the north of Portland. The other stream, which parted from it at 'the Notch,' must have followed the other stream, which reaches the sea a little to the south of Portland. At Portland, 90 miles away, glacial striæ are as well marked as they are at Mount Washington, but they point N. 28° W. at a mountain-pass, diagonally across the rivers, instead of pointing up-stream, as they ought to do, if made by local glaciers.

Either the whole land was covered by one vast sliding geological formation of polar land-ice, or it was drowned in an arctic current like that which is now passing the same latitude in the east. Immediately under the 'tip-top' house is a 'corrie' called by the euphonious name of Tuckerman's Ravine. Tuckerman was somebody, of course. In this temple of Tuckerman's apotheosis, a snow-wreath generally survives the summer, and forms an arch, which is a favourite 'lion,'

though rather hard to get at. The rocks about it have the form of rocks about Alpine glaciers; it is the very spot in which to plant a glacier. If the snow-wreath be the last remnant of a departed race of giants, the last of them must have carried stones from Mount Washington to Gorham. But if the ice was sea-ice drifting through a narrow sound, from the north-east towards the south-west, no loose stones from Mount Washington could well reach Gorham, though they might reach New York, or any other place to the south.

At Gorham, 802 feet above the sea according to guide-books, the rocks are all glaciated; the bottom of the valley is a plain of drift, the sides are conspicuously terraced, and the rivers have not laid the rock bare. Rivulets higher up have done more work, so they are of older date than the lower rivers.

At Thomson's Fall, above the Glen House, the rivulet has smoothed a considerable breadth of rock, and it has worn a trench in gneiss 18 inches deep and 36 wide; the depth of water was 5 inches, the width of the stream 18, and the height of the fall below this tiny spout is some 6 or 8 feet. The other falls which are visited have done about as much in proportion to their size. The river at Gorham has not cleared the drift out of the rock-groove in which it flows. The

terraces line the hills: one is fully 200 feet high, and as well preserved as any in Scandinavia. They contain very large boulders of red, gray, pink, coarse and fine grained granite, granite with dark slate enclosed, black and red porphyry, black hornblende, hard slate, and others, similar to Labrador rocks and northern boulders. Many of these are finely polished and striated; but, after a long search, no single scrap of the peculiar shiny mica-schist of Mount Washington was found at Gorham. The base of the terrace on the north side has been laid bare by a landslip; the foundation on which heavy boulders are piled is finely-laminated gray sandy clay, arranged horizontally. Where small rivulets have washed the face of the terrace, beds, thin as paper—56 to an inch, and 50 feet thick at least—are seen. The beds are evenly disposed about large stones, so they must have been deposited in still water. With the thermometer at 70 in the shade, it was very pleasant to think of cool lakes and ice, and drink iced water. No shells were found in these terraces; even under a strong microscope, nothing was found in the sand; and till something organic is found at some high level in American terraces, glacialists may continue to theorise.

While busily rubbing a bit of heel-ball upon a sheet of paper laid on a rock, with the edges north and south

by compass, a regular pedestrian in blouse and knapsack, alpenstock and all, stalked up, followed by a gentleman in spectacles, who said nothing. The guide, if such he was, took a wrinkle from the stranger, and told him in return that he had hunted striæ on these mountains for many years. He meant to write to Agassiz; it is to be hoped that he will send heel-ball copies of glaciated rocks to head-quarters at Boston. So much for the superficial geology learned during three days in this region.

The natural history was taught by bears. Each of these public houses keeps a bear, chained by the neck to a large post. The bear at the Glen House was big and black and lusty, and looked good-humoured. Wishing to make acquaintance with every living thing, walked down to fraternise with the bear. The brute turned his back and walked off to the far side of his worn ring, sighing and grunting, as if he were somewhat uneasy in his mind or body, and wanted comfort. Having got to the end of his tether, he sat down on his hunkers and gazed abstractedly at Washington over the way. But there was something indescribable in the manner of doing this; it was so like acting that suspicion was roused. Pausing at the edge of the ring, the traveller tried to act his part and sell the bear a bar-

gain. Judging by the chain-marks how far the brute could reach, the human actor took his place within the ring, turned his back on the bear, and gazed abstractedly at Carter on the other side. Both were looking out of the corners of their eyes. The bear, thinking he had done it rather well, suddenly sprang up and charged, running as fast as ever he could to catch the man; but, as the stage directions might have it, enter bear L.; exit traveller R., with a quick motion. The first act ended, the second began by puffing and snuffling, and whining and fawning for food; but a vision of the brown, bushy, Labrador dog, with the sharp white teeth, rose up, and that mild dodge would not do either. So Bruin rose, and stalked off with a tragic, solemn, two-sided step, and laid himself down to bask in the sun.

The bear at the Alpine House was bigger, and fatter, and better-natured, but evidently a very miserable brute. Near him were a tribe of very happy big free brown kingfishers. They made a noise like the sharpening of edge-tools, and delighted to sit swinging on the telegraph wires, from which they dived headlong into a still mill-pond. After each plunge they flew round their domain, and then they sat in a row and sang their song of triumph over dead minnows.

If there be 'sermons in stones,' the rocks hereabouts

are eloquent, and teach something of American ethnology. There is a puffing tribe of bill-stickers in every community. Moses and Son keep a poet; here they keep artists with a good eye for the picturesque. Londoners used to read the virtues of Warren's blacking from every dead wall; but Highlanders, who wear no boots, were spared this blessing. American city highlanders do wear Wellington boots when they stamp on the head of Washington, and they drink bitters; so at every picturesque spot in this their highland region, they learn the virtues of the 'cherokee medicine,' 'golden bitters,' the 'vermin exterminator,' or some other quackery. On every picturesque foreground rock or stone which peers through the tangled forest grass, hideous white letters a yard long roused a strong wish to exterminate some vermin with their own drinks and drugs. Scribbling on walls is an English vice; in America it has grown big, like everything else. In this land of liberty, it is to be hoped that citizens will be so free as to duck the bill-stickers in their own pails of whitewash. The tourist Americanus, whose sense of beauty is thus outraged, seems to be a well-dressed, well-educated, good-humoured, prosperous mortal, pleasuring with his wife and bairns, with plenty of spare cash to pay his way, and fully resolved to enjoy his holiday. There seems

to be no shoddy here. The difference is in the wider region over which this variety of a common human migratory species delights to wander.

Tourists from Cuba and South America, and the Southern States; Labrador and the North; Canadians, Europeans, men from opposite ends of the earth, make a struggle to get to the 'tip-top house' and get photographed on the head of Washington. Amongst the Britishers who shared that honour was one with a handle to his name, and his advent was announced by telegraph. It so chanced that the writer was the first Britisher up, and while standing on Washington's bump of veneration, in the cool breeze, he heard these words :—'There he is—do tell; look what a beautiful bag he has on his back; that's the Lord.' Turning suddenly, a bevy of girls were detected at the kitchen-door, so the sham lord pounced amongst them, and routed them in emulation of the black bear down below. The real lord was called 'a lone object,' and much and deservedly admired when he arrived with his friend. Britishers and Yankees, lords and commons, fraternised, dined, got photographs, and drove down together in peace and good fellowship; and may they long stick to the same excellent plan.

As they used to say in France in 1848—

VIVE LA REPUB— DEMOC— SOC—

The points established by this upward cast are—first, that the flanks of the highest mountain in eastern North America are striated horizontally, up to a certain height at least, in a direction parallel to the longest mountain-chains in that region; secondly, that stones similar to Labrador rocks occur at far greater heights than 1000 feet in terraces at Gorham, at the hotel 1632, at the 'Notch' 2030, near the 'ledge' above 3000, and elsewhere. Without a knowledge of the local geology of the whole district, it is impossible to say whence these stones did not come; but stones like them occur along the whole route described so far, and they did not come down from Mount Washington.

The geologist in the blouse referred to Dana's 'Geology' for information as to the age of the rocks in this tract. The work, when consulted, gives no certain information on this point; but the rocks themselves are sufficiently conspicuous. They are disposed in beds, which are much upheaved and contorted. Many of these are sedimentary beds, which retain their original texture; others have been altered into a peculiar crumpled mica-schist, which looks very like frosted silver. When the sunlight streams through the forest, and lights up a fallen block by the road-side, it glimmers like a great nugget of virgin ore. Where this rock has

weathered, branches like silver boughs seem to be spread on the stone, and shapes like fossil-shells rise up in clusters elsewhere. Other beds are hard gray gneiss; others have large plates of mica; but no rocks like the loose boulders on Mount Washington were seen in it, and none of the mica was found in the terraces to the north; plenty of mica was found at New York.

On leaving Gorham for Montreal by rail, on the 9th, the same system of spooring was pursued. It is excellent pastime while travelling through a new country, but, like other hunting, detailed description of every run is a bore. The result is easily told. The same water-work which occurs on the Atlantic slope recurs in the middle and on both sides of the valley of the Connecticut, and on the east side of the St. Lawrence valley. At all the watersheds crossed by the Grand Trunk—at all heights up to 1500 feet at least—beds and mounds of water-worn gravel are piled; but above a certain height—apparently about 3000 feet—the mountains are bare rock. From Dana's 'Geology' it appears that glacial striæ occur on the summits of hills in the whole of this region.

He says:—

'Again the scratches are found on heights as well as lower lands. They occur to a height of 5000 feet on the Green Mountains (Hitchcock); on the top of Jay's Peak, 4000 feet high

(Adams); on the top of Monadnock. In some instances the wear and scratches are most decided on the north side of elevations. Professor Hitchcock has observed that Mount Monadnock, in New Hampshire, 3250 feet high, is scarified from top to bottom on its northern and western sides, but not on the southern. . . . . Groovings over the highest parts of the summits in the Green Mountains on which they occur were more easterly in their direction, according to Hitchcock, than those over the general surface below. The following are a few examples:—On Mansfield Mountain, 4848 feet high, the course is S. 20° E.; on Jay's Peak, 4018 feet, S. 40° E.; on Camel's Hump, 4188 feet, S. 40° E.; Mount Holly, 1415 feet, S. 60° E. Several peaks in the Hoosac range, in Massachusetts, S. 45° E. to S. 70° E. Hitchcock also gives S. 40° W. as another course observed on Mansfield Mountain.'

From this quotation it appears that the course on isolated peaks was not from north to south, as required by the big-glacier theory, but from various directions, which agrees with the movement of a current flowing amongst and over submerged hills. In valleys, current or local glacier must have moved in the big grooves which still remain; and accordingly scratches in big valleys do sometimes coincide pretty well with the shape of the land.

'In the valley of the Connecticut the courses S. 8° E. to S. 10° W. are very common, as well as over the country east and west.'

Now, in reading of 'a valley' an old-country traveller is apt to picture something like the Valley of Chamouni,

or the country about the Lake of Geneva, or the Caledonian Canal, or the Vale of Clyde. In travelling from Portland to Montreal, these old-fashioned notions are driven away. The valley of the Connecticut would pass for a wide boggy, sandy, gravelly plateau, overgrown by a dense forest, but with occasional hills rising in the distance. Without a barometer, it is sometimes hard to tell where the road crosses a valley or scales a ridge. The deep glens are at right angles to the ridge. With the barometer in hand, a section can be made of the whole of a day's route, and one was made accordingly.

After scaling the last of four ridges, at a point 1500 feet above and 160 miles from Portland, there is a clear run down hill for 134 miles to Montreal. The drift-terraces on this side are more conspicuous than they are on the Atlantic slope. The Canadian side is a rich slope of well-cultivated land, with sleek horses and cattle grazing placidly in green fields, which are watered by still shining rivers of clear water, moving slowly over beds of gravel and sand. Through these, glaciated rocks and boulders peer out here and there. In the midst of this flat smiling land occasional rocky hills stand out boldly upon the horizon like blue islands. Montreal Mountain is one of these, and from it a very wide landscape is seen. It is grand scenery, but

horizontal grandeur. The Adirondaks, 100 miles away, and other mountains which make a figure on maps, are too distant to make conspicuous features in Canada. The Lawrentian chain is too far off to be seen at all. The river St. Lawrence looks like a strait; the 'valley' suggests immensity, but it is the immensity of a wide green sea, with a few rocky islands on the distant horizon. Upon Montreal Mountain, which is limestone and trap, are large blocks of gneiss and granite, and striæ, found about 200 feet above the sea on a trap-dyke, near a road, aimed N.E. magnetic, as does the long axis of the mountain itself. So the spoor left in the Straits of Belleisle (p. 107) was picked up at Montreal after a long cast.

Nothing worthy of note occurred during the journey, unless that we arrived in exceptional good time, and without accident. The unfortunate Grand Trunk spent its energies in building the biggest bridge in the world, and has never recovered the effort. Permanent way, rolling stock, and shares, are shaky. A train broke down not long ago in the heart of the wild boggy forest near the frontier. There was nothing to eat 'on board,' and nothing but berries and birch-bark 'on shore.' The passengers were almost starved, but they were rescued at last. In winter, frosts are such that the

English system of chairs will not suit American rails—so it is said. They are hitched in somehow with hooks, and play so that the ends move. One result is a peculiar clanking sound, which is characteristic of American travel. Another is an occasional smash. The pace is everywhere slow, therefore a smash does little serious damage; but now and then it does a great deal, as in the late Richmond accident, where a whole train full of emigrants was decanted into a canal, by the simple expedient of opening the drawbridge.

At the frontier, baggage was chalked and dinner eaten, and that was the only symptom of passing from one country to another. It was rumoured that several Southern officers, bag and baggage, passed successfully into Canada; but who can tell a Southern from a Northern, a State's man from a Canadian or a Britisher, unless he choose to reveal himself or betray his nationality by some peculiar phrase or twang? Without acting a part, I have passed for a native everywhere, unless I chose to say that I came from the old country.

One of our fellow-passengers was a Scotchwoman, who had been a Canadian, and now is a Cuban, travelling as interpreter, maid, companion, and factotum to a Spanish party out on 'the tramp,' as the phrase is. No wonder that Southerns slip in and out in such a crowd.

CHAPTER XI.

MONTREAL TO NIAGARA.

Arrived at Montreal on Friday 9th. On the 12th travelled by rail and steamer to Ottawa city, about 120 miles; on the 14th by rail to Prescott, 54 miles, and down the rapids by steamer to Montreal, 113 miles; on the 15th by steamer to Quebec, 150 miles; on the 17th to Montreal by the river, 150 miles; on the 19th by rail to Brockville, 125 miles; on the 20th left Brockville by steamer, and arrived at Toronto on the 21st, about 200 miles; on the 22d travelled by rail to Hamilton and Niagara, 80 miles. In all, with sundry expeditions in carriages and on foot, more than 1100 miles in 13 days.

On arriving at a new place, it is a good plan to mount to the highest attainable spot, and there make a mental map for future use. The article is useful, portable, and easily made; and when combined with other maps and mental sketches, it becomes a portable model. Like solid statues, which grow out of a dozen photo-

graphs, the length, breadth, and height, form and colour, of a country, seen in a short time, grow into a solid miniature image at last.

At Montreal the best attainable spot for a traveller's survey is the top of 'the Mountain.' In the native country of many Canadians a rock 550 feet high would be 'a hill,' but in Canada it is high ground. The view from the Mountain is magnificent. The Adirondaks are clearly seen in one direction, and they are distant more than 100 miles. A few pictures taken from such points may include a large tract. For example, ten circles of 100 miles described about points visited in this region approach each other or cross.

One horizon seen from a hill near Sydney joins another seen from a hill near Halifax; and these two circles are linked together by a third seen from a hill near the head of the Bay of Fundy. The horizon of Springhill, at Fredericton, joins these three to the wider eye-circle described by turning the head on the top of Mount Washington. Five more eye-sketches, taken from Quebec, Montreal, Brockville, Buffalo, and High Peak in the Catskills, carry this survey to New York. Broad bands carried across and around the country, by looking out from steamers and railway cars, leave few blanks. In fine clear weather, by the help of steam, it is possible

to see a large country so as to learn the shape of it in a very short time.

The country seen from Montreal Mountain appears to be a fair sample of a tract of greater area than Britain. Roughly, it is about as far from Quebec to Lake Ontario as it is from London to Edinburgh, and the whole rise (234 feet) is less than the rise to a church weathercock. Two good trees would measure it. Water is a levelling instrument, and the level of Lake Ontario (234 feet) may be carried from Hamilton past Brockville and Montreal, 500 miles to Quebec, where the vertical scale may be read in the hill on shells and sea-margins. When Canada is fully mapped, the shape of it will be like that which the sea and a rivulet make in sand when the tide ebbs through a narrow passage between two rocks, and a new-born streamlet follows the track of the ebb-tide.

The view from the esplanade at Quebec takes in the rock-pass through which the sea escaped when it retired from Lake Ontario; and through which that young giant, the St. Lawrence, now follows the sea. On a fine bright sunny autumn morning, the Quebec landscape is painted in brilliant colours. The land is yellow with corn and spangled with white houses; the sea and the blue hills are like the fairy robe which

the good lady got from her godmother—'couleur du temps;' the foreground town is 'dirty box' and brick-dust glazed with soot and sunlight; and the picture is worthy to be engraved on the memory. In the centre of it, about 9 A.M. in September, a spot of blue shadow is let into the yellow terrace which bounds the blue St Lawrence on the left. It is a manifest notch chipped out of a step on the hill-side. So much is best seen from a distance of ten miles.

A drive of 10 miles shows that the little blue chip on the edge of the door-step of Canada was made by the famous fall of Montmorenci, which tumbles 250 feet down-stairs into the sea. When the sea-level was higher than this threshold, there were no falls, so the notch made by the fall records a date in the pre-historic annals of Canada. If the rate at which the falls now dig shale could be ascertained, the date of the dynasty of boulders, drift, and sea-shells could be fixed. The step is somewhat higher than the top of the fall, for the river has cut a trench on the stone. At Quebec one sea-margin is clearly marked at about 300 feet above the present shore. The Chaudiere on the opposite bank of the St. Lawrence does not plunge at once into the arena, but leaps 100 feet, and staggers on broken stones the rest of the way down to the strand. Numerous smaller streams

run down in V grooves, but they all run down-stairs from shelving plains; and a well-marked shelf recurs at about 300 feet, at many distant points about Quebec.

Upon some of these opposite steps, common sea-shells are buried in drift, at about 300 feet, and boulders of large size are perched in fields above the falls of Montmorenci and to the west of Quebec. At Brockville, 300 miles away, the level of 234 to 300 feet is marked by cockle-shells and boulders. The cockles were found by a native of Wicklow in sinking a well, and he was very much astonished. Big Laurentian boulders are piled on the surface of a low hill, and fixed in a matrix of yellow clay. Below them, in a well, were smaller stones mixed with black earth, and lower down is a bed of fine sand, which yields water. The cockles were 28 feet from the surface, below beds of clay of various colours; and they were for all the world like cockles in ould Ireland. At the head of Lake Ontario, 500 miles away, at Hamilton, the level of 300 feet is marked by gravel, boulders, and stratified sand; but, according to Dana's 'Geology,' (549), the Ontario terraces are 'destitute of marine remains' beyond Kingston. More searching will probably unearth more shells.

On the hill-slopes seen from Quebec, higher steps are visible to the left; and to the right lower steps are

seen on the Isle of Orleans. Mental eyes look at the model, and follow the terraces through the Straits of Belleisle, up the Labrador, round Newfoundland and Nova Scotia, and from Portland to the shilling gallery of the amphitheatre, 3000 feet high, where Washington and his staff sit gloating over the fair proportions of Canada.

At the head of Lake Ontario, 500 miles from Quebec, the land rises suddenly from 234 feet to the level of Lake Erie, 564 feet above the sea, or 330 feet above Lake Ontario, nearly level with the top of Montreal Mountain, with terraces seen at Quebec, and on the flanks of the Alleghanies.

On the borders of Lake Champlain, sea-shells have been found up to a height of 325 feet. On the opposite side of the country, more than a hundred miles away to the north, on the banks of the Ottawa, sea-shells have been found up to a height of from 400 to 500 feet, and they have also been found at lower elevations at many places between New York and Cape Breton, beyond the Alleghanies, and in Canada. At Montreal, according to Sir W. Logan, quoted by Dana, they reach 450 feet above the river, 470 feet above Lake St. Peter, and the tide. From the habits of the shells found, the sea was from 100 to 300 feet deeper than the places where the shelly critturs lived and died. The species

found are identical with those which now inhabit the Labrador Seas, and a whale was found 150 feet above the ocean-level, 60 feet above Lake Champlain. A sea more than 600 feet deeper than the present ocean is thus carried from Quebec to Niagara Falls, and past the whale's tomb through Lake Champlain to Albany, past the foot of the Catskills, and to New York. It is proved by sea-shells that a sea extended from Belleisle past Quebec to New York. As yet, according to the books, the shell-scale reads no higher than 470, and 100 of water, 570 above the present sea; but the terrace-scale on the hills reads to 3000 feet at least, and the old scratch of Jack Frost's claws is higher still.

Nearly 800 miles away from Quebec, the level of 570 feet is marked by the shore of Lake Michigan. It may be read on Lake Erie and elsewhere, for all the upper lakes communicate and are near the same level. Beyond Chicago is the highest step to the westward. It is a dead level plain of drift at about 620 feet above the sea. It corresponds in height to a hill fifty feet high at Buffalo, where Lake Erie escapes, in order to tumble downstairs at Niagara; to the tops of trees on Montreal Mountain; to boulders near Quebec; to collections of water-worn drift on both sides of the Alleghanies.

Judging by eye, by rough measurements hurriedly

made, and by facts culled from books, terraces seen from the esplanade at Quebec might be followed round the St. Lawrence basin, in which Europa and John Bull might bathe.

The Canadian rivers confirm this view. They are large copies of Swedish rivers which enter the Baltic and pour their waters through the Sound. If the bed of the Baltic goes on rising, all the Swedish and Russian streams will join to make one large stream, and it will enter the sea, and pour out of the Baltic basin at the lowest notch in the lip of it, if the whole basin rises evenly. Elsinore will be the Quebec of the Baltic when the sea is poured out and rain pours through. The Canadian basin appears to have risen evenly and gradually; the sea has poured out, rain pours through, and the river St. Lawrence enters the sea at the lowest notch in the lip of the rock-basin, which once held an inland sea larger than the Baltic. Quebec is the Elsinore of Canada, and the largest Canadian rivers are new-born streams.

When shells lived at 120 feet above Lake St. Peter, at the foot of Montreal Mountain, the sea-coast was somewhere near Lachine Rapids, and there the old sea-margin seems to extend inland from both sides of the St. Lawrence. All the land below that limit was under tidal water when the shells lived, and the great river

only began to cut out its groove when the sea retired from Lachine towards Quebec. The Ottawa and St. Lawrence then formed a V, now they make a Y. The same coast-form is repeated higher up. Shells are found at Montreal at 120, 220, 386, 440, 490 feet above the level of Lake St. Peter.* At higher rapids in the St. Lawrence and Ottawa, the rapid fall in land is not confined to the river-bed, but extends as far as the eye can reach and judge. Each rapid marks the end of a step, the mouth of a river, an ancient sea-margin, or the end of a submarine delta. Near Prescott, about 300 miles from Quebec, is a rapid, and a corresponding fall of forty feet is at Ottawa city, more than forty miles away. Between Prescott and Lachine are other rapids, which correspond to rapids on the Ottawa. Ancient sea-margins, or contour lines made by the ebb, cross the fork of this Y. When the sea reached so far, the two rivers were neighbours, like the Luleå and Umeå, but did not meet. Like Swedish streams, these and other Canadian rivers, which now join in the St. Lawrence at Quebec, form long shallow lakes, with short rapids between, throughout their course. The flat water-level of the lakes marks the top of a broad bench, the 'portage,' 'rapid,' or 'fall,' is at the edge of it. Like the rivers, the Grand Trunk

* Dana, p. 551.

and other railways and canals mount and descend step by step, and each step was plainly seen along the hill-side, when the barometer marked a sudden fall. Rail-roads, canals, rivers, terraces, and sea-shells, tell one tale and help the model.

In the midst of this amphitheatre of great plains, a rock of trap and limestone has been left standing by the denuding engines which shaped the low-ground; shells left on the side of it make it a scale like a nilometer; but above all the shells, on the top of it, three large blocks of granite and gneiss are stranded. They stand near the level of ground near Niagara, Buffalo, and Chicago, at about 570 feet above Lake St. Piere, near the highest water-level marked by Canadian drift-shells. The mountain seems to be a roche moutonné, with hard trap to the N.E., limestone to the S.W., and the long axis of the hill pointing S.W. Striæ found on the Mountain aimed up the valley; they abound throughout the whole district, according to the Geological Survey, and aim all manner of ways. At the foot of Lake Ontario, at Brockville, a rock of gray quartz in the town is so finely polished that lines on it were invisible, and almost impalpable, till a heelball rubbing brought them out. Their main direction is N. 45° E. (magnetic), and large polished grooves, in which sand-

lines occur, are ten feet wide. At other spots on the same rock, lines point north, and have other bearings, but the whole shape of the country bears N.E. and S.W. Beyond Brockville, "the thousand isles" of Lake Ontario closely resemble groups of low rocks off Gottenburgh. The solid rock foundation of Canada, up to the level of Lake Ontario, is glaciated. It is striated in various directions, but the main lines observed aimed from Belleisle towards Niagara. Upon or near the rock are beds of sand, shells, gravel, and clay, with large and small scratched boulders of foreign origin. Higher than these beds of drift are more beds of sand, shells, gravel, clay, and boulders, as high as up to the top of Montreal Mountain, and the top of Niagara Falls.

Surely this glaciated, striated, terraced, flat land of drift and sea-shells, which looks like a green sea with blue islands in it, was once at the bottom of a gulf like the Baltic, 500 miles long, in which bergs drifted, and grounded, and sowed boulders, as they now do in the same latitudes, in the bays and on the banks of Newfoundland. Surely no glacier could descend from the North Pole, pass south into Canada, and climb over the Alleghanies towards the Equator, and yet cut the low grounds into hills and hollows bearing N.E. and S.W., as do the Alleghanies, Canadian hills and hollows,

rivers, lake-basins, striæ, and sand-lines. The spoor found in the valley of the St. Lawrence points towards Niagara, so it had to be followed there.

In winter the power of ice-floats driven by water-power is tremendous. The river freezes, and packs ice till the flow of water is obstructed. The rock-pass at Quebec is like the Narrows at St. John's, Newfoundland, in the frontispiece. A photograph was made some years ago, when the river 'took' at Quebec. The whole pass, about a mile wide, was then paved with great broken slabs and rounded boulders of worn ice, as big as small stacks, piled and tossed, and heaped and scattered upon the level water below, and frozen solid. The upheaved and contorted crust appeared to be at rest, and the camera was placed upon it; but the solid was shaken by ice-quakes, which resulted from tides and waves in the water below. The camera moved, and the picture was blurred. As a register of an ice-quake, it has the more value. This kind of ice does not produce striation at the water-margin at Quebec. At Montreal, when the river 'goes' the ice goes with it with a vengeance. A watchman sits in a box at the end of the iron tube of the Victoria Bridge, some 50 feet above the river, on a solid stone pier. The river once drove its broken crust up the side of the pier,

over the parapet, on to the railway and the watchman's box. If a river can push ice over an impediment 50 feet out of water, the Arctic Current may do more, for it is wider, and deeper, and stronger. The piers are not yet striated by river-ice at Montreal. At Ottawa the river flows along the foot of a cliff of limestone, which is about 150 feet high. The river is frozen in winter, and when it goes in spring the water is 18 or 20 feet higher than it was in September 1864. The rocks at the high-water level have no trace of glacial striæ. Horizontal beds are undermined, and project over the water-line, as rocks do at the Bay of Fundy, and further north. The upper water-line is marked by a horizontal groove, sawed out by river-ice and waves; but this tool-mark is not the same as the ice-spoor. In the dry autumn of 1864, a broad rock-surface was bare in the bed of the river, below the new buildings at Ottawa. This rock is rubbed by river-ice every spring, and always in one direction, but it is not striated. The beds are shattered, and the fragments thrust from their places down-stream. Large slabs have been moved various distances, so that joints are open from one to three or four feet, and the last of a series has been carried away.

These surfaces are all rubbed smooth, and the edges

of broken beds are rounded where exposed to the ice, but there are no striæ. The limestone is ice-rubbed and water-worn, shattered with ice-wedges, and moved by levers of river-ice worked by water-power, and it bears the marks of these engines. An island below the fall is made of similar horizontal beds of limestone. A stream, occasionally loaded with heavy ice, is constantly passing it in one direction, and the shape of the island is the result of river-denudation. The plan of it is like the water-line of a yacht or a fish: sharp in front, broad at the shoulder, tapering down-stream. The elevation is a terraced mound rising by steps to a small slab on the top of all, and each course of masonry has taken the same fish-like plan to resist the ice and the stream. The steepest end is up-stream. This rock is a miniature of shapes in the Faroe Isles. An ocean-current with ice-floats may sculpture rocks into large copies of the Ottawa Island. On the top of the cliff, the foundation of the new building is dug through beds of unstratified clay, which contain many large striated Laurentian boulders. Where the limestone rock beneath this boulder-clay was newly exposed in a drain, it was not striated, but apparently water-worn. The striation of rocks is not universal, as it would be if caused by a polar glacier; but partial, as

it would be if produced by ice-floats heavier than river-ice, but similar in all other respects.

The water-line at Brockville, where the still river or flowing lake forms an ice-bridge between Canada and Yankeeland every year, is distinctly grooved. If the lake were drained, the old water-level could be read on a granite scale; but the surface on which thin ice works every year is coarse. It is neither polished nor striated. A glaciated tor of quartz near the spot appears to be made of sandstone, altered by the heat of whin-dykes, or of the granite about it. Marks on it contrast with marks made by river-ice, and prove that some heavier engine sculptured the ship-like form of Montreal Mountain, and the rocks in the street of Brockville.

Many of the colonists who now live at the bottom of the old Canadian gulf are queer fish. It is very strange to hear the familiar accents of Norman French, and to see crowds of old Frenchwomen in broad straw hats craning over the edge of locks to sell apples and pears; screaming and chattering like their relatives over the water in the market-place at Avranches, and scolding like furies about 'sous.' Voleur! voleur! voleur! rend me les paires. In Hogarth's print of the gate at Calais, a lot of old fish-fags are made like the skate which they offer for sale, and the old French-Canadian apple-women

were, if possible, stranger fish than they. The scene changed when the boat was left for the cars, and the Irish element broke out in a free fight between drunken lumberers. It was not the English battle of fists and fair play, nor was it Italian murder; the fight was a series of cuffs and kicks, like the 'knock-him-down and-stamp-upon-him' faction-fight of Ireland, with a cross of French savatte and Scotch caution. It is told that a Scotchman once mastered his foe in a street fight, and having done so held him. 'Let him up, you coward,' said the English crowd. 'If it had cost you as much to get him down,' said the Scot, 'you would not be so ready to let him up.' Having floored his man, the upper Canadian kicked him and pounded him till it was time to embark on a second boat. Amongst these rude bony pike an English maiden, under a blue umbrella, selling tea and snowy bread and butter, with a broad shady yellow straw hat and flowing ribbons above her bright curls, might have inspired Sir Joshua. For sweet maidenly modest beauty, and fair rosy complexion, a purer type of Anglo-Saxon beauty could not be found in merry England. She was lissom as an eel, and fresh as a trout. Close at hand was a picturesque brown half-breed, with dark locks and a wild roving eye, armed with gun and powder-horn, bound for the backwoods.

A strong sulky salmo ferox of a man he was—half Indian, half habitant, French Celt and savage. Then came a well-known home figure—the old Highland dame, with snowy cap and broad black ribbon, the tartan shawl and short gown, and the neat strong shoe and woollen stocking of the flourishing farmer's wife. She had brought her niece down to see the train for the first time. To see them and hear them was to think of herrings and heather, and the smell of peat-reek and wet birches, far away in Argyll. How strange it seemed to hear the very accent of Lorne naturalized in a Canadian forest! She lived in the strath, she said, close by, and she had not been so far from home for many a day. Her speech was Gaelic, and it is the common everyday speech of a flourishing race of well-dressed proprietors, farmers, and labourers, who have changed their sky—not their nature. 'We had a ball here last week in the barn,' said one of these Celts in broadcloth, whose twang betrayed him in the car; 'and a better-looking set of lads and lasses you would not find in all Canada. We kept it up till gray daylight. We had the pipes and a fiddler, and plenty of good whisky; and a better-behaved, decenter set of people there could not be. There was not *wan* of them that was drunk.' In another place it was suggested long ago that Celts would never make sailors,

because the genius of the race lay in farming and adventure on shore.

Here in Canada Highland emigrants flourish. They settle kindly to farming, rejoice in a forest life which admits of a shot at the deer, make excellent lumberers, and in the backwoods earn large sums by cute trading with wild Indians. If farmers must give place to herds on the Highland hills, it is better to send them here than strive to drive them out of their element into the sea after fish. As a Gaelic proverb has it, 'The cat's delight* is on the strand, but she will not go there to fetch it.' The Gaelic region passed, there enters a mongrel, who is neither fish nor flesh nor good red herring, as it appears. He is drunk as an owl, his speech is a jargon of English and French, with some novel ingredient intermixed; his hair is woolly, his features most like those of a chimpanzee, and his colour whitey-brown. As the midshipman wrote in his log, under the head 'Manners and Customs of the Natives'—This native 'has no manners, and his customs are disgusting and obscene.' He is supposed to be a cross between a slave and a slave-driver, with a dash of the Redskin and habitant somehow introduced. Then comes the lake-steamer, and from a nondescript crowd of everyday folk a group of Indian

* Fish.

women stand out in strong relief. Dark-skinned, dark-eyed, with straight hair black as night, and graceful figures draped in blue and russet brown, they stand alone in the crowd, unable to speak the jargons of white men. They are out on the tramp with a store of embroidered nick-nacks which can be of no earthly use to anybody, but may tempt idle folk with more money than brains. The neat small feet of a pure breed come gliding into the saloon, the slender thoroughbred hand presents a coloured contrivance of bark and quills, and a soft musical voice suggests 'Will you buy?' When night comes they make their camp amongst the boxes, roll their heads and drape their figures in some picturesque gear, and lay them down to sleep on the boards in graceful postures worthy of sculptors' models. There is no unseemly sprawling—there they rest with the native grace of a healthy young savage, still as veiled figures on a bronze tomb. When feeding-time comes, the figures awake, the boxes open, and stores of wheaten bread and apple-pie appear and disappear with great decorum. Old and young, the squaws are pictures, but they are mute as fishes for want of a common tongue. Not so the backwoodsmen bound for home. Seated in clumps on boxes and barrels, they gaze silently first on the red-hot sun, then at the red foxy sky, and then at the silver moon-

light on the calm lake ; but when night has fairly come, their deep manly voices awake, and there they sit and chaunt Methodist hymns and forest melodies for hours.

How different from these natural figures are the actors on the stage of society in large towns ! There the life-drama is played out by kind, hospitable, well-bred people ; by men and women who would adorn any station in any land ; but very like well-bred, hospitable, kind people everywhere else. There also are 'fast young ladies' and 'frisky matrons,' prudes and 'pretty horse-breakers ;' careful matrons, muffs and muffins ; soldiers, sailors, tinkers, tailors, apothecaries, ploughboys, gentlemen, and thieves—all in active pursuit of each other, and the ends which people like them pursue at home. They all fight out the battle of life, like whales and shrimps, cod-fish and caplin, off the Labrador.

The landscapes in which these figures appeared are strongly marked. There is something strangely wierd-like in the glimmering lustre of the bright tin church-spires, shining with the reflected glow of sunset against a cold twilight sky. On the St. Lawrence, the foreground is clear smooth green water ; the background, a line of dark green firs, with a log-hut, or a big warehouse, or a corn-field, or a white town, or a cloud of dun smoke, a tin roof, or some such incident, to relieve the dead

flatness of the lines. A rapid is approached, and the banks begin to heave and roll like the water. The vessel seems to acquire new life, and speeds on like a bird, while the magnificent river rolls and tumbles like the Race of Alderney, or the flood in the Bay of Fundy, as wild and as wide.

The rapid ended, the first picture rolls on again like a revolving circle of green water and fir trees, passing continually, but never ending. The marked feature in every picture is vastness, clearness, and uniformity. There seems no limit to the country, no point from which to begin or end. The new incident is the passing raft. Those who have seen floats on the Rhine or Danube may add up all they ever saw there in a year to make one mental raft, and the sum will scarce equal one of many Canadian timber-floats seen in a day. It is an island of wood, with a large floating population. There are the log-huts, the tall spars for masts, the axemen hacking and hewing timber as they go; there sit whole crews, working sweeps, and above all stands the admiral or pilot commanding by signal. He may be some old Indian, wrapped in a buffalo robe, still as Nelson on his column in Trafalgar Square till the rapid is near; then up goes the flag, and men and trees, wood and waves, fight out their battle with might and main,

they roar, and struggle, and shout, till the raft is safely launched, or torn into little chips, which are great trees, or large faggots of fir. At Quebec—the bourne of so many forests and the birthplace of so many navies—timber is gathered so as to cover some square miles. The road along the river-side is paved with deals, the footpaths for miles around are like the road. An offshoot led from the falls at Montmorenci works the largest saw-mill in the world—and the sole occupation of the machinery is the making of planks, deals, and 'the wood that is neither crooked nor straight.' There is food for many such mills, and for many years to come, at Quebec. The beach is laid with logs and shavings, every creek is filled with spars and chips. Every man, woman, and child, for three miles at least, seems to be a carpenter, and fully employed. Above this timber-shore is the steep fractured rock on which the fort is perched at Quebec.

Landscapes on the Ottawa are much the same. The water is brown and thick, instead of green and clear. The river is far smaller and the banks somewhat higher, but the same endless panorama of trees and water seems to roll past the ship, as she paddles up or down. Ottawa city is a marked feature. The landscape and the building would be fine anywhere. The banks of the

river are low cliffs, hewn into bluffs by small streams. Falls, forty feet high, are fondly compared to Niagara, and are in fact grand falls. The neighbouring country swells up into low, rolling, pine-clad hills, somewhat like the country near Ascot and Wellington College. On one of the bluffs, above a river as wide and as still as the Thames at London, and with dark rolling hills and forest-plains on every side, the new Provincial Parliament House is growing up, a stately pile, worthy of the Union whose interests are to be cared for within the walls.

It is little inferior to the palace at Westminster, and the materials of which it is made are better and more durable. Like the Capitol at Washington, it stands near the middle of the settled country, in a town which scarce exceeds an English village in commercial importance. The railway scenery is like that of the rivers, and the lakes are like seas with the low American coast on the horizon.

About a hundred years ago, Captain Carver travelled through America, and of this region he wrote:—'On the north-west parts of this lake (Ontario), and to the south-east of Lake Huron, is a tribe of Indians called the Missisauges, whose town is denominated Toronto, from the lake on which it lies; but they are not very numerous.'*

* Carver's Travels through the Interior Parts of North America, in the years 1766, 1767, and 1768, p. 172.

Since these days great changes have happened, and one thing which strikes a wanderer is, that the further west he goes the better things seem to grow. St. John's is a big oily fish-market on the banks of Magotty Cove. Halifax, and St. John and Portland, are no great shakes. Quebec is better, and bigger, and richer, but it is a dirty old French-looking town, and the only beggar seen in Canada dwelt there. It is fair to add, that the beggar was an Irishwoman newly landed. Montreal is a far handsomer city, with stone churches, wide well-built streets, and active commerce. Kingston is a bright gay lake-town, with white ships, forts and fish-markets, fruit and flowers, drums and fifes, and military parades. But Toronto boasts a museum, a university, a garrison, a review, shops worthy of Glasgow, banks, busses, statues, gardens, and railways, telegraphs, steamboats, all the newest and best paraphernalia of a rich flourishing new town. No wonder the proud sisters quarrelled about who was to be queen, and growled at the favour bestowed on the modest Cinderella Ottawa. But if the chief town of the scanty tribe of Missisauges has grown to be Toronto in a hundred years, the chief town of a tribe of British colonies may grow a body to fit the big head which is sprouting at Ottawa.

If colonial senatorial M.P.P. brains only grow to the

proportions of the colony and colonial buildings, what prodigious wisdom and gigantic intellect will flourish on this ancient sea-bottom, between Quebec and Lake Huron! They have the sympathies of a countryman who owes them a day in harvest, for many a good turn done in a short time. May the provinces unite and flourish, and take warning from their neighbours. Even whales come to grief sometimes.

The getting up-stairs from Toronto to Niagara is soon and easily accomplished. At Hamilton, a red-coated sergeant, armed with the traditional rattan, was keeping guard over British interests. It spoke well for the service, when one man was set to stop all deserters, and even he seemed to have nothing to do. Behind the station at Hamilton is a green terrace, broken down by a sand-pit. Near the top are beds of sand so packed as to indicate water flowing towards the south. The country between Hamilton and Niagara is rich, flat, cleared, and well cultivated. It is a raised plateau: the edge of it is near the lake shore; the other side of the step is beyond Chicago. Captain Carver, a hundred years ago, could find nothing new to say about Niagara Falls, and his example is worthy of imitation. It is now a cockney resort for all the world, and one of the best worth visiting. One institution has not yet been suffi-

ciently praised. A lead, like a small mill-race, carries a small burn from the big river through a garden past a kind of summer-house. By raising a sluice a miniature of the rapids outside is turned loose in a square wooden box, and those who love a hearty morning set-to with a strong fresh opponent, may get into the box and fight the fall. There is a rope to hold on by, and a strong man may struggle to the upper end. When there flesh and muscles seem to flutter and quiver against the bones, like furled sails against a ship's mast; and if the hands slip their grip, away goes the man, body and bones, to the other end.

A breather of this kind calls up a wolfish appetite, which can be satisfied at the neighbouring hotels. There tribes of coloured gentlemen minister to the motley crowd, which flows in and out, comes and goes, like the river.

If any one wishes to study a crowd, his best plan is to lay a trap for conversation, and hold his tongue till the bait is swallowed.

One of the best baits for a tourist is a sketch-book. There is something in drawing which invariably draws all the neighbourhood to stare over the draughtsman's shoulder; and if he is willing to hear he may learn a great deal from his critics.

'E molto bello questo quadro, e molto piu bello del originale,' said an English lady to an artist at Rome; and the same good-humoured spirit is always uppermost when people are amused.

Seated on a bench on Goat Island, with pencil and book, making daubs and enjoying the weather, was pleasant occupation; and the passing crowd who stopped to criticise were as good as a play. One pale dark-eyed Spaniard, who took the bait greedily, preferred to converse in French, and got quite excited. He told his own history. He was a surgeon; and, anxious to study his profession, he had joined the Northern armies 'en amateur.' His health gave way, and he had been sent to recruit at Niagara.

'Monsieur,' he said, waving his arm like Gavazzi, or a pump-handle, 'nous avons eu des operations superbes —su-perbes, Monsieur, superbes. Un seul homme avait seize blessures, figurez-vous, ça Monsieur, seize blessures! Ah, c'était magnifique. Yes, sir, it was. Seize blessures superbes, it était criblé. Bon jour, Monsieur, au plaisir de vous revoir.'

I would almost as soon meet death on his pale charger as that enthusiast; but he represented the class whose work now goes hopping about in Yankee towns.

To him succeeded a couple newly married, and spooning desperately; a party from the uttermost end of America doing the lions, a Californian, a British officer, a university man, a lot of New Yorkers, some shopkeepers, Canadian farmers, wounded soldiers; but the stock stage Yankee never came. The majority spoke through their noses, and reckoned; but they were civil, quiet, holiday folks, exceedingly like their class at home.

Having utterly failed to discover this antediluvian, set off scratch-hunting and had several good finds. Behind Niagara House a bit of the rock-surface was lately cleared up to the verge of the cliff which makes the American side of the river. It is ground, polished, striated, and grooved in many directions. Small remnants of very hard sand and clay are left in some of the hollows. The following bearings were got within a space of three sheets of foolscap:—N. 5° E., N. 10° E., N. 30° E., N 35° E., N. 45° E.

It is plain that the ice that had made this uncertain and devious spoor was moving southwards and westwards up-stream towards Goat Island, Buffalo, Lake Erie, and Chicago; and no glacier could well move in so many directions at once. Near the end of the Suspension Bridge is a very large boulder of foreign rock

perched about 600 feet above the sea, nearly level with similar blocks perched on Montreal Mountain. While contemplating the stone, and wondering how it got there, a neighbouring cottager called out a Gaelic salutation. By some freemasonry he had found out a countryman, and if we had only been French, we would have embraced then and there. The man and his wife came from the Highlands to Canada, worked up beyond Toronto, and got to the States at last. Their son went to the wars, and they lost him; and now they are spending their lives in a cottage very like a Highland bothy, no better off than they were at home. 'This place is very dear,' they said. 'Since the war everything is raised, and we are by ourselves in this world.' As their proverb says, 'Men may meet, though hills will not;' and so we met and parted beside a wandering block at the end of Niagara Bridge.

At the 'Whirlpool,' shells are found in a bed of gravel which is 300 feet above the present level of the river. A great many of them were picked out of a bank, newly cut in making a walk. They are fresh-water shells, like shells now living in neighbouring rivers and lakes. A native, who is a sportsman addicted to superficial geology, said that shells and striated rocks abounded throughout this district. On Luna Island, at the edge

of the fall, is a large boulder of gneiss. The rock-surface, within a foot of the fall and in the water, was carefully examined for recent marks of river-ice; but there were none, though ice is carried over the falls every winter.

As everybody knows, Goat Island is in the middle of the river; at one end it is nearly level with the water, the other end is a cliff capped with drift. It is a bit of the country hewn out by the river, and left standing. At the upper end, a corner of rock has been newly exposed. It is polished like the top of the cliff beyond the gulf made by the fall, and in a similar direction, N. 25° E., N. and N. 25° W., magnetic, within the compass of a sheet of paper. At some short distance above the rock is a bed of fine red sand, disposed in layers, dipping 15° S.E. up-stream. Upon the flat surface of this bed rest three feet of gravel, coarse sand, and clay, containing scratched stones. These beds are disposed horizontally, and indicate still water. Upon these rest flat layers of stiff clay, containing scratched stones, many of which are 'azoic' rocks. Above these, near the surface, are beds of gravel, containing recent fresh-water shells, and these dip N.E. down-stream. In the talus, shells, bones, and other things were mingled. The translation seems to be—1st, That when the rock was scratched, it was under water,

which moved towards Lake Erie, laden with heavy ice, boulders, and sand.

2d, That after a time the water ceased to flow in that direction, but flattened the sand-bed, and overlaid it with gravel and clay.

3d, That fresh water began to flow towards Quebec, and rearrange gravel, clay, and boulders.

If the sea were now 650 feet deeper it might flow from Spitzbergen past Quebec and over Chicago into the Gulf of Mexico. The Goat Island document seems to record that it did.

Having finished the scratch-hunt, went stick-hunting in the woods, and gathered a goodly armful of cudgels, especially one for the original 'Wanderer.' They were all duly baptized in the river, one over the edge of the fall. Sir C. Lyell has used this fall to measure geological time, and it is a chronometer if its rate of going were known. The water in falling drives the wind, and the wind in return drives the spray; so that a constant whirlwind whirls like a mill-wheel behind the green curtain of Niagara. One of the things to do is to go under the fall, and when there it is scarcely possible to see anything for the storm. But by dint of feeling and blinking, it is possible to make out that the cliff is worn into a hollow curve) by this revolving wheel.

The force of an ocean-wave is at work, and it undermines the cliff. In winter, ice forms in the chinks, and hangs in festoons from every cliff and tree. Where it forms it is a wedge, where it hangs it is a weight. The rock behind the fall is shattered like shale in a frost, so that bits can be picked out with the fingers. The rock in the cliffs elsewhere is cracked horizontally and vertically. Water and ice together split off slices of rock, and these fall and break, and are fallen upon and further broken by all the power of this water-hammer. A pile of fallen cliff is under Terapin Tower. When the sun shines the cairn of stones may be seen through the spray. The deep water in the Horse-shoe Fall is then emerald-green; the shallower water and foam next Goat Island tells purple against the green, and the wet burnt sienna stones shine through the purple haze. The pool below heaves like a green sea after a storm in a bay. With all these water-powers, this purple and green engine eats back into the land, not gradually, but by fits and starts. It has eaten from the step near Lake Ontario, and it will burrow up to Buffalo and drain the lakes if it goes on. The St. Lawrence is a bigger stream, but so far it has scarcely dug a trench big enough to hold the water.

The river Niagara is an older stream than its descendant the river St. Lawrence; because it has done

more work with less power, but the shell picked out of the bank above the whirlpool is older than either.

At Niagara the ice-spoor pointed to Buffalo; so to Buffalo we went on the 26th, after spending three pleasant days in dawdling and sauntering about the falls.

At Buffalo, Lake Erie is 564 feet above the sea. The town is built on a plain of sand packed in beds which dip 15° S.E. in the foundation of a new house in Main Street. At 150 feet above the lake, 714 feet above the sea, and therefore higher than part of the watershed of the St. Lawrence basin, on the highest ground near the town, are large boulders of gneiss, gray crystalline quartz, ditto with black crystals, and other hard foreign rocks. The rock of the country is dark limestone of Lower Silurian age. At 'Blackrock,' near the railway, a surface is cleared of drift in a quarry. The limestone contains hard nodules of chert (?), which will not yield to the knife, and have resisted the wearing power which ground the rock. They are broken, not ground. Each nodule is a 'crag' with a limestone 'tail.' From this shape it is easy to make out the direction in which ice moved—the head is up stream, the tail down. The ice which made this rock-sculpture went towards Toledo, up Lake Erie. On three sheets of paper the following cross

bearings were got within a few yards :—N. 25° E., N. 30° E., N. 45° E. (magnetic).

Beside this ground scored surface with cross markings are small pot-holes, like those which are found in all limestone rocks over which water flows. The surface is both ice-ground and water-worn, and it is dinted as if by blows. On the rock are beds, of which sections are got in railway cuttings and at the quarries. The surface-beds are about thirty or forty feet thick, and consist of stiff reddish clay, containing small angular stones, water-worn stones, and large blocks of azoic rock, scratched and finely polished. Amongst these were mica-schist, like Mount Washington rock; gneiss; quartz, highly crystalline and transparent; and many other specimens of azoic rocks. In some places the clay is largely mingled with stones, in others nearly pure. No stratification could be made out; but no clean section was got, for rain had washed clay down the banks. Some broken shells were found, but they may have been snail-shells from the top. Tried pitching stones down upon the rock, and found that dints made by throwing a stone towards the south-west resembled old dints. That nilometer, Montreal Mountain, will not fathom depths thus recorded at Buffalo; but if the sea were here, the seaway would be open to the Gulf of

Mexico, and the rock-sculpture seems to record that the Arctic Current passed this way.

If a beaver's dam were constructed here of a timber raft, and enough of hay and stones and boulder-clay to make a mound rise fifty feet above the water for a quarter of a mile, a deluge would result. The river escapes in a rock-groove, which might be corked. A rise of fifty feet at Lake Erie would flood all the upper lakes, and would be felt in seven of the Western States, and in Canada. Unless a notch somewhere else is lower than fifty feet, the waste would escape near Chicago, flood the Mississippi, and drain the St. Lawrence. In the event of a war, a Buffalo dam would be worth consideration. Newfoundland beavers have done greater works in proportion to their size. The dam would do more harm than all the guns that ever were made; and the work to be done is less by far than many a Dutch dam-dyke in Holland.

Descending from these heights, went seeking for shells on the beach; and having gathered a store exactly like those which were found above the whirlpool at Niagara, went to a picture-gallery and the play. The gallery contained one excellent picture of a scene in the Rocky Mountains. A young damsel opposite to it fainted, but was revived with a glass of water. She

could not have paid the artist a better compliment. The play was a performance of poses plastiques, nigger melodies, comic dances, and melancholy nonsense. The audience smoked and drank beer, and bestowed their applause on patriotic songs and sentiments. Most of them were soldiers or recruits. A couple of Britishers would have heard something to their disadvantage if there had been any popular notion of war, but they heard nothing of the sort. They smoked and swigged, and clapped their hands like the rest, and never felt a passing wish to build the beaver's dam-dyke at Buffalo.

All the central plain of America was now open to choose a route. If the sea were level with the boulders on the hill at Buffalo, ice-rafts might float south-west. The spoor at Blackrock pointed south and west; so places were taken for Chicago and the lip of the St. Lawrence basin, to see what could be seen there.

Buffalo to Erie . . .	88 miles.
Erie to Cleveland . . .	95 „
Cleveland to Toledo . . .	112 „
Toledo to Chicago . . .	247 „
Total	542

The distance is about equal to a drive from London to Aberdeen, which in England is done in eighteen

hours. The first 295 miles skirt Lake Erie, the next stage passes over the isthmus of Michigan, and the extreme points are at opposite ends of a great silver star of inland seas, and within a few feet of the same level.

CHAPTER XII.

BUFFALO TO THE WATERSHED.

Friday, September 27.—Very fine bright hot day. The country rich and well cultivated; green fields and fine masses of hard-wood scattered about like plantations in the richest and best parts of England. The soil appears to be a thin bed of drift evenly spread over the whole rolling country. The rock-foundation shows here and there, and consists of shales and slates, which are weathered where exposed. A few sections are seen in the banks of rivers, but the rivers hereabouts have not dug far into the rock, though it is easily weathered and worn. According to American geological slang, this is the 'Chemung' formation; according to the original English slang, it is 'Devonian.' At all events it is something conspicuously different from rocks in Canada and Labrador. Boulders near the way-side are large, and where gathered from fields abundant. They are chiefly rounded, striated, polished, or weathered blocks of 'azoic' rock. The prevailing direction of the wind is

plainly marked by trees at Buffalo, and along the shore of Lake Erie it is S.W. If currents of wind thus keep a general direction in passing over these plains, currents of water would probably hold to their prevailing direction if the plains were sunk low enough to let them pass. The Arctic Current flows from N.E. to S.W. as far as it can. Probably the Arctic Current carried the boulders to lat. 42° at least. 42° is near one northern edge of the Gulf Stream in January and February now; and plenty of ice-floats are working still farther south along the Atlantic coast.

Towards the upper end of the lake a few low hills, from 200 to 300 feet high, are seen to the left, or towards the Alleghanies. Amongst them are the famous oil regions, where fortunes are made by boring a hole and sitting still. It is narrated that country damsels in these regions have grown so proud of their oily greenbacks that they scorn their former admirers. 'You needn't come bobbin' around here, I reckon; dad's struck ile.'

Such is the way of the world. One of a pair goes down or up, and the uppermost nose turns snub, and aims up at the stars above it.

Besides oil, this country yields wine, and fatness in the form of pigs and bullocks. Long trains full of

corpulent creatures, grunting and lowing, quarrelling and squealing, at the tail of an equally noisy engine, were shunted to let us pass. Boulders, pork, and beef, are abundant near Buffalo. Lake Erie is in a very well lined rock-basin. And 'that's so, SIR,' as the natives say.

On this day's tramp we found out why British tourists talk so much about Yankee haste in dining. Arrived at a country station, it was somehow communicated to us that we stopped ten minutes to feed; and by watching the crowd and a big bell we found out where to go. Some hundreds of hungry mortals clustered round a lot of small tables in a large wooden room, and a corresponding number of country damsels —whose 'dads hadn't struck ile,' it is to be presumed —were condescending enough to wait. There was a decorous pause to get a fair start, and then there was a rush upon the dinner. Everyone took his own line, and went straight ahead. It was like the old mail-coach dinner, which many are old enough to remember, but the pace was fitted to the railway cars. An old story tells how a famous Scotch judge once travelled with some reverend Scotchmen, and by dint of a white choker passed himself off for one of the same cloth. They had ten minutes to dine at some country inn near

the Kirk of Shotts. The padres were hungry ; the Scotch lawyer was sharp-witted, and though sharp-set, he was going to dine at a country house hard by. 'My brethren,' he said, 'let us ask a blessing.' Putting on his best judicial solemn face—which could look very solemn when the owner chose—the sham parson asked a blessing, and continued to ask it till the coachman blew his horn. Here, on the shores of Lake Erie, no blessing was asked, but the signal given by one of the damsels was followed by a vigorous attack upon excellent beef, potatoes, green corn, apple-pie, and other smoking delicacies. It is always disagreeable to be beaten at anything by anybody ; nature had been kind in the matter of teeth, and she abhors a vacuum ; we said nothing, but we did all we could. Boasting may be forgiven for once—we two Britishers rose first from table, and we reckon we were 'crowded,' as a distinguished lady said to her hostess after dinner.

While smoking the pipe of peace in the cars after this rapid act, a couple of gentlemen with note-books walked up and asked whether we would vote for Lincoln or M'Clellan. Hurrah ! No one knew us to be foreigners. 'I haven't got a vote.' 'How ?' exclaimed the teller who was taking the sense of the meeting in the cars—'How ?' It was evident that he thought something must be wrong

about a grown man without a vote. 'I'm a Britisher,' I said. 'Wal, stranger, if you had a vote, which would you vote for?' 'Neither,' I said. 'I should only put your numbers wrong by voting; so go along, and let us hear the result.' Away they went, acting all the formalities of a real election, and when they had finished one car they walked through to the next, and so on to the guards' box and the engine. The result was a majority for M'Clellan. This was the first of many similar elections, and the only one that went for George B.; so the probable result of the big election came to be pretty well known to a traveller long before the event came off.

Many of our fellow-passengers this day were young men but old soldiers. One, who had seen much service and was minus a leg, explained that he would as soon shoot a Reb as a coon; but on being further interrogated, the witness declared that the 'Graybacks' fought well. 'We'll whip them,' he said; 'we've got to do it; and as we are the strongest, we'll whip them at last; but it will take us a long time to do it, I reckon. The Rebs fight well—yes, sir, that's so.' And then came a long string of Yankee expletives which are unfit to be recorded.

A Cincinnati man, the last and not the least plucky of the arctic explorers, records that an

Esquimaux woman remarked to him that American whalers swear much more than English; and Mr. C. F. Hall records that he blushed for his country. At the famous fire-engine contest, held at the Crystal Palace in London, it was remarked that the New Yorkers, who were beaten, cussed so as to frighten the foe. It is told that two wicked old Highlanders once swore a match, and the curse which won is recorded. A Highland keeper once got his foot jammed between two big stones, and cussed awful. When he was extricated, a pawky boatman quietly observed, 'I'm sure Hughy swore the worth of a new leg.' The young soldier who had lost his leg swore ten times as much as Hughy, without the provocation; his cusses would have beaten the winner of the match out of time, the firemen and whalers; perhaps a Billingsgate fishwife might have matched him, but out of the States I never met his match at cussing. There is a perverted ingenuity, an *invention de méchanceté*, about American blasphemy, that would be absurd if it were not disgusting. Swearing is an obsolete English vice, still flourishing in an old English colony. It is unfashionable, ill-mannered, senseless, stupid, and wicked; but it is not confined to the 'lower classes,' if there be any classes in a republic which will not admit a first-class car.

At night we had a rough time at Toledo. All the hotels were full. At the Station Hotel crowds were sitting about a large hall on benches, sleeping, talking, smoking, chewing, spitting drowsily, and waiting for beds or trains. By favour we were promised the first vacant room. 'Is it a double-bedded room?' said the British lion. 'Well, I reckon there's a double bed in it,' said the clerk; and there were two or three people in it then, as it appeared. When a morning train set off for somewhere, the sleepers awakened and got out of bed; fresh sheets were put on, and the Britishers were put into a closet without a window at the top of a stair. They had slept in worse quarters many a time, and lay heads and thraws, and slept placidly for a few hours; but it was unusual to have to bundle in this fashion in a grand hotel, with gas-lights, billiard-rooms, and a capital table d'hôte; and it was difficult for two tall men to bathe in one small basin.

28*th*.—Between Toledo and Chicago the railway passes for 243 miles over land which is near a water-shed. It is rich green rolling land, with white houses, and blue pools of water, and old forest-trees clad in all the hues of the rainbow. It is very like England in many ways—very unlike it in many others. There are no old English gentleman and no old paupers; there is

no mountain-peak or valley, no palace or hovel to be seen. The country and the people are on a pretty high level.

The shape of the country is like many a watershed in old Scotland near the same level. Eskar and osar, mounds and ridges of stratified gravel and sand, are abundant everywhere. The whole surface appears to be water-work; but a large proportion of the loose stones are of the old northern type. They are glittering, crystalline, striped, hard, azoic rocks. The people and their soil have travelled in the same direction; natives and native rocks are hidden alike by foreign masses which travelled westward over the sea.

Most of the boulders scattered about near the railway stations are about the size of turnips, but many are as large as haycocks and hogsheads, and some at least are scratched stones. The highest point reached was about 300 feet above Toledo, or 864 above the sea. When this level is carried back to Mount Washington, similar gravel-beds and boulders are found there, remarked while passing from the watershed of the Alleghanies into Canada. By looking back, terraces at about this level are seen beyond Quebec; but Montreal Mountain and Buffalo will not reach so high as the isthmus in Michigan and its boulders. The

nearest 'azoic' rocks are away north beyond Lake Huron, or north-east about the Adirondaks; the rocks of the district are Devonian and Carboniferous. Very few rocks, and no striated rock-surfaces were seen; but according to Dana (p. 539):—

'In western New-York the course is mostly south-west; in Ohio, generally south-easterly; and the same in the larger part of Michigan and Illinois, in Iowa and Wisconsin, and over the country to the Lake of the Woods from the northward. In northern Michigan the courses vary between W. by S. and S.W.'

Either the big glacier passed up-hill this way from Quebec, or the Arctic Current flowed from the polar basin on both sides of the Labrador, as it now flows on both sides of Greenland. So far the drift looks very like water-work, and very unlike a moraine. Our comrades this day had nothing remarkable about them, or we are used to their peculiarities. There was something peculiarly English about the look of the country, and nothing un-English about the people. The zigzag fences, Indian corn and pumpkins, the charred stumps amongst the wheat-stubble and in the green meadows, told of a new southern country. There were no old churches or churchyards, but there was a look of comfort and neatness about white houses peeping out through glades of oak and groves of poplar, that was very English or very German, and the majority of

these people are emigrants from England and the plains of Germany. At one station a school treat was going on; it was a grand open-air tea-party of pretty fair children, headed by masters and mistresses, all smiling and chattering, cheering and gobbling and speechifying, as if there were no one-legged cussing soldiers or black slaves in the world. At another station an amateur fire-brigade out on the tramp came on board with a brass band, and made themselves merry with lugubrious horn music. They were dressed in fancy dress helmets and uniforms, and were at first supposed to belong to a circus. They left us to dine publicly with other fiery spirits in some lake town.

And so we got to Chicago at last, after two long days of pottering railway travel, through a country able and willing to support ten times the population which is thriving there.

The guard had announced that a message had just gone down the lines to proclaim that Lee and 30,000 men had surrendered to somebody else somewhere. Hungry for details of so great an event, we searched the papers, and found many other crams, but no telegram to this effect. Thenceforth we took no heed of anything political, and waited for news till we got to a place, or within reach of English papers; for

amongst other crops, the West grows a large crop of big lies.

The echoes of the late Chicago meeting were still grumbling in the city. The walls were placarded with notices about 'the poor man's blood and the rich man's gold,' and it was feared that the draft would be resisted by force. Many brave words were uttered, but there was no fight. What could an unarmed population hope to accomplish against the military power arrayed against them? They might talk—for this is a land of liberty—but their only possible act was meek submission. Sulky crowds attended at their several places of muster; and those who were drawn cussed and went to battle peaceably, if they could not pay for a substitute.

CHAPTER XIII.

CHICAGO.

If there be sameness in Canadian scenery, here it amounts to uniformity. In running through Canadian plains, occasional glimpses of distant hills, or rising grounds in the middle distance, relieve the eyes. The dancing green water of the river is always something bright and cheery; but the 'Garden City' stands upon piles in a swamp, between flat water and flatter land. The water has waves, but the land is as flat as new-made ice; and outside the gardens there is not even a tree to break the horizon. Except in the middle of the Atlantic in a dead calm, such another dead flat landscape is hard to find. Nevertheless, Chicago is well worth a visit. About twenty-five years ago, the only building there was a log-hut, in which bargemen used to liquor when they came to fetch grain or pork from the farmers. It was a place like the city in which Mark Tapley was jolly, and Martin Chuzzelwit was chiselled and fevered. It is now that which a city becomes when the site is well

chosen. In the streets of Chicago a foot-passenger has to look out sharp at the crossings. He has to watch for a break in the long procession of carts and busses and carriages, and bolt over, as he must in Paris, or in any other capital. The main street is worthy of a large European town—wide as Oxford Street, and with far better houses on both sides of a wide carriage-way some miles long. The farther west we go, the better things will grow, and here towns grow like prairie-grass and mushrooms. On the outskirts of this western growth are gardens and villas stretching far and wide. Some of the railways had to go out into the lake and walk on stilts, for there really was no more room for them on shore. Ships of large size, big steamers, tugs, boats, and all the paraphernalia of a big inland seaport, come straggling through the town in canals which open to the lake; and street-cars and locomotives come rattling, panting and hissing, roaring and ringing, through the town. The whole is something unlike any other place in the world. In its water streets it savours of Amsterdam, and a very bad savour it is. In its wharfs, it has something of Glasgow or Liverpool. The main street, with the magnificent shop-fronts, is something like Argyle Street; the bustle is like Lord Street; the tame railway engines unlike anything to be found

out of America. The useful dragons do no harm. Why should they not be allowed to snort about streets at home? These tame railway engines travel on lines which radiate from Chicago into the plains; and wherever a line goes, there a crop of farms and farmers forthwith grows also. To the company who make the line grants of land are sometimes given, and these the company sell to emigrants. In each district a warehouse is placed, to which farmers 'haul' their produce, and there they sell it, and have done with it. Corn and wheat are tossed loose into railway cars, which look like horse-boxes. The train speeds slowly over the plain, and unless it runs foul of another train—which happens occasionally—corn and train, engine and all, come snorting and rattling through the city, and vanish at last into a great tall brick magazine like a lofty Liverpool warehouse. That is the 'elevator;' the railway is within it; the wharf and the ships are beside the great corn-bin, and it contains a steam-engine, which does a great deal of work. The loose grain is shovelled from the cars into a wooden well, through which pass a whole regiment of tin buckets. They move on the principle of the engines which deepen rivers. A strap is passed round a couple of rollers at the top and bottom of a system of wheels, and the buckets on the strap go down

head-foremost empty, turn up, and return full of corn; at the top they turn again, overturn, and tilt the grain into hoppers and spouts. Through these the grain is turned into bins, where it is weighed to an ounce by the machinery; and when a ship is ready for a cargo, a sluice is drawn, and the grain pours into the hold. The whole operation seems to go on without human care. Labourers shovel grain into the maw of the elevator, and it does the rest like a brownie. It only wants a feed of coal and a drink of dirty water now and then.

The trains which thus haul grain from a circle of hundreds of miles, also haul hogs and beeves. It is quite impossible to convey any idea of the shindy which goes on when a congregation of cattle-trains get together near the station. The voice of a Yankee engine has no resemblance to the shrill yell of an English locomotive; the tones are all deep, and they are modulated to all manner of notes and keys. When a gathering of iron monsters takes place in a wilderness of rails, and in the dark, each has something to say; and the result is like a conversation of wild beasts with fiery eyes. Grunts, howls, roars, and yells, with gurglings, hissing, and snorting, make a strange concert. But when the passengers are hungry country hogs, who have roamed at

large all their lives, and stout oxen used to gallop over the wide prairie or feed at ease in the barn, then the music becomes discordant. The voices tell of sore discomfort and discontent. On a still evening it seeems possible to understand all about it. Get out of the way —Don't tramp on my hoof—Let go my tail—I can't get out—Take that—Oh dear, my ear—Worry, worry—Yell. Having seen an elevator, it was necessary to see an abattoir and the end of the hogs. In 'Life in Normandy,' a description is given of the making of country bacon; a whole family of Normans spend half the day in putting a pig to death, and when they have done the deed they spend the rest of it in salting him and talking over their prowess. Here it is a very different thing. They kill pigs by steam in Chicago. The talking engines deliver their noisy freight at warehouses. It is found best to pack hogs and beeves together in railway travelling, so they have to be sifted and separated. The hogs go into square yards, and there they are left without food for twenty-four hours. Now these are free and independent pigs, and they do not take kindly to captivity. Some go to sleep and try to be quiet, but the most of them spend their last hours in biting each other viciously. One, without any apparent cause, takes the nearest neighbour by the hind leg and grunts savage

defiance. The neighbour generally accepts and turns to battle. The champions clash their jaws and smite their armed cheeks, howling and screaming and foaming, till one is vanquished, and then he charges over the lazy sleepers, squealing, and each down-trodden hog howls. The victor grunts content for a time, but the battle breaks out anew, at unexpected places, and the end of the prairie-hogs is not peace. One spotted brute in particular seemed to be furious or ravenous, and bent upon eating somebody, for he kept charging open-mouthed at distant dreaming hogs, trampling on everybody, and biting viciously at ears, tails, and legs, and anything that came in his way. But the hour of execution was at hand. It was the first day of some new machinery, and it took time to get it into gear.

On the upper storey of the building were the executioners. They were tall well-grown men, chiefly Germans, probably used to sausages at home. They were dressed for the work, in sailors' waterproofs, leggings, and frocks, and each was armed with some deadly weapon and a steel. To wile away the time, while they chatted pleasantly they whetted their knives, and felt the edge, and as they felt they smiled. At one end of the building was a large trough, in which a steam-pipe heated water to the scalding point. The

grand invention, which was to work for the first time that day, was a great iron claw, which dipped under water and rose again, like an iron hand with five fingers. It was meant to hook out the pigs who were quarrelling down stairs in the pen. Below this iron hand was a long sloping table, and at the foot of it was a gibbet, with hooks and turntables, wheels and rails, for shunting split pigs along the rafters. When steam-power had been applied to the wrist of the iron hand, a signal was given, and the spectators scrambled out of the way, up the rafters, and anywhere. Outside, a door was opened in the long pen below, and a certain number were driven into a passage and up an inclined plane, where they stood quarrelling to the very last. The top door was opened, and two small pens were filled with the combatants. Their battles were nearly done. A sweet smiling rosy dandy new hand, a youth in new yellow leggings, and armed with a hammer, stepped in amongst them, and dead silence followed him. A hutch like a rat-trap rose up, a fat body slid down a way of rollers, and plumped into the tub, and a second followed—plump. But by some mishap these unfortunate brutes were only half killed, and thereupon came a scene that was perfectly horrible. With heads broke and throats cut, the scalded hogs dashed furiously

to and fro, struggling to escape, while two Germans tried to drown them by holding them down with long staves. 'You, Heinrich,' they cried, when the battle was over, 'why do you not kill the hogs? No man can stand this.' And then they rubbed their scalded arms ruefully. No one seemed to care for the pigs but one of the spectators, who felt very sick.

The two scalders now stirred the pot, and finally pushed a pig into the iron hand. It turned its wrist, and emptied the handful upon the table. Another followed, and yet another; and the stream of pork, once set agoing, flowed on. Out of the prairie the pigs drove at railway speed into the hog-pen. Out of the pen they walked up-stairs quarrelsome live pigs, and fifty were dead, scalded, scraped, cleaned, split bacon, and hung in rows ready for salting, within an hour. Within a few days they would be food for soldiers and sinews of war.

After the first few hitches, the whole machine worked like a clock. Luckily it was seen after the 'Ariel' cruise, for salt pork has become an abomination not to be borne. It is said, in joke or earnest, that a pig is here put in alive and comes out, packed in his own inside, a string of sausages.

Wishing to retain the power of eating beef, no more Chicago lions of this kind were visited.

The great boast of the natives is the lifting of houses. At first the town was built anyhow. A clever American gentleman thus described the growth of a Western town: —'You see,' he said, 'we are liberal people in the West. When a lot of people get together, they want their own clergyman of course, and we give him a lot for a church at once. He builds, and then more people come over to join their friends, and a block gets filled up. No matter what his religion may be, we give a parson a lot, and he soon draws a congregation; and so the town grows. We are liberal people in the West, and so we go ahead.' Now this process did not produce uniformity in the growth of a town which only a few long heads foresaw in the swamp. The churches multiplied, and the town grew; but the pavement was irregular, and the sanitary regulations nowhere. The town had to be rebuilt or lifted. It seemed good to the natives to lift it out of the mire, and they assert that they lifted whole blocks at a time. In particular, a large hotel was lifted, with all the guests in it, and all the dining and sleeping operations went on. A man who went out in the morning found the door-step higher when he came home, and that was all he knew about it. A great number of men with a great number of screw-jacks were underneath, and when their 'boss' whistled they turned together, and up

went the Tremont House, hair-breadths at a time. On telling this tale to an old London builder, he utterly refused to credit it. 'Did you see it yourself?' he said. 'No, I did not; but I believe it.' 'Well, I don't,' he said; 'you are younger than me, and you haven't been taken in so often. It would have been far easier to bury the lower storey and build one on top.' That may be so—the fact was so often repeated by so many people that it must have some foundation. The city stands sturdily in the marsh, and will probably flourish there till the beavers' dam is made at Buffalo. It is one of the queerest places in the world, and may become one of the most important.

The people who dwell there are chiefly natives of Europe—many of them are British subjects. The working population are chiefly Irish and German—many of the richest merchants Scotchmen. The whole lot are of European origin, and except that no beggars exist, and everybody has plenty to eat who chooses to earn it, populations might be exchanged with an English town without producing any marked outward difference.

The play at Chicago was worthy of the town, and some of the pieces acted were signs of the times. In the first place, the sorrows of Uncle Tom were enacted nightly, with all the tragic bits selected and fully de-

veloped. Eva died by slow degrees; Legree murdered Eva's papa, and flogged everybody with a big whip. The only redeeming feature in all the misery was a charming Topsy, who had just returned from starring it in California, as the bills declared. It was a sign of war when Uncle Tom was allowed to appear; but niggers were not popular, and scarce in the streets. Another favourite play was in illustration of the Maine Liquor Law, and it was well acted and much applauded; but very one went home and liquored nevertheless. The Ticket-of-leave Man was a special favourite, and exceedingly well acted. The bills published letters from young men who had been saved from crime by the skill of a charming actress. Here, and elsewhere throughout the States, actors on the stage dropped their accent, and spoke through their throats; off the stage, they used their noses like other people, and emigrants seemed to acquire that art in a few years. It is hard to understand why they do it or whence the twang came, for no other part of the world has this proboscidal peculiarity. As it is possible to speak otherwise, it is desirable to drop the twang, and apply noses to their proper uses.

CHAPTER XIV.

CHICAGO TO ST. LOUIS.

It was here determined to vary the proceedings by a little shooting. Tickets for Wilmington and a bag of shot were purchased, and on the 30th of September, the end of the month called 'poppy,' we started. The distances travelled in a short time may give some idea of the size of the farm over which we had leave to shoot.

Sept. 29	Chicago to Wilmington . .	58	miles.
	„ St. Louis . .	230	„
	„ Seymour . .	253	„
	„ Louisville . .	49	„
	Mammoth Cave and back, about	150	„
	Cincinnati by river, about .	150	„
	Indianapolis	112	„
	Layfayette	64	„
	Michigan City . . .	91	„
	Chicago	50	„
Oct. 21	Pittsburg	468	„
	Total . . .	1675	„

'Scratch-hunting' can be combined with other sport.

At Chicago a scratched stone was found on the beach of Lake Michigan, but no bare rock was discovered. The Chicago and St. Louis railroad passes south-westwards over a dead flat, alongside of a canal with very few locks, for about 20 miles. The surface beds in this plain are stratified water-worn gravel, with large scratched stones. Where the rains have washed the rubbish on the bank of the canal, large boulders occur in patches, and smaller boulders abound at other places. Were it not for the canal and railway, the country would seem to be a grass meadow, with black rich soil. At Le Mont the rock appears in a quarry. It is a yellow limestone in horizontal beds. Here the rail ascends; and there is a step in the plain, over the top of which the rail and canal run to Joliet, 40 miles in all. The edge of this step is a terrace of yellow limestone, with a cap of drift, and it looks like the ancient margin of a lake or sea. The upper plain seems to be the level top of a bed of limestone, washed almost bare, and large azoic boulders are strewed about on the top of the limestone. This is the summit-level—the common watershed of the St. Lawrence and Mississippi. The highest point is about 50 feet higher than Chicago, and 100 feet higher than Joliet; and the rock is so near the surface, that the canal runs through a rock-cutting for many miles. If

the rock-cutting in which the Niagara flows at Buffalo were filled to the level of glacial striæ in the quarry at Blackrock, the fresh-water lakes would overflow in this direction, unless there is a lower watershed elsewhere. Here the limestone appears to be water-worn; it nowhere seems to be glaciated. Beyond this latitude, and in this region, no mention of striated rocks has been found in any book on the subject.

More than 1000 miles away from this spot, a whole fleet of icebergs are stranded off the entrance to the Straits of Belleisle. The biggest stand up like the Castle-rock at Edinburgh, and they are pushed by a whole ocean-stream. There they stick for months, but they are constantly wasting; and as they waste away above, they rise like ships relieved of their cargo, and drift on. By insensible degrees the draught of water decreases, and the bergs advance towards the straits, scraping the ground. The plane of the sea is level, but the bottom of the sea is a rising ground up which the bergs advance. If Arthur's Seat were thus to slide up from Edinburgh to the Kirk of Shots, it would leave a spoor. Those who have the taste may calculate the power of the tide on such a mass. In course of time the bergs off Belleisle melt or break so as to float into the strait, and they finally drift through. But having

passed over the top of a ridge in forty fathoms, they cannot ground in deeper water on the other side. Though they do not ground in the Gulf of St. Lawrence, ice-rafts carry stones and mud to Cape Breton, and further south. There is very little mud about the Straits, but a great deal at Cape Breton, Prince Edward's Island, and the Bay of Fundy. Over this western water-worn American watershed, some engine has carried azoic boulders, and they are exactly like boulders strewed over Newfoundland. In size, shape, and material, they are alike. The boulders and mud are here together.

At Joliet the rail leaves the canal, and mounts ninety feet to the upper plain. It passes through a cutting in yellow drift clay, which contains azoic boulders; and having regained the summit, the iron horse gallops over a sea of green grass, which has no apparent limit but the horizon. At Wilmington the prairie 'rolls,' as the saying is. It is not quite a dead flat, but the rising grounds are insignificant. According to the accounts of those who live north of Chicago, and the published works of travellers and surveyors, the whole region between the Mississippi and the great lakes is like this tract. Along the watershed, rivers crawl sluggishly and interlace. A beaver's dam, or a delta made by a rain-flood, turns water into the

Gulf of Mexico, or the Gulf of St. Lawrence, into Hudson's Bay or the Polar Basin. At Wilmington one of these slow-going rivers, called the Kankakee, has dug through the drift, down to the rock; but it has got no further. It has washed away the lighter materials, and large boulders are left on the bank. One beside the bridge is of greenstone, 6 feet long, 4 wide, and 2 thick. It is polished and striated, so that a good rubbing was taken from the surface. At Niagara and Buffalo, limestone rocks beneath such stones are striated; here the rock is limestone, full of fossils which are not far below the neighbouring coal-formation; but though every bare rock and quarry that could be found was carefully examined, no trace of glacial work was found here. These facts seem to record that the watershed in Illinois was like the sunken ridge in the Straits of Belleisle, over which the Arctic Current carried northern boulders on ice-rafts. The mud ought to be found beyond the boulders to complete the case.

The section of the drift, so far as it was made out while shooting prairie-hens, appears to be—

1. Surface. From one to three feet of black mould, in which large glaciated azoic boulders are planted. The largest found was nineteen feet in circumference, and six high. It stands in a wide plain, fifty feet above the river Kankakee.

2. In the bank of the Kankakee. About six feet of sand without any visible stratification.
3. Same place. About two feet of gravel and coarse sand in beds dipping down-stream. A few gray flints are in the gravel, but no shells were found. Thickness varies. Looks like river-work.
4. Same place. About twenty feet of clay, containing angular gravel and scratched stones. The upper part of this bed is roughly stratified horizontally. The large stones are all foreigners.
5. Talus. About eight feet, hiding the base of the bank.
6. Large boulders, apparently washed out of the clay.
7. Yellow limestone with a water-worn surface, from which fossils project in strong relief. The river has not quarried a foot of stone. Numerous large shells abound in the water, which is wide and shallow. Wherever land has been disturbed, great numbers of large boulders appear throughout this district, and all the sections and rocks discovered were much alike. The drift was evenly spread, and has not been much disturbed by rivers.

Here then ice can only be tracked by boulders; and the next thing to be done was to hunt them down.

Wilmington is a fashionable resort. It is within easy reach of Chicago, and New Yorkers addicted to gunning get into a sleeping-car, and move themselves and their batteries to the west. The *Times'* correspondent was here arrested, and fined for shooting on Sunday, but really for writing about Bull Run. Natives shoot on Sunday without fear of the law. H.R.H. the Prince of Wales went gunning in this neighbourhood,

so now it is a favourite resort. Game is abundant, but will soon be extinct. Prairie-hens are the chief attraction; in size and colour they are very like gray hens, in nature they resemble grouse. They either sit so close that no one can find them without a pointer, or they pack and get so wild that no one can get near them. They are very good to eat, sell well, and the railways open a large market. There are no game-laws in America, therefore sporting poulterers overrun the country, and the race of prairie-hens will soon be extinct. Besides these birds, great numbers of snipe frequent marshy bottoms and half-drained river-courses. Geese pass to and fro; the little russet American woodcock may be found in scrub; and there is a ruck of miscellaneous game, for all is game in the West. Owls, hawks, greenshanks, cranes, quails, prairie-larks, bitterns, and other creatures, may be shot in a morning tramp. Even deer are seen now and then.

A tough wiry Englishman, who has been to the real 'far West,' keeps pointers and manages the hotel at Wilmington. He is a first-rate shot, and one of the chief attractions there. He is not the sole representative of his country; a tidy Englishwoman keeps the inn; and there are so many Britishers about, that the place is called Little Britain.

Dogs, men, guns, and prog, are packed into a tray on wheels, and off they set. If there be roads they follow them, if not, they go over the prairie right ahead. There is nothing to stop a mail-coach for a hundred miles, unless it be a hospitable farm-house or a railway station. The inhabitants are a flourishing, well-fed, solitary race, who live the life of the last cotter on a Highland moor. They are a happy race, but the echoes of distant war reach even here.

Having finished the prairie-hen season, set off for boulder-hunting to St. Louis on the Mississippi. It was announced and partially credited that General Somebody had invested the town. He had made a vigorous attack, but the Federals were so valiant that he was forced to retreat with the loss of a thousand men. The Federal loss amounted to a dozen all told. But though St. Louis was saved, no travellers could enter without a pass, and no one was allowed to move about after sunset. Mentally cutting snooks, took a ticket, went to St. Louis without a pass, and walked about the streets that night without obstruction. General Somebody was somewhere in the neighbourhood, and there had been a fight at some place some forty miles away. The wild-fowl are large in the west.

People at home know more about the war than I

do, though I am near a field of battle; but I see small details. This is a great country, and there is room in it for all the spare population of Europe—room and food, work and plenty. I have seen but one person asking charity, and she was a blind Irishwoman. As we rush over these vast plains we see wide oceans of yellow Indian corn, sugar-cane, wild grass, and wheat stubbles, with occasional islands of green trees. Leave the railroad and take a stretch into the country, and it is still the same. We drive where we will, for this is a land of liberty; occasionally we meet a train of waggons out on the tramp as we are, steering out into the wide world, with a human freight and a lot of gear; they are farmers who have sold their land, and are seeking new pastures to plough. When they get to their new station, they knock up a house with a few boards, plough up the prairie, and, without more ado, sow and reap and prosper. Near Wilmington I measured stalks of natural grass over eight feet high. I have walked through acres of it higher than my head. The Indian corn is like a small forest, each stalk hung with two or three yellow ears, each yielding 700 to 900 fold.

When we stopped for our noonday halt a buffalo-robe was laid on the ground, and the horse's master walked into the corn forest and returned with an arm

full of yellow fruit. There were no owners in sight to cry out; and if they had seen us their only cry would have been 'Welcome.' Pricking up his brown ears, the horse watched the spreader of his dinner on the hide tablecloth, and when it was ready he fell to. With skill which only long practice could give, he twisted the long spiral ear of corn, and scraped off the yellow grains till nothing remained but the white cob, the foundation of the corn. A dozen of ears was a good feed for the horse, and the Brobdignag corn-field beside which we sat was nearly a mile wide.

It is no wonder that birds abound in such stubbles, that prairie-hens and wild geese, cattle and horses, are fat and lazy as the quarrelsome pigs who are executed for the crime of fatness at Chicago; and there is a market for everything close at hand. If there were a hill to look at, this would be an earthly paradise, as it seems. The people I have fallen in with are chiefly from old countries — Swiss, Germans, Norwegians, English, Scotch, and Irish. Those who have strong arms use them and get on; those who have brains and arms prosper. This is one side of this fair picture; but no landscape is complete without a shadow, and the shadow here is the black draft. One man has two sons in the war, another has lost some near relation, a

third has come home broken down with hardship, another has lost a leg and goes limping about on crutches, without pay or pension, 'cussing.' At any moment a man who has spent his strength to make a home is liable to be drawn and sent to fight whether he will or not, and dismay reigns in this 'bread-basket of the world.' Pondering these things, watching for boulders, smoking, munching apples, and reading a stupid novel turn about, I whirled down the lip of the Mississippi basin from Wilmington in one of the long cars. We stopped at a country station, and I was overwhelmed by an avalanche of gray-coated men. They tumbled in and filled the car to overflowing. One sat on my knee, another sat beside me, a third made a pile of packs and sat on my feet, and a cluster stood around us. All were sturdy, brown-faced, hard-handed men, but they did not seem to fit into their gray clothes, and it soon appeared that they had been 'drawn.' The only happy face among the whole lot belonged to a lad who was half-seas-over: he was a substitute; he had got a thousand dollars from a richer man who could pay for his hide, and he was performing 'Dixie' on a Jew's-harp. 'What have you done with your money?' said I.—'drunk it?' The Scotch-Yankee youth winked his eye. 'I've put it where I can find it

again if I come back ; and if I don't, them that's at home knows where to get it, I guess;' and then he resumed 'Dixie,' and worked away till he wore a raw on his lip with his forefinger. My neighbour on the right was grim as a signpost ; and he, too, was a horny-handed Scotch farmer. We got our mouths opened with a pipe, and it soon appeared that he and the rest were 'bad'—that is to say, exceedingly disgusted at having to go to the war. His brother had his head knocked off by a cannon-ball, and he had been drawn, and he had not got a thousand dollars to pay for a substitute. He was of the class who posted placards in Chicago about the rich man's gold. As we smoked, his heart seemed to warm up to his home. There was the town, there the court-house, there the local institutions for educating the children of citizens, free gratis and for nothing, as well as they could be taught at Edinburgh or Glasgow. That was fine land off which a man could get a 'turf-crop' the first year ; and then sorrow came over the honest brown face, and he seemed to remember that he was a prisoner going to be drilled and shot at. It was evident why sentries with fixed bayonets stood at the doors. By the aid of an apple and a cigar, the nearest sentry was set a-going, and he explained that this lot was 'ugly,' but that there was

no danger of anything unpleasant as he thought, and then he puffed placidly and spat vigorously upon my poor novel, which had fallen on the floor. At the next station we stopped, and the conductor roared 'All out for dinner.' 'Yes,' grumbled my neighbour, 'for them as can get out.' 'Let none of our men out of the cars,' shouted a captain. I got out and dined well and cheaply, bought a lot of baccy for my neighbours, and returned. I met my friend getting out, followed by a soldier with his loaded piece. 'All right,' he said, 'I have spoken to the captain,' and off they went towards the refreshment-room. Ding-dong went the engine-bell, and the train began to move. The captain beckoned, and the train moved faster. He beckoned harder than ever, and the recruit came hurrying slowly over the boards. The train went on, and by the time the soldier of the Republic got to the step, it was going so fast that to leap in was a serious risk, not to be incurred of course; so the Scotchman looked at the captain and made signs, and gradually faded away in the distance. One of the institutions of this country is a rope, which passes from car to car, and to the engine; the captain seized it and pulled, but by some accident the cord was loose, and it came away till there was 'quite a coil of it.' Then the captain looked round the

corner and 'cussed,' and the sentry, turning to me, said, with unction, 'Well, now, that's awful; them's thousand-dollar men.'

Now, whether the Yankee-Scotchman and his sentry 'skedaddled' together, or came on by the next train, I do not know; but no man moved a step afterwards without a sentry at his heels, with his hand on the lock of his gun. A second human avalanche of Germans came down upon us at another station; and so, packed like cattle on a freight-train, we all arrived at last.

Abolitionists are apt to say that America sheds her blood freely to wash out the blot of slavery: this sort of freedom is not the sort that suits people at home. Scarce a journey was made in the Western States without some such adventure. Nearly every squad of recruits was guarded by armed soldiers with fixed bayonets, and a pair of glittering handcuffs often dangled openly from under the soldier's gray coat. The natural pugnacity of the races who have migrated to the far West makes them fight when it comes to the point; but when taxes and service are so very unpopular, it is a marvel how the war goes on. The next rent in the Union will surely tear off this new Western patch upon the American luireach. Arrived at St.

Louis; a train of omnibusses-and-four drove up to the side of the train, took in the freight, and drove on board a steamer. The steamer snorted and paddled over, and the procession of busses drove out as they drove in. We rattled up the streets, and dropped our passengers at their respective hotels; and I found myself in a real palace, beyond the Mississippi, on the 6th of October. The further I go the better things grow. I have travelled more than 9000 miles since I left Liverpool on the 9th of July, and here is a better hotel than the best I know in London.

The last boulder seen on this line was near about 50 miles from St. Louis, and was like the rest in size, shape, and material. According to the Mississippi Survey, the junction with the Missouri, a little above St. Louis, is 381 feet above high-water. The aneroid made it 430; but after a journey of 288 miles from the known point, and a week of varied weather, the difference (49 feet, or half a tenth) is not to be wondered at. The height of the river-bank is nearly as much. At the most the fall from the watershed is only 247 feet in as many miles. The 'valley' of the Mississippi is something very like a plain.

The 'valley' has much the same character to the watershed of Hudson's Bay and of the polar basin. In

confirmation of this, and in illustration of life in the West, a story told by an American gentleman may be here retailed. The utmost source of the Mississippi is only 1680 feet above the sea, according to the American Survey. Near it is the territory of Minnesota, and beyond it, in British territory, is Lake Winnipeg, near latitude 50°. It is in the latitude of the Land's End, and the country about is said to be exceedingly fertile. The winter is cold, but the climate is healthy and agreeable. Wheat grown in Minnesota weighs heavier than any other kind that passes through the Chicago elevators, and fetches a higher price there. In the days of Captain Carver, a hundred years ago, it was well known that copper and iron abounded about Lake Superior; 'the copper district' and 'the iron district' are marked on the American 'Bradshaw' map. Of late years it has been discovered that gold abounds in British Columbia, and that the best, the shortest, and the easiest way of crossing North America is about latitude 50°. With gold at one end, copper and corn in the middle, and energy at the other end of this chain of communication, a way must be opened before long, and the Minnesotans knew it. In the first place, they set up a line of stages to run over the prairie, without any road at all, and the stages are running on grass at the old

English mail-rate, on English ground, paid by the American Government. Then they started a steamer. She was built to run on American waters, but it seemed to her owners that she would pay better on the other side of the frontier. So they hauled her out of the water, mounted her on a lot of wheels, harnessed four-and-twenty span of oxen to the prow, and drove the steamer over the prairie. She was launched in water which flows to Hudson's Bay, and she is plying now upon Lake Winnipeg, in English latitudes, on English territory, if I rightly understood my informant.

In an old country a man takes up a business and sticks to it, and his son follows in his father's groove. Steamers stay in the sea. Here everybody turns his hand to everything that happens to turn up, and goes ahead his own way; and 'there's nae law aboon the pass,' as the old Highlander said to the Saxon. Old Norse worthies were dragged in their ships overland, to fulfil the letter of a grant of all that they could sail round in the Western Isles of Scotland. Bruce followed in his ship over a tarbert, as it is told. Perhaps Uncle Sam meant to circumnavigate the Hudson's Bay territories, and the colonial league, and circumvent his old father John Bull. If he won't use what he has no

wonder. A Scotch lawyer turned Yankee, and too energetic for the Eastern States, represents an accumulation of energetic cuteness that may do a great deal, and such men abound in the north-west, amongst the bison bulls.

CHAPTER XV.

ST. LOUIS TO LOUISVILLE.

Rose early from a luxurious bed. Above a marble basin was a printed request, that notice might be given of anything amiss with the waterworks. Turned on

the water, and a stream of chocolate flowed in. Reckoned that this was amiss, and rang accordingly, but reckoned without my host. An ebony gentleman answered. He looked blandly at the water, which was so thick that an inch hid the white basin ; he dipped his black finger daintily in, as if that would make it any cleaner ; and then he smiled cheerfully and said, 'I reckon there must be a lot of steamers in the basin.' I thought he meant my basin, but it seems he meant the basin of the Mississippi, or that part of it which is opposite to St. Louis. Pointing humbly to the notice, excused myself for my ignorance, bowed out the blackamoor, and did the best I could with the golden water. The mud of this great yellow flood is so exceedingly fine, that it is next to impossible to get rid of it, but after a few trials the water does as well as if it looked clean. Filled a glass, and left it to settle ; the mud was still suspended after twenty-four hours.

As the river is muddy at all seasons, the quantity carried by it in a year must be something portentous. According to the Mississippi Survey, enough to cover a square mile to a depth of some feet (I think ten) is annually taken away from America and given to some land under the sea. But a river whose fall is 1680 feet

in 3000 miles, or about twenty inches in a mile, could never move a heavy boulder. The denudation effected by this, one of the largest rivers in the world, amounts to something like the scouring of a road by a shower. The macadam is washed in the rut where the rain-water accumulates most; the road itself is not much altered, but some of the mud is packed in the gutters, and there sorted into particular forms. Having got through the muddy marble basin of this magnificent hotel, fed like a prince in a hall of dazzling light with dark attendants, and went out to see what was to be seen in St. Louis. At home I always skip the American political news; here American affairs are forced into notice. The first thing worthy of note was the absence of bustle and the presence of soldiers. The enemy really was somewhere near, headed by a former State governor who was very popular, and all the town was drilling or being drilled. The shops were closed in the afternoon, and the owners were met in the streets learning the goosestep in plain clothes. They looked very like an awkward squad of London volunteers on an undress drill-day. It was rumoured that one-half of the town men were 'secesh' at heart. Why should Chicago flourish and St. Louis pine? One is a baby in a bog; the other an old respectable merchant-city, seated upon

the biggest river, in the heart of the richest land in America, and founded on a rock.

This cruel war is the apparent cause; but what is the cause of the war?

The chief commerce of this town lies up-stream and down. The Northern States have opened the river, and hold New Orleans at the mouth, but they cannot guard the whole bank. The enemy are always popping at steamers. Sometimes a couple of guns get on the inside of a curve in a bend, and follow the steamer, pitching shot into her till she gets round the curve of the S, and has the inner curve. There is nothing for it but to sit on the safety-valve and go. As it is a service of danger to travel, commerce is in a bad way down-stream; up-stream the water is so low that steamers can hardly make their way. A whole shoal of white Noah's arks were stranded and moored like herrings packed in a barrel, with their sharp noses in the mud and their tails in the water. It is an ill wind that blows nobody good; and the blast of war has blown all the pigs to Chicago. But what evil power blew the ill wind that blasted the trade of St. Louis?—that is the question. As it appears, Chicago is better placed for the provision trade than St. Louis.

It is good for wine to sail round the world; it

is especially good for port-wine to be carried to Newfoundland to be cooled in a sea fog—why or wherefore nobody knows, but the fact is so. It is very bad for corn and flour, salt beef and pork, to be carried through the torrid zone past St. Louis and New Orleans. On the other hand, it is impossible to get out of the basins by way of Quebec in winter, because of the ice-plug. At all times the lake navigation is difficult and dangerous: the shores are low and hard to see, nights are dark, winds are strong, and there is a lee-shore close at hand in every wind. To get to Buffalo from Chicago, my friend the murdered pig must describe a path like the letter Z. But the rail on a flat goes straight as a dart; and rails radiate from Chicago in all directions. The dead pig and John Barleycorn may travel together by rail from abattoirs and elevators at Chicago, through cool climates, good for provisions and consumers, at all seasons, to seaport towns on the eastern seaboard, and there embark for anywhere. For these reasons, as it is said in the West, the Garden City and the farm-states about her cannot afford to quarrel with friends on the eastern slope of the Alleghanies. The Western States submit to the draft, and support the war, which could not go on without their help, because of their provision trade. In Ould

Ireland, the pig pays the rint, and is the poor man's best friend. Here, as it appears, he is his deadly foe. 'The poor' (Irish) 'man's blood' flows that 'the rich' (merchant) 'man's gold' may be boiled out of scalded pigs and mush. On what strange little pivots great events seem to turn! The old song says—

> 'Buy my caller herrin';
> Though ye may ca' them vulgar fairin',
> Wives and mithers, maist despairin',
> Ca' them lives o' men.'

When we dined on salt pig in the 'Ariel,' we fed on Irish men, and supported the war by supporting the provision trade of the Western States. For the sake of dead pigs the steamers are stranded at St. Louis in the mud, through which I had to wade on getting up. The pigs keep the war going, but what set it agoing at first? Was it the ebony gentleman who answered the bell, or some other?

The banks of the river are made of mud. Sections cut by small creeks show beds of yellow-gray sand, and impalpable mud, all dipping down-stream. This is river-delta work, but it is packed in a rock-groove. The town is founded on rock, which appears at the end of one of the streets, and below the town, in a quarry; it also appears on the opposite side.

In winter this river freezes, so that carts can cross. Boulders abound higher up. Here there is scarce a stone to be seen. On the cap of the quarry, next to the river and immediately above the river-plain, a section is got of the surface-beds. At about fifty feet above the river, the beds are horizontal, and the rock beneath them is water-worn limestone, with knots of gray chert. This looks like the work of still water. About forty miles below St. Louis there is a quarry of pink granite, and about twenty-five miles below the town the river is narrow and rocky, according to the account of boatmen. If a delta of mud left there has been removed by the river, it has drained a wide lake hereabouts. The country looks like it, and this looks like an ancient shore. By the help of a strong lens, some minute scratches were found on the chert in this quarry, but the shape of the surface was the shape of limestone in the bed of the Ottawa. It was full of pot-holes and honeycombed. The cap of the quarry is about twelve feet of yellowish earth and clay.

To the west rise low hills, and they were selected for a day's tramp, to see the country and the fortifications.

The river flows in a limestone groove, at the bottom of a larger groove, which is about 200 feet deep: that

is to say, the highest hills about the town are 200 feet higher than the river, and from them no higher ground was visible in any direction. But at 200 feet above the river the ground is very near the level of Chicago, and not more than 50 feet below the watershed of the basin. The river cannot have been so high, for loose drift is there still. The rock shows at the brow of the hill, and it has been cut through in making roads and quarries. Fossils in the limestone project half an inch or more, and stand out like shells half-buried in sand. According to geological slang, this is umbral or vespertine, or carboniferous limestone; and as the coal-measures are close at hand to the east and west, some denuding engine has probably cut out a groove in the prairie in which the river now flows. That engine was not a glacier according to the marks. All the rock-surfaces are weathered or water-worn. On this foundation are beds of compact clay, with scarce a vestige of a loose stone: the few that were found, after a long search, were small bits of chert and limestone. No symptom of a boulder was discovered, and yet the moraine of the big glacier ought to be hereabouts if it ever existed. The groove does not look like river-work. That kind of denudation is well exemplified in small water-courses cut by rains in the swelling green hills about St. Louis. Every sec-

tion of a trench dug by running water in the clay is angular, like V, and the plan of it is like a gnarled oak-branch ; but the wide trench from coal-measure to coal-measure is like the Bay of Fundy when the tide is out —a plain of red mud, with leads of shallow water here and there, and a coast-line of rocks with a cap of drift. This is the shape of sea-work.

On leaving St. Louis on the 8th, the road passed eastwards for 20 miles over a plain as flat as a board; it then reached a low range of yellow limestone hills capped with sand and clay, and about 150 feet higher than the plain. This semblance of a coast-line bounded the lower plain as far as the eye could reach on a clear day.

The clay on the hill-top is more than twenty feet thick, and had no apparent stratification. In a cutting near a road, it stands firm, upright as a wall ; but the rain digs into the clay, and small streams have made trenches in it more than six feet deep. If these hills had been long above water the clay would all be gone—washed from the solid foundation into the Gulf of Mexico, or the wash-hand basins at the Linnel Hotel.

The results of this tramp to St. Louis so far co-incided with former results, and supported the theory founded upon them. The last vestige of Greenland ice

in the Atlantic was seen about 37° 10′ (see page 2); the last northern boulder was found about lat. 39°. The next cast was therefore organized so as to keep along near this latitude by travelling eastwards to Louisville, with the Mammoth Cave for a southern point to aim at in Kentucky.

In wandering about St. Louis looking for boulders, other things intruded themselves, and had to be noticed.

On the river-bank one only place appeared to be a centre of active work. It turned out to be an iron-factory, whence came the peculiar clang of clinching rivets in iron plates. Sentries with shouldered arms mounted guard at every opening; but, nevertheless, enough of a sharp snout was seen to betray an ironclad gunboat of small proportions. Perhaps she may be intended for the raiders and bushwhackers and rebs who pelt the peaceable white arks in the yellow mud; but she may be intended for other purposes. Once in the Mississippi, a steamer may go anywhere—even over the prairies, as it appears.

On the hill-tops were fortifications very ugly and very like other mud edifices of their class. Near them were soldiers. They were camped under *tentes d'abri*, as all the soldiers seen encamped in these regions were. They were very jolly, very noisy, very busy about cook-

ing beef, and mostly very young. Not far from them were a gang of navvies working in the clay cutting. One of these—an Englishman by his accent—advanced and began: 'Friend, are you from the old country?' 'Yes, I am,' I said. 'I thought so,' he exclaimed. 'Well, then, will you tell me how things are in Liverpool?' And then he opened the floodgates of his grief, and poured his sorrows into my ears. His cotton shirt was egregiously dear. He got good pay, but what was it worth when things were so dear? He thought he would go back to England, for this was a bad place to live in now. There were the soldiers on the hill there looking down at us. That one was an officer. Did he look one in that shabby hat?—and so on. Not wishing to be mistaken for a disguised reb taking a plan of the new defences, I launched out in strong approbation of the officer and his costume, shook hands with the navvy, and departed. One of the soldiers was kind enough to accompany me part of the way home, and we conversed amicably till we got to his destination, a camp in the suburbs, and there we parted. Unless these fellows were looking after suspicious characters, no other creature in this besieged town under military law, swarming with spies, and inaccessible to peaceable travellers, took the smallest notice of 'dis here child.'

The result of the boulder-hunt to the eastward is soon told. Though the roadside was keenly watched, with the full expectation of seeing the familiar shape of a big striped stone, not one was seen between St. Louis and Louisville, on plain or on railway cutting. The road crosses a number of rivers, which flow southwards into the Ohio, and join the Mississippi. As soon as the old coast-line (if it be one) is passed, the way rises, winding through well-wooded hills of sand and clay, containing small water-worn stones. At 180 feet above St. Louis (460 above the sea), the prairie is reached. It is a beautiful rolling country, like the best parts of fertile England, with neat villages nestling among trees, and wide tracts of corn-land stretching as far as the eye can reach. They extend to Wilmington and Chicago. After a while the road descends to 50 feet above St. Louis, and there it stays for a spell.

At Carlisle the engine broke down, and there we had to stay for a spell also, waiting for a fresh horse. We had taken berths in a warm sleeping-car, and as this was Saturday night, no more trains were coming; but as we had no food on board, all adjourned to Carlisle in search of supper before going to roost. The landlord of a little country inn was rather taken aback by this invasion of hungry men; but he and a lot of smart girls,

who had just fed a large country company, set their shoulders to their wheel, and their hands to the frying-pans, and in ten minutes twenty or thirty ravenous travellers were munching as many good beefsteaks, and swilling hot tea. A large map of the county hung on the wall. The whole of it is rolling prairie, grass land, and woodland, disposed in long strips, which run N.E. and S.W., as do the rivers. Hill and dale, and varieties of soil and vegetation, all trend one way. According to a sharp, good-natured, native, who clearly thought I was a land speculator, boulders of granite, and of a blue stone, as big as a man's head, are found in the land. If so, they must be rare, for I saw none. There is good shooting in this district. Prairie hens abound, ducks and geese are numerous, and three deer were brought in this morning. The rivers are flooded once a year, generally in May and June. The bottoms are very rich. The district is rich in coal. One pit was at work at the first rise, and several more were seen at work. A seam 7 feet thick was found at 250 feet below the surface, in boring an Artesian well near this place. Large fortunes have been made by purchasing land with undiscovered coal-seams hidden under the rich prairie. Any man who does not mind the chance of being drafted, may here become proprietor of a large

coal estate for a small sum, if he has sufficient geological knowledge to select his farm in a good place. The coal-market is handy, the country pretty, and the climate excellent. A German passenger had lately come up from New Orleans; he came in a steamer between two gunboats with guns loaded and cocked ready for fighting; but there was no fight this time. Many other steamers had been fired at. He described the scenery as monotonous, and the voyage cost a week.

Having supped and listened to a political discussion till sufficiently sleepy, strolled out into the frosty moonlight, and listened to the cackling of wild-geese in the air, and all the sleepy sounds of a country-town going to roost. The sunset colours this evening were most beautiful. The sky was perfectly clear, and glowed with orange and green till the dark blue and silver of a hard frosty sky sunk down upon the horizon, and put out the orange light. There is something peculiar in these American sunsets in low latitudes. We are far enough south to note the rapid change from day to night; but that is not the only peculiarity. The European sun goes down behind a sea horizon, and the light is reflected from the convex water-mirror, and shines through haze; here the sun goes down behind a dry plain which does not reflect. There is a marked

difference in the colour, whatever the reason may be. There is less variety of shade, and a recurrence of the same effects night after night. Found the way to the railroad in the dark, and after stumbling over the sleepers, found the end of the shipwrecked train. Got in, and walked through the deserted cars to the sleeping-car; turned in, and went to sleep. Dreamed of dancing furious reels in a very small house, and of the chain of the 'Ariel,' and the fore-hold of that palace on the water; and finally awoke, to find the sun shining, and the train crawling slowly through a rolling country. The barometer was at the same level. It was a fine, sharp, frosty, cloudless morning, but there was no breakfast to be got. Passed a cutting in which were beds of sand dipping opposite ways, a shape which indicates ebb and flow. Got into an empty car, toasted myself at the stove, and thought how much I should like to eat somebody if I really were the wolf whose appetite had fallen to my share for breakfast. We got nothing all that frosty Sunday but a slice of apple-pie late in the day. The breakdown had thrown everything out of gear. Near the White River the country is hilly, the rock a coarse sandstone, which forms weathered cliffs near the river. The hills are not more than 200 or 300 feet high, but well-wooded and very pretty. The

rail winds through the hills like an eel up to 360 feet (740 above the sea), and therefore higher than the watershed near Chicago. For a distance of 213 miles there is no symptom of glacial action, but every sign of water-work in all forms. An unfortunate woman here proved the use of the frame ahead of the engine. She was seen by the engineer sitting on the track, and the usual staccato movement on the steam-horn was performed with vigour. The woman never stirred. The engine took her on the side of the head, and the frame lifted her up and cast her into the ditch. The train stopped, and all the passengers got down and trotted back a quarter of a mile to the place where the woman lay. They clustered round her, and then the train thought it would go back too. So it snorted and screamed, and ran backwards into the thick of them. They scattered and made room, and, for a wonder, no one else was hurt. The woman was badly stunned, and her head was cut and bleeding, but no bones were broken. So she was bundled into a baggage-van and taken on to Mitchell, where she was left in charge of a landlady. No one knew anything about her, and it was surmised that she had been liquoring freely somewhere on Saturday night.

From Mitchell the line runs southwards to the

Ohio, and the country is much the same. At Salem, 450 feet (830 above the sea), the rock is yellow sandstone, clear of drift, and weathered. The country appears to be a series of hollows scooped out of horizontal beds of sandstone of the coal-measures. The shape may be expressed by curved lines, thus—

A tongue of land like a low promontory extends out into the prairies westwards from the Alleghanies. The Ohio is on one side of it, Lakes Erie and Ontario on the other; the crest of it is about lat. 41,° and the end of it near Chicago. The hollows are mere ruts dug out of it, and we have been crossing the hollows thus far. From Mitchell the road rises to 630 feet (1010), and then runs down to New Albany, on the Ohio, where the aneroid marked 150 feet above St. Louis. According to the survey, the difference between Louisville and the junction of the Mississippi and Missouri is only 20 feet.

Omitting details, the present shape of the surface which covers the coal-basin in the fork of the Y made by the Ohio and Mississippi may be expressed by a curve of 340 miles ⌒ long, and 630 feet high. The rocks seem to be very little disturbed, so coal-mining

ought to be easy. A reference to Plate 8 in Johnston's 'Physical Atlas' will show that the form of the coast of the Gulf of Mexico is repeated in miniature about the fork at Cairo. The black colour on the geological map coincides with a rise like a coast near St. Louis, and near Mitchell. The hollows look like aqueous denudation; and there is no symptom of a glacier, little or big, in this region.

The Ohio is crossed in a steamer, and from the landing-place busses carry passengers to the several hotels. The water is quite as dirty as in the Mississippi, and the colour of the dirt is the same. The town is crowded with soldiers and all that belongs to war. The railroad which runs south into Kentucky is new; it was not finished when my edition of Mitchell's 'Guide' was published; but, as the publishers of that useful work wisely omit to date it, the date of the railroad cannot be learned from the railway guide. In July, the first thing the Halifax pilot had to tell was that gold was at some fabulous premium, and the next was that a great Southern raid was threatening Washington. When it was over, the armies near Richmond used to chaff each other. The Rebs bellowed like bulls, and shouted, 'Bo! have some beef, Yanks?—Ba!' The

Yanks returned bullets, and the Rebs retorted; and so men died for beef and chaff.

On returning from the North, the war pendulum had taken another swing. Atalanta had fallen—so had gold. Nobody knew where Atalanta was, but all were agreed that it was a glorious victory. After some time, Atalanta was discovered in a map, and it seemed plain that a very disagreeable missile was in the side of the Reb. The bullet went in by way of Louisville and the Kentucky railroad, and supplies of men and provisions followed through the wound. The most obvious remedy was to plug this hole, and extract General Sherman and his army. On this head nothing certain was to be extracted from the newspapers, but it was gradually drawn from fellow-travellers that the communications with Atalanta were in considerable danger; that to travel on the railway was now a service of great peril; and that the North had got a pretty considerable whipping somewhere near Salina. It further appeared that the Federals held the ground on which they stood in Kentucky, but little else even there. A gagged press would not be apt to insert stories against the rule of the ruling power; and here are a few stories of daily life taken from one paper:—

Louisville, Kentucky, October 13, 1864.

'MURDER OF AN ENROLLING OFFICER.—Captain M'Carty, formerly of the 42d Indiana, and enrolling officer for Reeves township, Daviess County, started, on Monday of last week, to notify the drafted men of the township. In the afternoon, while riding along the road in the south-east part of the county, he was shot by men in ambush, and, as it appears from the confession of one of the conspirators, by a detachment of eighteen who banded together for this purpose.

'After killing M'Carty, they placed the body on a sled and dragged it the distance of one and a half miles to White River, and, tying a large stone to the body, sank it in the river. His horse ran to a house not far off, and was taken up, but not recognised.

'On Tuesday, the family becoming alarmed at his protracted absence, inquiry was made in relation to his movements; and his horse was found, and traces of blood discovered on the saddle.

'One man was arrested on suspicion of having committed the murder, but no proof of his guilt could be adduced, and he was liberated. On Thursday the place of his assassination was discovered, and the track of the sled traced to the river-bank.

'The man who had been arrested accompanied the party on the search, and when the body was dragged from the water, stricken with remorse, he burst out crying, and declared that, though his hands were clear of M'Carty's blood, his heart was not, and then proceeded to make full confession of his guilt, and of the damnable conspiracy that had been set on foot, and thus cowardly executed. Eighteen had banded together for this purpose, and on Monday, knowing of the movements of Captain M'Carty, had divided into squads and waylaid the different roads along which they supposed he would pass. Five men formed the squad that did the killing. He gave the names of the entire band, and seven of them have been arrested and sent

to Indianapolis. Captain M'Carty is represented by all who knew him as an excellent and estimable man; and even the men who murdered him so cowardly and cruelly bore this testimony to his character.'

What a popular service it must be when the people thus welcome the recruiting officer north of the Ohio! No wonder there is a conspiracy and a political trial now going on in the Western States.

Murder No. 2.

'MURDER IN PUTNAM COUNTY, IND.—We learn that on Wednesday, the 28th ult., a most shocking murder was committed in the town of Cloverdale, Putnam County, Ind. An old citizen named George Young, who was residing alone, was murdered by some person or persons unknown, who entered his house in the night time. The marks on the corpse indicated that he had received a blow on the back of the head with a bludgeon of some kind, and that he had also been choked. The horrible deed was not discovered by the citizens till Friday following, when he was found lying on the floor of his house, the front door locked, and some article of furniture drawn up to the back door to keep it closed. A coroner's jury was summoned, which elicited the above facts. Mr. Young bore the reputation of being a peaceable and quiet citizen.

'Several persons of questionable standing have been missed from the neighbourhood since the murder, one of whom is known to have belonged to Morgan's raiders when they entered Indiana over a year ago.'

Morgan is a famous 'Gorilla' of great power and

ferocity, according to one side; a sucking dove of great suavity and polite demeanour, according to the other.

Murder No. 3.

'Two Men Hung.—Last week two men were hung at Paris, Linn County, Kansas, for robbing a soldier's wife of over three hundred dollars. When the soldier returned home, he raised a party of citizens and caught the robbers. They were forced to reveal where they had hid the stolen money, after which they were hung.'

Lynch law seems to prevail in this region.

'Snow.—Snow fell on Friday at Indianapolis, Lafayette, and other places in the northern part of Indiana. This will account for the cool weather in this vicinity.'

Pleasant weather for campaigning, and a good reason for carrying the war into the enemy's warm country; perhaps this may account for the northern practice of burning everything.

This was the whipping which individual soldiers confessed, but the papers would not :—

'General Burbridge's Expedition.—The following facts in regard to the failure of General Burbridge's expedition into Virginia were obtained from a gentleman of Covington, who conversed with General Burbridge during his brief stay in that city Sunday afternoon.

'General Burbridge left Lexington Ky., about two weeks since with a force of mounted men, for the purpose of destroying the extensive salt works at Saltville, Va. Upon arriving there,

he found the place strongly fortified and defended by a large rebel force, under command of Breckinridge and Echols. General Burbridge had two brisk skirmishes with the enemy, capturing two redoubts, one hundred and fifty prisoners, and a large number of horses, mules, and cattle. Our losses in the two fights were small. Colonel Mason, of the 11th Michigan, was killed, and Colonel Hanson, acting Brigadier-General, and a very brave officer, was mortally wounded.

'Finding the place too strongly fortified, and defended by a superior force, General Burbridge withdrew in the night, leaving his wounded at the farm-houses in the vicinity where the fight took place. The rebels pursued our troops about eight miles, but with what effect is not known. General Burbridge and staff arrived at Covington on Saturday afternoon, *via* Big Sandy river, and left immediately by special train for Lexington.'

Here lies one of the Western wild-fowl—a *Canard sauvage;* but he proves that nigger soldiers are not popular in this region, and that is true.

'Versailles, Oct. 9, 1864.

'*To the Editors of the Louisville Journal.*

'The paragraph in your paper on Friday, the 7th inst., under the caption of "A Difficulty in Versailles," is purely imaginary, and without the slightest foundation in fact.

'There has been no collision between the citizens and negro soldiers in Versailles, and no stringent measures adopted by the military authorities in consequence thereof. It is not true 'that negro soldiers are stationed at every corner of the streets, and have orders to disperse all gatherings of the citizens, or that only two men are permitted to stand and converse with each other on the street,' as stated by your informant.

'It is true that on Monday, the 3d inst., a squad of negro

soldiers, with arms in hand, paraded the streets after night, to the great annoyance of pedestrians, and rudely thrust aside gentlemen, and even ladies, who happened to be in their way. Now, there was no apparent necessity for this military display at such a time—there was no threatened danger from any quarter. Upon inquiry, it was ascertained that these negro troops were acting under the orders of a major in command at this post, who was drunk at the time, and not conscious of the character of his offence. The citizens, feeling justly indignant at such a breach of decorum and respect, drew up a remonstrance to head-quarters at Lexington, setting forth the facts in the case, and in a very short time said officer was required to appear before his superiors and answer for the offence charged against him.

'It is not true that hostility exists on the part of the citizens toward the negro soldier, for, as a general thing, they are obedient and civil; but the cause of complaint is against those placed in command, who are generally Dutch, rude and rustic in manners, never looked into Chesterfield, with scarcely an idea above converting a cabbage head into krout. Of course there are some honourable exceptions.

'With all due deference to your informant, I am induced, from a sense of justice to all parties, white and black, to make the above statement. SAM.'

Here are the pleasures of war in a loyal State, and close to head-quarters :—

'GUERILLA OPERATIONS NEAR THE CITY.—The guerillas are growing extremely bold, as their operations within a few miles of the city plainly testify. We are informed that at an early hour on Wednesday morning, a band of twenty-five armed men was on the Bardstown pike, a short distance from Louisville, engaged in committing depredations. Last night seven of the scoundrels

made a raid on the Two-Mile-House, and robbed several parties living near. One gentleman, whose name we did not learn, was relieved of his pocket-book, containing 1000 dols. The toll-gate keeper was robbed of a small amount of money. We trust that an energetic move will be made by the military authorities, which will result in the capture of the entire party of thieves.

'At an hour later than the above writing, we learn that the guerilla scoundrels lorded it completely over the highway this morning. Every person met on the road was halted and robbed. A great commotion existed among the marketmen and milkmen, as the robbers paid particular attention to them. Mr. I. M. Hornsby was halted by five of the desperadoes, four and a half miles from the city. They presented cocked pistols at his head, and forced him to hand over his purse, containing 300 dols., and a fine gold watch. They then unharnessed his horse, and left him on the highway, quietly sitting in his buggy. The last he saw of the thieves, they were riding down the Taylorsville Road. From other parties we learn that they robbed the toll-gate keeper on this road, and he (the keeper) says, threatened to kill him. He is an old grey-headed man, and we would have thought that his silver hairs would have commanded respect. The robbers did not respect his age. He was beaten over the head with the butt of a pistol, and otherwise roughly handled.

'Five miles from the city, on the Taylorsville Road, Mr. S. Gibson, of Shelby County, who was coming to Louisville on horseback, was halted and robbed of 556 dols. in money. As he neared the city he overtook men on foot, on horseback, and in waggons and buggies, who reported themselves as victims of this wholesale robbery. The guerillas addressed their leader as Captain Furgueson. It is a shame that so daring a band of robbers should be allowed to approach so near the city and practise so many outrages.'

So there was irritation about this wound in the side

of poor old Kentucky, and her Southern friends were striving to plug the wound.

The state of military affairs, as it appeared, was not then favourable for the North, or for travelling from North to South. The Atalanta raid was going the way of the Southern raid—back again; and the draft was not going on quite as well as might be wished in the Western States.

What is the cause of all this evil; this making and shedding of ill-blood? If it is not the dead pig, the provision trade, and pelf, is it philanthropy and the live nigger?

The ladies of Louisville are famed for their beauty throughout the States, as I am told. English and French damsels are as fair, so far as I have been able to ascertain. Shortly before leaving England, a fair young English girl arrived from France with the French polish of the most select French millinery added to her numerous charms. The newest of the French novelties brought to bear upon dazzled male Rebs by this fair young damsel arrayed for conquest, was a black silken coat with a white lining, shaped like a man's evening swallow-tail, but adorned with sundry frills and ruches set round the borders, which made it a truly feminine garment of great elegance. No such garment had ever

delighted male eyes before, and certainly no such garment ever was seen behind the Alleghany Mountains, as I supposed. One of the first things seen in Louisville was the outward form of the frilled swallow-tail coat, which was new in London in July. This specimen of art was sky-blue, and beautifully made; so was a silken gown, so was a bonnet with a garden of flowers and a nodding plume, so was a parasol over all. The wearer was slight and graceful, and carried herself and her silken train with a light tripping gait. It was impossible to resist trying for a peep at the face of the most beautiful of the beauties of Louisville, in the Parisian fashion of the fairest of London ladies. Sliding off the pavement not to seem impertinent, I strode through the dust, got ahead, turned incidentally to look at a shop window, and saw—a nigger. She was a regular darkey, with blubber lips, disguised as 'The girl I left behind me.'

> As I was going down de street,
> Down de street, down de street,
> A dark fair sex I chanced to meet—

and there she walked on, ogling this 'dark gal dressed in blue.'

Is this the triumphant Bellona, the type of her race, *causa teterrima belli*, the Helen of the American war?

Are free men drafted to free enslaved niggers? The records of every-day life tell a different tale—

'Diabolical Murder in Henderson County.—The Owensboro Monitor of Wednesday says :—

'Mr. Charles Winfrey, a wealthy and highly respected citizen of Henderson county, was murdered last week under the following circumstances, as related to us.—A party of nine men, who had been drafted in Indiana, went to Mr. Winfrey's residence and tried to persuade or steal from their master a sufficient number of negro men to relieve them from the draft. They made several attempts to accomplish their purpose, but the negroes could not be induced to leave. They also tried to intimidate Mr. W. by telling him they had an order from Colonel Moon, who commands at this post, for the negroes for military duty, but this had no effect. They then left. Mr. Winfrey called his servants together and told them that these men would make their appearance again, and if they did not desire to go they would have to assist him in defending themselves. This they readily assented to do, and a signal was to be given by which they would be called to the main building. A noise being heard on the premises the same night, Mr. Winfrey got up and opened a side door to give the alarm, when he was shot by a man named Peyton formerly of Henderson county, who was concealed near the door, killing him almost instantly. A man by the name of Pipes, and another named Holder, were among the accomplices. They immediately fled to the opposite side of the river, and have not as yet been arrested. As an evidence of attachment existing between Mr. Winfrey and his servants, we will state that at the beginning of the war Mr. Winfrey divided a large sum of money among his servants and bade them take and conceal it, which they did, and after he was killed, as we are informed, 6000 dols. in gold and silver were brought by these

faithful negroes and delivered over to the proper person to receive his effects.'

Nigger recruits are stolen or taken, but they would rather be household slaves than be shot.

It is sweet and decorous to die for country, but disagreeable to be made to die for a drafted somebody else, who, as the song has it, 'doesn't want to go.'

Theoretically, the North is fighting to free others; practically, it is doing nothing of the sort. Here are more crumbs of daily bread.

'Police Proceedings.—*Wednesday, Oct.* 11, 1864.—Thomas Moore, drunk and disorderly conduct. Three dollars fine.

'J. R. McGee, drunk and disorderly conduct. Three dollars fine.

'William Demph, disorderly conduct. Three dollars fine.

'Mary Henley, drunk and disorderly conduct. One hundred dollars bond for two months.

'Sarah Ganaghty, drunk and disorderly conduct. One hundred dollars bond for one month.

'Butler Smith, charged with aiding Bill, a slave of Guntcherman, to escape. Continued.

'James Manning and Julia Manning, charged with stealing towels, sheets, &c., from J. R. Nesbith, worth over four dollars. James discharged, Julia three hundred dollars to answer.

'Elijah Bremer, fast driving. Fined five dollars.

'Thos. Kincholow, shooting Mary Dolan with intent to kill. Four hundred dollars to answer.

'William, a slave of John Summers, stealing a horse and wagon from Mr. Rogers. William being a drafted man was handed over to the military.

'John Coogriff, stabbing Pat. Flaherty with intent to kill Continued.

'Henry, slave of Mr. Marshall, stealing a coat from a soldier. Discharged.'

'Cœlum non animam mutant qui trans mare currunt,' poor Pat is drunk and disorderly, but three cases of slavery in one morning do not look very free.

As there are no old scratches in this district, attention was directed to black men, and a trip was organised for the Mammoth Cave and the lower regions.

Not wishing to get involved in the fight which was coming, we went no further on Tom Tiddler's ground. Here is a sample of stories told by men who had lately travelled through the conquered country in southern bounds, which all described as a howling wilderness of blackened houses, burned fences, and ruined farms, with a population of soldiers, guerillas, and ruined angry hungry men.

'The Raid on the Lexington Railroad.—From a gentleman who was a passenger on the Kentucky Central Railroad, captured eight miles from Lexington on Tuesday morning, we learn the particulars of the raid. About 7 o'clock in the morning the train was thrown from the track by an obstruction placed upon the road. The cars were immediately surrounded by thirty armed men dressed in Confederate uniform, under the command of Captain Pete Everett.

'The passengers were ordered from the trains, and permitted to secure their baggage. As a general thing, private property

was respected. The Mail Agent preserved the most of the mail under his charge, and carried it safely to Lexington. But one bag, as far as our informant could learn, was cut open and rifled. One of the guerillas took a watch from the conductor, but as soon as the loss was made known to Everett, Pete promptly ordered the watch to be returned to the owner.

'The Express safe was opened and robbed of packages of money to the amount of two thousand three hundred dollars. The private papers of the Company were not molested. Everett claimed that the robbing of the safe was strictly against his orders, and told the messenger that, if he would point out the man guilty of the act, he would make him refund the money, and would punish him for disobedience of orders.

'The messenger was unable to point out the robber, and therefore the passengers could not determine whether Pete was sincere in what he said or not. Everett claimed that he did not capture the train for plunder. He said that he expected to find General Burbridge and staff aboard, which was the only inducement he had in making the raid. He said that he had been watching the road for three days, in hopes of capturing the General.

'The cars—three passenger, and the express and baggage—were set on fire and burned to the ground. The locomotive and tender were uninjured. Three Federal officers were captured on board the train and carried off as prisoners of war. We did not learn their names. The guerillas left in the direction of Mount Sterling. They told the passengers, in taking their departure, that they were the advance of a large force of rebels under Breckinridge, who was now in the State. This announcement was made with an air of bravado, and, as a matter of course, is regarded as nothing but a monstrous stretch of the truth.'

Having gone as far underground as possible—having

reached the Styx and Lethe with a black man for guide, and having got safe out of the mess, the cause of the American war seemed deeper and darker than ever.

This great country is shedding white blood to wipe out the dark stain of black slavery, as it appears. I have now seen something of the result. Some days ago I spent a long morning with a very intelligent darky, who had a white twilight glimmering through his shiny skin. Having gained his confidence 'some,' I ventured to ask if he was a free man. 'No,' he said, with the echo of sorrow in his voice, 'I belong to a man in Nashville (a town now held by the North); and while you are here, I belong to you. I am hired out to do this.' 'And do they give you anything for your work?' 'No, sir, nothing.' The answer made the blood of a free-born citizen glow, and drew a tip of course. That same day I saw a spirit-stirring sight. At the edge of a tall forest, just beginning to turn from green to scarlet, beside a still pool of clear water, smooth as a mirror, under a bright blue sky, with the glorious hot October sun of these Southern regions glowing on the autumn leaves, a nigger regiment had pitched a snowy camp, and the bright sun glittered on the steel of their weapons, as it might gleam from the helm of a knight. The slaves had taken up arms to fight for liberty. The

officer in command poked his ebony phiz out of an ivory-white tent, when I doffed my battered tile, and gave me leave to inspect his troops thus :—'You men, let dis man walk about.' Hurrah for liberty and equality! We were 'men' and brothers. I walked about and looked. One fellow as black as my boot was playing Scotch reels on a fiddle ; another was strumming on a banjo ; a great many were singing and playing at various games ; some were hacking beef, others cooking it round a glorious camp-fire ; everybody was munching, and grinning, and chattering. One only seemed out of humour with his work, and he was splitting firewood by driving his fixed bayonet into a log, and running it home against the ground. It was a glorious happy picnic of idle thoughtless beings ; and, though the log-practice was bad for the weapon, it might teach the soldier to strike home for freedom.

It was a picturesque sight, and one to make free blood stir. But this Rembrandt-brown picture, with the glittering high lights in the foreground, had deep shadows in the background. All is not gold that glitters. I thought of the drafted men who stole niggers for substitutes, and of the slave in the police report who was handed over to the military authorities.

At railway stations it was ordered in large print

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