

VOYAGES AND TRAVELS.

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By CAPTAIN BASIL HALL.

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LONDON:

EDWARD MOXON, DOVER STREET.

MDCCLX.

LONDON :
BRADBURY AND EVANS, PRINTERS, WHITEFRIARS.

EXTRACTS FROM A JOURNAL

WRITTEN ON THE COASTS OF

CHILI, PERU, AND MEXICO,

IN THE YEARS 1820, 1821, 1822.

BY

CAPTAIN BASIL HALL, R. N., F. R. S.

IN TWO PARTS.

PART I.

LONDON:

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PREFACE.

THE following Work contains literally what the title-page expresses, Extracts from a Journal written at very momentous periods, during short professional visits to the principal ports on the western coast of South America and Mexico.

It has no pretensions whatever to be considered as a detailed account of those countries. But, at the present moment, when everything connected with the New World engages so great a share of public attention, it was thought that a few characteristic sketches, by an eye-witness, of the progress of the revolutions, and of the state of society, domestic and political, in regions so little known, might be favourably received; as tending to give more correct ideas respecting them than have hitherto prevailed.

From various nautical and scientific researches, which have already appeared in the Philosophical Transactions, or formed the subject of official reports to the Admiralty, a short Memoir on the Navigation of those seas has been selected, and added in an Appendix.

Edinburgh, April 1, 1824.

ADVERTISEMENT TO THE SIXTH EDITION.

AFTER the lapse of more than eighteen years since the voyage was made of which these volumes give a hurried, but faithful sketch, I have been called upon to revise them for their republication, in a new and cheaper shape, better suited, as I am led to hope, to the taste of a large class of readers whom it is essentially important to interest in the class of topics here treated of.

South America, when I visited it in 1820, 1821, and 1822, was in a state of violent revolution from end to end, and the field being so vast and complicated as to render any detailed account impossible, I conceived that I should be doing more justice to the subject to extract from my journal only such points as appeared best calculated to give a general, but, at the same time, a just impression of the momentous scenes then passing.

I adopted this course, on the principle that would have guided me in describing the ravages of an earthquake, which I might have happened to witness, where any attempt to describe the whole would manifestly lead to confusion; while the narration of a selected few of those circumstances which actually fell under my own observation, might, if faithfully painted, help to elucidate the whole catastrophe.

A similar work, or one executed on the same plan, at the present moment, after an interval of nearly twenty years, would unquestionably afford matter for one of the most interesting, and perhaps useful, comparisons between promise and performance that the political world has ever witnessed.

Such a task, however, could be executed only by an eye-witness, who with equal opportunities to those which I enjoyed, and no less fidelity and diligence, should unite higher powers of observation, and greater capability of giving them effectual expression. For the describer of the present state of things in South America would be required, not to relate what he should actually see, as I have attempted to do, but to trace and expose the causes, as well as the probable consequences, of the dreadful state of confusion—amounting in some places almost to anarchy—which, to the sorrow of every lover of political freedom and of social improvement, too deeply characterises the society of that magnificent continent.

Nevertheless, when preparing this edition for the press, I set on foot some inquiries—not indeed with a view to any change in the text—but to the introduction of such explanatory notes, as might help to throw light on the progress of those stupendous events of which I saw only the commencement. But I soon discovered that, so far from these researches enabling me to furnish information to others, they only tended still further to mystify my own notions; at last I gave up the inquiry in perfect despair, resolving neither to touch a word of my original narrative, nor to add anything new.

These volumes, therefore, must be taken now, as they were at the time of their composition, twenty years ago, as a brief, but exact, account of the state of things existing in South America, at the termination of the mighty struggle between Spain and her colonies, a moment necessarily of the highest interest in the history of that, as of every other country which, having long been dependent, has at length dissevered the connexion. This transition state it was my good fortune to witness, and I have endeavoured to describe it faithfully.

London, March, 1840.

who, from holding communication with the out-law, merited, if not the same, at least nearly the same punishment."

This singular official document winds up with the four following lines, in prominent characters.

*Esos monstruos, que cargan consigo
El caracter infame y servil,
¿ Como pueden jamas compararse
Con los Heroes del cinco de Abril ?*

Those monsters, who bear about with them
A character infamous and servile—
How can they ever compare themselves
With the Heroes of the 5th of April ?

The 5th of April being the anniversary of the battle of Maypo, which decided the fate of Chili, is an era introduced, naturally enough, on every possible occasion. The foregoing lines form a stanza of their most popular national song.

CHAPTER XXVI.

CHILI.

Excursion to the Mining Districts of Chili.—Coquimbo.—Parallel Roads in the Valley of Coquimbo.—Theory in explanation of these Appearances.

AFTER returning from this very busy and amusing trip to Arauco, I landed my instruments, and set up an observatory at Valparaiso, where I hoped to profit by a week or ten days of leisure, which were allowed me before proceeding on a fresh cruise to the northward. Nothing, indeed, could be less favourable to the successful performance of the delicate experiments I had undertaken, than the constant hurry and distraction in which I was necessarily kept at this time ; but I was willing to give them a chance, and, although in the end nothing material was accomplished, I had the satisfaction of acquiring sufficient experience in using some of the instruments which were new to me, and especially the Invariable Pendulum of Captain Kater, that, upon subsequent occasions, I was enabled to take advantage of accidental moments which otherwise must have been lost. It is not, however, my present purpose to enter into any detail of these operations ; their results are given at length in the Appendix, and I shall merely remark, in passing, that even in so hurried a way, there is something particularly interesting in the progress of astronomical observations. The beautiful regularity and absence of all bustle in the celestial movements—the majestic silence with which they are conducted—and the total separation which exists between them and the affairs of the earth, come forcibly home to the imagination when the attention is seriously called to them. While the observer's eye is fixed at his telescope, in expectation of some approaching phenomenon, and his ear is conscious of no sound but the beating of the clock, he feels for the time lifted into another sphere, and admitted as it were to a companionship with the wonders of distant planets, and is tempted to ask how, with such objects of curiosity and interest at his command, he can ever condescend to mingle with the turmoil of human affairs, or exchange the contemplation of such matchless order for the instability of earthly passions ! The fascination of such pursuits can only

be known to those who have deeply indulged in them ; and I am sure they will bear me out in the assertion, that there are few purer enjoyments.

On the 14th of November, 1821, I received orders to proceed in the Conway from Valparaiso towards Lima, and to call by the way at the intermediate ports on the coast of Chili and Peru. The object of this cruise was to inquire into the British interests at those places ; to assist and protect any of his Majesty's trading subjects ; and in a general way to ascertain the commercial resources of the district. Several points of this inquiry have formed the subject of official reports ; but, as any interest they possessed was of a temporary nature, I shall not repeat them here, but confine myself to a general sketch of what we saw on the voyage.

The ship being required by a certain day for other services, we were much restricted in time ; which was the more to be regretted, as accidental circumstances put it in our power, if we had possessed leisure, to have visited many of the mines under considerable advantages. Hurried, however, as we were, it was impossible to take more than a superficial glance at that interesting part of the country ; and we were more solicitous to mark the effects of the recent political changes on the mining system, than to investigate minutely the nature of the ores, or to inquire into the details of working them.

Sailing from Valparaiso on the 15th of November, on the 16th, a little before sunset, we steered into the bay of Coquimbo ; and, having anchored the ship, landed at a point near some huts, in order to inquire our way to the town of La Serena, or Coquimbo, lying two leagues to the northward.

On entering a remote foreign port which no one on board the ship has before visited, there always arises a delightful feeling of curiosity and uncertainty, which recalls those juvenile emotions with which every boy has read Robinson Crusoe. The reality, in general, comes fully up to the vivid promise which the imagination holds out, nor is this interest abated by the repeated sight of new objects ; but on the contrary, each new place seems more curious than the last ; and as the sphere of observation is enlarged, curiosity becomes more impatient, though, at the same time, it is fortunately more easily gratified. The world, indeed, in every place is so thickly crowded with new and varied objects, that no traveller, even by the most awakened attention, can observe thoroughly the details of any scene ; and his interest is thus kept constantly alive by the certainty of meeting everywhere with novelty. If he does not fall in with it in the great outlines and broad distinctions, he is sure at least to find it in the minute shades of difference, which experience will teach him to discriminate, and enable him to apply with increased satisfaction, as the objects of comparison are multiplied and his familiarity with them extended. In the first instance, the observer's pleasure springs out of ignorance—in the course of time it is derived from his knowledge.

Just as we were mounting our horses, two English gentlemen from Coquimbo came galloping towards the landing-place. They had mistaken our ship for the American frigate Constellation, on board of which a son of one of them was expected to come as passenger. The father bore

his disappointment with great good-humour; and even insisted upon carrying us back to his house. At the door we were received by his wife, a native of the place; while half-a-dozen children, who rushed in a body to the court expecting to meet their brother, could ill dissemble their mortification at seeing only strange faces. But our reception, notwithstanding this disappointment, was hospitality itself; and our kind friends insisted on making up beds for the whole party, although it consisted of five persons.

We remained at Coquimbo four days, during which our host entertained us with morning and evening parties at his house, and by carrying us round to visit the different families of his acquaintance in the place. Though it would be ridiculous to attempt any account of a society in which we passed so short a time, yet there were some traits which, even in that brief acquaintance, were distinguishable as sufficiently characteristic. It is true that, where every object is new, a traveller may be so well pleased, as to render it difficult, in description, to disentangle the transitory interest arising out of mere novelty, from the enduring impression which real excellence alone ought to leave. This facility of being pleased, which is the happiness of a traveller, is the misfortune of travel-writers; who sometimes are expected, when strongly or sincerely interested, to give their readers some grounds for their sentiments and opinions, which it will often be very difficult to do.

In their manners the Coquimbians are remarkably unaffected and gentle, and seem habitually well-bred; but they act more, perhaps, from feelings which lead to general kindness and consideration, than from any formal rules of politeness. They have as yet had little intercourse with foreigners, for the town lies considerably out of the way, and has never had much commerce. Their climate is delightful; and the people appeared to be so easy and contented in their circumstances, that we were sometimes inclined to lament the inroad which the progress of civilisation must soon make upon their simple habits.

On the 18th of November, our friendly host accompanied one of the officers of the Conway and me, in a ride of about twenty-five miles, up the valley of Coquimbo; during which the most remarkable thing we saw was a distinct series of what are usually called parallel roads, or shelves, lying in horizontal planes along both sides of the valley. They are so disposed as to present exact counterparts of one another, at the same level on opposite sides of the valley: being formed entirely of loose materials, principally water-worn rounded stones, from the size of a nut to that of a man's head. Each of these roads, or shelves, resembles a shingle beach; and there is every indication of the stones having been deposited at the margin of a lake, which has filled the valley up to those levels. These gigantic roads are at some places half a mile broad, but their general width is from twenty to fifty yards. There are three distinctly characterised sets, and a lower one, which is indistinct when approached, but, when viewed from a distance, is evidently of the same character with the others. Such shelves are improperly called parallel: horizontal would be a more correct term: the planes in which they

lie are indeed parallel to one another, and thence has arisen the erroneous expression.

The uppermost shelf or road lies probably three or four hundred feet above the level of the sea, and two hundred and fifty from the bottom of the valley; the next twenty yards lower; and the lowest of the distinct set about ten yards still lower. These distances are loosely estimated, and may be wrong; for it is very difficult to determine heights or distances in a country quite new, and without natural and determinate objects of comparison. There being neither trees, houses, cattle, nor men in this valley, our estimates were made entirely by guess. This, however, does not affect the general question, but only the dimensions. When at any time we found ourselves on one of these parallel roads, we saw, upon looking across the valley, or up or down it, as far as the eye could reach, portions of flat spaces, apparently on the same level with that on which we stood; and when, in order to determine this more exactly, we went over the edge of the road or beach, and brought our eye into the plane of one of the roads, we invariably found, on looking round, that the same plane produced would merge into every portion of the same road; exactly as we should see the margin of a lake, with all its windings, on a level with the surface, if, while bathing, we brought the eye close to the water and looked round. I regretted not having time to return with a spirit-level, to examine accurately this question of horizontality.

In the centre of the valley, which is six or seven miles wide, there stood an extensive plain, narrow at the upper end, and widening out towards the sea, thus dividing the valley into two parts*. The surface of this insulated space was to all appearance quite flat and horizontal, and, as far as the eye could determine, exactly on a level with the highest of the above-mentioned roads; so that, if a lake ever stood in this valley, at the level of the upper road, the present surface must have been barely covered, or, as seamen term it, just lipping with the water's edge. It is several miles wide, and shaped like a delta; its sides are at many places deeply indented with ravines, which enable us to see that it is composed exclusively of the same water-worn materials as the roads, which, on both sides, are easily traced at the same levels, and in perfect conformity with those on the opposite banks of the valley. The stones are principally granite and gneiss, with masses of schistus, whinstone, and quartz, mixed indiscriminately, and all bearing marks of having been worn by attrition under water.

Since the above description of the Coquimbo roads was written, I have had an opportunity of examining the analogous phenomena in Glen Roy, in the Highlands of Scotland. The resemblance between the two cases is not so great as I had been led to suppose from description. In principle, however, there is not the slightest difference, and the identity of origin seems unquestionable. In the Chilian valley the ground is entirely destitute of vegetation, while Glen Roy is covered with a thick coating of heath. In the latter, too, the shelves are comparatively narrow, and resemble

* It appears from Mr. Darwin's more careful measurements, that this valley is not above three or four miles wide.

exactly the beaches which fringe the Highland lakes of the present day. Those at Coquimbo are greatly wider, and I should think had been caused by the operation of some more violent agent than the others.

One theory which presents itself to explain these appearances, supposes a lake to have been formed in the valley and to have stood at the level of the highest road, long enough for a flat beach to be produced by stones washed down from above. The water in the lake must next be conceived to have worn away and occasionally to have broken down portions of the barrier across the valley; this would allow the lake to discharge a part of its waters into the sea, and consequently, to lower its surface to the level of the second road; and so on successively, till the whole embankment was washed away, and the valley left as we now see it.

These stones all bear the marks of having come from some distance, and may possibly have been deposited by a river flowing, in ancient times, from the Andes; while some vast, though transient cause, may, at one operation, have scooped out the valley, filled it with water, and left a barrier of adequate strength to retain it at the upper level long enough to account for the formation of the beach we now see, which may have been the work of years or of minutes, according to circumstances. By a succession of sudden disruptions of this dam, the supposed lake would be made to stand at different levels; and the water washing down the sides of the banks would bring along with it the loose stones, gravel, and mud, to the water's edge, where, their velocity being checked, they would be deposited in the form of level beaches. In the Alpine valleys of Savoy, circumstances precisely analogous frequently occur: a great avalanche dams up a stream, and forms a lake which stands at different heights as the barrier of ice successively breaks away, and we can readily trace the different levels at which the water has stood.

According to the Huttonian theory of the earth, it is supposed that vast masses of solid land have been forced up, from time to time, from the bottom of the sea, with great violence. If this be admitted, it has been suggested that a wave, greater or less in magnitude, according to the size and velocity of the submarine elevation, must inevitably have been produced: and it requires no great effort of the imagination to conceive a wave sufficiently large to submerge the whole of this coast: at least those who have examined the Alps, the Andes, or any other lofty chain, and have seen the solid strata of rock now elevated on their edges, to the height of many thousand feet, in the air, although bearing indubitable marks of having once been in a horizontal position, and under the sea, will discover nothing extravagant in supposing that if they had been thrown up suddenly from the bottom of a deep sea, a huge wave must have been the result.

P.S.—*March*, 1840. At the time I wrote the Journals from which these volumes are extracts (in 1823) I confess I saw no objection, in theory, to the foregoing conclusions. The perusal, however, of Mr. Lyell's admirable book on the "Principles of Geology," has quite satisfied me that

nature does not act *per saltum* in the manner above conceived, but that all the geological operations of which we have had the means of carefully examining the traces may be referred to the gradual action of existing causes.

The following observations, which are taken from Chapter X. of Mr. Lyell's work, will be read with interest by those who are curious in such matters:—

"As I did not feel satisfied with this explanation," (that above given by me,) "I applied to my friend Captain Hall for additional details, and he immediately sent me his original manuscript notes, requesting me to make free use of them. In them I find the following interesting passages, omitted in his printed account:—'The valley is completely open towards the sea; if the roads, therefore, are the beaches of an ancient lake, it is difficult to imagine a catastrophe sufficiently violent to carry away the barrier, which should not at the same time obliterate all traces of the beaches. I find it difficult also to account for the water-worn character of all the stones, for they have the appearance of having travelled over a great distance, being well rounded and dressed. They are in immense quantity too, and much more than one could expect to find on the beach of any lake, and seem more properly to belong to the ocean.'

"I had entertained a strong suspicion," adds Mr. Lyell, "before reading these notes, that the beaches were formed by the waves of the Pacific, and not by the waters of a lake; in other words, that they bear testimony to the successive rise of the land, not to the repeated fall of the waters of a lake*."

These parallel roads of Coquimbo have since been visited and carefully examined by Mr. Darwin, whose Journal on board the *Beagle* has deservedly excited so much attention in the geological world. At page 423, he has these words:

"I spent two or three days in examining the step-formed terraces of shingle first described by Captain Basil Hall on the west coast of America. Mr. Lyell concluded from the account that they must have been formed by the sea, during the gradual rising of the land. Such is the case. On some of these steps, which sweep round from within the valley, so as to front the coast, shells of existing species both lie on the surface and are imbedded in a soft calcareous stone. This bed of the most modern tertiary epoch, passes downward into another, containing some living species associated with others now lost. Amongst those now lost may be mentioned shells of an enormous perna, and an oyster, and the teeth of a gigantic shark, closely allied to, or identical with, the *Carcharias Megalodon* of ancient Europe; the bones of which, or of some cetaceous animal, are also present, in a silicified state, in great numbers. At Guasco," continues Mr. Darwin, "the phenomenon of the parallel terraces is very strikingly seen. No less than seven perfectly level but unequally broad plains, ascending by steps, occur on one or both sides of the valley. So remarkable is the contrast of the successive horizontal lines, corresponding on each side with the irregular outline of the surrounding mountains, that it attracts the atten-

* Lyell's Principles of Geology, vol. iv. page 18. Fifth Edition.

tion of even those who feel no interest regarding the causes which have modelled the surface of the land. The origin," adds Mr. Darwin, "of the terraces of Coquimbo is precisely the same, according to my view, with that of the plains of Patagonia; the only difference is, that the plains are rather broader than the terraces, and that they front the Atlantic Ocean instead of a valley,—which valley, however, was formerly occupied by an arm of the sea, but now by a fresh-water river. In every case it must be remembered that the successive cliffs do not mark so many distinct elevations, but, on the contrary, periods of comparative repose, during the gradual, and perhaps scarcely sensible, rise of the land. In the valley of Guasco we have the record of seven such nights of rest, in the action of the subterranean powers*."

As the whole history of these singular phenomena has been lately fully investigated by Mr. Darwin, and as I feel that my description given above is not only meagre, but probably inaccurate, from the inevitable haste in which the observations were made, I felt it due to the subject, as well as to all the parties who have treated of it, to request Mr. Darwin to give me his frank opinion upon my statement, to state the analogy existing between the phenomena at Coquimbo, and those of Patagonia, and also to point out the parts of his recent paper on the Parallel Roads of Glen Roy in Scotland, which bear most directly on this curious question. The following is the answer with which Mr. Darwin favoured me:—

"12, Upper Gower Street, 15th March, 1840.

"MY DEAR SIR,

"I much regret that, from the state of my health, I am incapable of answering your question at the length which I should much wish to do. I forget what I said to Mr. Lyell, but I remember that, from your description, I had expected a much larger valley. If the valley be considered as bounded by the mountains of granitic rock, its width is between three and four miles. But the width of the valley, in which the river flows, is only about a mile. I think, too, you have considerably overstated the distance up the valley to which the terraces extend, at least as far as I could discover. There are five terraces, of which three, as you observe, are best characterised. The height of the edge of the upper plain, close behind the town of Coquimbo, is 364 feet. This upper plain slopes down, but insensibly to the eye, towards Herradura Bay, where it is chiefly formed of calcareous rock, in the place of gravel, and its height is only 252 feet. This calcareous rock, contains recent marine shells. On the lower terraces, I also found existing shells. The upper plain, (whose edge is 364 feet close behind Coquimbo,) rises (but insensibly to the eye), in its course up the true valley of Coquimbo, and at two miles up the valley is 420 feet above the sea,—that is, 55 feet higher behind the town of Coquimbo.

"The sketch I have given in my Journal of Researches, of the theory of their origin, is I

* Darwin's Journal, in the Voyage of the Beagle, p. 423.

believe accurate. You will understand it better, if you will be so good as to read what I have written about the plains of Patagonia, at pp. 200 to 208. When I wrote p. 423 of my Journal, I had not visited Glen Roy. I now consider the cases as somewhat different. The appearances at Glen Roy are almost entirely due to the cumulative power of the sea, on steep slopes during a period of rest. The terraces of Coquimbo and Patagonia, are due to the abrading action of the sea, on gently inclined surfaces, during such periods. The parallelism of the terraces are, consequently, far less exact than those of the "Roads" of Glen Roy. If you think it worth the trouble to read my Glen Roy paper, in the Philosophical Transactions, you will perceive that the formation of terraces, by the abrasion of the matter accumulated in a gentle slope in the valleys during the rising, is a somewhat complex action. The upper terrace, or plain of Coquimbo, is, I believe, strictly analogous to the fringe of stratified alluvium in Glen Roy, described at p. 50 in my paper; its origin is explained in the hypothesis given at p. 59. The successive terraces at Coquimbo, I believe, are analogous to some appearances in the mouth of the Spean, which I have just alluded to at p. 67.

"Glen Roy and Coquimbo, or Guasco, offer two grand instances of slight modifications of the action of the sea on land, during periods of rest in its gradual elevation.

"I much fear this note will be scarcely intelligible; I should have much enjoyed conversing with you on this subject, but I am not at present capable of such exertion. If the subject is worth your attention, I am sure you will fully comprehend all I know, by comparing what I have written on Glen Roy and Patagonia at pp. 200 to 208. I should feel extreme interest in hearing your judgment on the theory I have proposed to account for the whole class of appearances under question. I think you will be pleased to hear, that traces of parallel roads have been discovered in other parts of Scotland, since I published my paper in the Philosophical Transactions for 1839.—Believe me, my dear sir,

"Yours very truly,

"CHARLES DARWIN."

I have only to add that, after having examined the parallel roads of Glen Roy, and carefully perused Mr. Darwin's paper on that wonderful series of shelves, as well as what he says of the gigantic terraces of Patagonia, and having witnessed in various other parts of the world many analogous phenomena, I feel compelled (cheerfully, I grant,) to surrender my judgment on this point into his hands, and to abandon many of my former notions on the subject. I consider Mr. Darwin's generalisations on this point as not more distinguished by boldness of speculation, than by the most careful, minute, and progressive induction—qualities by which geological theories are not always characterised.

END OF PART I.
