

The image shows the front cover of a book. The cover has a dark, vertically ribbed texture. In the center, there is a decorative oval frame made of a leafy wreath. Inside this frame, the words "OCEAN" and "WORK" are printed in a white, serif, all-caps font, one above the other. The corners of the cover are decorated with intricate, embossed floral and scrollwork patterns. The overall appearance is that of an antique or classic book binding.

OCEAN  
WORK



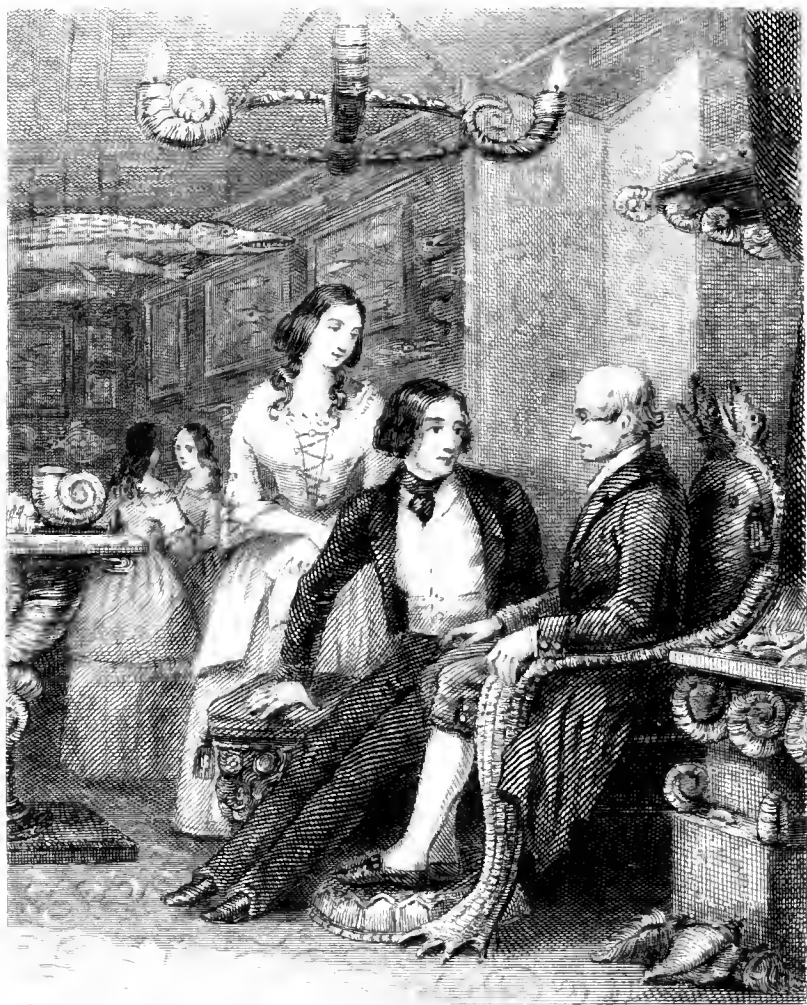
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OCEAN-WORK  
OR  
EVENINGS ON SEA AND LAND.  
BY  
J. HALL WRIGHT.



LONDON:  
PRINTED FOR THOMAS TEGG,  
N° 73. CHEAPSIDE.

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# OCEAN - WORK,

Ancient and Modern :

OR,

EVENINGS ON SEA AND LAND.

BY

J. HALL WRIGHT,

Surgeon,

Author of "Breakfast-Table-Science, &c."

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"For precept must be upon precept, precept upon precept; line upon line, line upon line; here a little, there a little."—*Isaiah*, xxviii. 10.

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LONDON :

PRINTED FOR THOMAS TEGG, 73, CHEAPSIDE.

MDCCCXLV.

LONDON:

BRADBURY AND EVANS, PRINTERS, WHITEFRIARS.

TO  
SARAH ROSE,  
TO THE GOVERNESSES OF ENGLAND,  
AND TO THEIR PUPILS ;

**This Little Work**

IS DEDICATED,  
BY  
THEIR SINCERE FRIEND,

THE AUTHOR.

CHATTERIS, CAMBRIDGESHIRE,  
*March, 1845.*



## PREFACE.

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IN "Breakfast Table Science" an attempt was made to attract the young, by presenting old scientific truths in a new and strange garb. In this little volume an endeavour is made to describe the workings of the *Ocean* from the *beginning of time* down to the present hour; and the reader will detect at a glance, that the present "Table of Contents" is formed after the work above alluded to.

When it is remembered that the Ocean has ever been, in the hands of the Divine

Architect, in the fashioning every rock and valley, what the *trowel* has been in the hands of man in building palaces and cities, it becomes an object of the deepest interest to all to explain *how* rocks, sand, clay, limestone, &c., were formed; and to show that the Ocean is even *now* employed as the agent in preparing a *new earth*, will be the main object.

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## INTRODUCTION.

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### CHAPTER I.

*Lucy.* How slow !—How very, very slow, does the old time-piece go ! It seems odd that the nearer we approach the holidays hours seem days, and every day a week.

*Kate.* And pray, Lucy, what is to be done when these long-coveted holidays do come ?

*Lucy.* Oh ! everything that is delightful, and lovely, and beautiful ! We are going to the sea—the real sea ! and we are to roam about all day long over the sands : and there are to be water parties ; and I have made large bags to collect the stones and pebbles, pieces of rock, sea-weed, and everything.

*Jane.* And my father has promised to tell us everything about *modern seas and oceans* ; and Charles, who has been all over the world, has promised to join us, and will bring his large collection “ of fragments of the floors of ancient oceans,” to compare with the modern specimens we are to collect.

*Lucy.* I cannot even guess what he means by the floors of ancient oceans ; but here comes my father. Let us ask him.

*Mr. R.* Well, ladies ! One at a time. Come, Jane, you talk the loudest ; you shall play the interpreter.

*Jane.* Can you explain what Charles means by—let me read from his letter—“ I shall bring with me fragments of the floors of ancient oceans, they have been collected in India, China, Russia, Germany, in the Islands of the Pacific, and, above all, in France.” Now, dear father, what we want especially to know is, what is an ancient ocean ? and what is its floor ? and why——

*Mr. R. (interrupting.)* Pray, my dear girls, wait till you see him. Why should I rob you of the pleasures of anticipation ; or Charles of the delight of telling you of the “ antres vast ” he has encountered, and the “ deserts idle ” he has journeyed through to form his collection ? There are indeed, Jane, “ more things in heaven and earth than are dreamt of in your philosophy.” Old as I am, I too look forward to the time when Charles will pour out before us his vast and profound knowledge of old worlds and primæval oceans, with an anxiety all but equal to yours ; but they are waiting for you in the garden.

*Mr. R. (alone.)* The earth has many chroniclers. Its mountains and everlasting hills still rear their heads as they did when Noah trod the earth. Oceans, and seas, still roll on where they have rolled for ages. Its pyramids still live in history ! Thermopylæ is still a pass where a handful of men could keep in

check a host of warriors. Vesuvius still pours its lava and flame as it did ages ago. Palmyra, Babylon, Balbec, Tyre, Sidon, are in ruins! but the traveller still stumbles over the giant skeletons of unburied cities, as he roams through the solitary plains. The history of the races who peopled these vast solitudes is familiar to us all; *but the ocean has no historian*—its caverns, its mountains, its sea palaces, its valleys, its floor, the races of gigantic marine monsters, whose shelly coverings and bones compose the very rock upon which we now stand, who shall be their historian? Who can?

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## CHAPTER II.

NOTWITHSTANDING Lucy's accusation against the old hall time-piece specially, and of the slowness of Time's movements in general, he "galloped withal" at his usual pace. The longed-for holidays came at last; and, as every movement had been so long arranged, the setting sun of the same evening shed his darting rays upon the whole of Mr. R.'s family as they entered Brighton.

Of course, the first inquiry was, "Is Charles come? Where can he be? What can he be doing?" These useless inquiries giving way to a variety of surmises as to the cause of his delay; and these again branching out into whys and wherefores, the most unlikely and startling, which were all cut short by the entry of Charles himself, with two porters groaning under the weight of boxes containing treasures

to him more valuable than any given weight of stones called "precious." We draw a veil around the sacred precincts of a meeting so joyous as this. In this whole world there is not a more pure and holy feeling than the affection of a sister, and for Charles this was heightened by an admiration for his intellectual endowments that was all but idolatrous.

Early in the morning the campaign was opened by Lucy stealing into Charles's room, ostensibly for the purpose of telling him breakfast was ready, but really to announce that she had already begun her collection; that, having been on the beach at a very early hour she had filled her bag with shells and other curious things. In a few minutes all were assembled, and the conversation soon flowed in the channel so earnestly desired by all.

*Mr. R.* I have been telling Lucy this morning, Charles, that this sea which we are now looking at is but a pigmy sea compared to the oceans of the olden time. It is indeed a beautiful pathway for a ship "to walk the waters like a thing of life!"—a cheap railroad from the new to the old world, on which ships are driven by "atmospheric pressure;" but it has no great and magnificent objects to accomplish like the ancient seas, that deposited the new red sandstone, and the coal—the one supplying us with exhaustless fuel, and the other with that prime necessary of life—salt!

*Charles.* True to a certain extent, my dear father; but still this modern ocean has its appointed works to perform, not the least important of which is

devouring the rocks of which the crust of the earth is composed, and strewing the fragments in its estuaries, and bays.

*Jane.* (*Whispering.*) Lucy, do you understand a word of what they are saying?

*Lucy.* Not a single word. I expected, when the breakfast-table was cleared, our bags would have been emptied, and Charles would have told us what they were, and I had prepared some little labels to affix to each.

*Kate.* Charles, here's a rebellion breaking out in this corner. Here's Jane and Lucy muttering their discontents in no very inaudible tones.

*Mr. R.* Thank you, Catherine. I see! I see! the old habit of forgetting that "new and old red sandstones," and "carboniferous deposits" have no charms for young lady collectors. Come, Charles, let us nip this rebellion in the bud, by chalking out a plan for our future operations. What say you?

*Charles.* I feel under great obligations to Kate for the interruption. We will form ourselves into a committee of the whole house. Father, you shall preside. Catherine, have you anything to propose?

*Kate.* Oh, dear, no! Nothing but to ask Charles to read the list of subjects he lent me this morning.

*Charles.* With pleasure! but would it not be better to stroll about whenever we feel inclined all day, and to discuss the subject of the *ocean* in its varied aspects in the evening when we are sitting quietly together.

*Kate.* That will indeed be delightful; and as our

absence from home will extend to two months, the whole of the *forty* divisions of your Syllabus may be descanted upon.

*Mr. R.* Forty divisions, Kitty! The sea, the ocean, under forty different aspects, impossible! May I read the paper, Charles? I am sure the ladies will listen patiently to “the syllabus of a course of forty evening conversations, by Charles R.”

*Lucy.* Pray begin, father. I am dying to know about these old seas and monsters.

*Mr. R.* (*reading.*)—

1. The Ocean as a Rockmaker.
2. The Ocean as a Polisher.
3. The Ocean as a Mausoleum.
4. The Ocean as a Valley Cutter.
5. The Ocean as a Treasure Casket.
6. The Ocean as a Lapidary.
7. The Ocean as a Pathway.
8. The Ocean as a Palace Builder.
9. The Ocean as a Lizard’s Home.
10. The Ocean as Fossilizer.
11. The Ocean as a Shark’s Workshop.
12. The Ocean as a Fish’s Battle Field.
13. The Ocean as Fertilizer.
14. The Ocean as Renovator.

Come, Lucy, I am out of breath; finish the list.

*Lucy.* I am sure I cannot read for laughing.

*Mr. R.* Come, Jane, do you try.

*Jane.* I am rather worse than Lucy. Let Kate take it; she is always grave and——

*Kate.* And what, Jane?



*Jane.* And good, Kitty.

*Kate.* (*reading.*)—

15. The Ocean as Destroyer.
16. The Ocean as Island-maker.
17. The Ocean as Mermaids' Hall.
18. The Ocean as Shell-factory.
19. The Ocean as Crocodiles' Playground.
20. The Ocean as Lizard's Grave.
21. The Ocean as Volcano Quencher.
22. The Ocean as Lava Lighter.
23. The Ocean as Earth-lifter.
24. The Ocean as Earth-burster.
25. The Ocean as Brickmaker.
26. The Ocean as a Mountain Builder.
27. The Ocean as Macadamizer.
28. The Ocean as Earth-maker.
29. The Ocean as Pebble-maker.
30. The Ocean as Coal-carrier.
31. The Ocean as Coral-feeder.
32. The Ocean as an Earth-roof.
33. The Ocean as a Floor.
34. The Ocean as Cavern-maker.
35. The Ocean as Basin-filler.
36. The Ocean as Slate-maker.
37. The Ocean as Seed-floater.
38. The Ocean as Sand-maker.
39. The Ocean as Earth-quaker.
40. The Ocean as a Sea Sun.

*Mr. R.* Thank you, Catherine; and I shall not attempt to say to Charles how greatly we are obliged to him. The understanding then is, that every evening one hour is to be devoted to the sea and its workings.

*Jane.* But when are we to see Charles's collection?

*Char.* To-day, if you please ; but I propose to select the appropriate specimens to illustrate each evening's *little lecture*, if I may call them so.

*Lucy.* And when are we to learn whether our pebbles and weeds are worth looking at, Master Charles ?

*Char.* Oh, that we will decide as we ramble together. Come, the day is half gone, and nothing seen or done.

*Mr. R.* One word, Charles. Let the girls select for themselves the order in which these ocean matters shall be brought before them. Come, Kate, you shall have the first vote. What for Monday evening ?

*Kate.* No. 1, "the Ocean as a Rockmaker."

*Mr. R.* Now, Lucy, for Tuesday ?

*Lucy.* No. 2, "the Ocean as a Polisher." Now, Jane, pray choose No. 13 for Wednesday.

*Jane.* No. 3, "the Ocean as a Mausoleum."

*Char.* Thank you ! thank you ! this plan is admirable. At seven to-night then we commence with "the Ocean as Rockmaker."





# OCEAN-WORK.

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## EVENING I.

### THE OCEAN AS ROCKMAKER.

---

*Char. (alone).* How serene and quiet is the scene before me! Not a breath of air ruffles the surface; and yet 'twas but yesterday that these tiny waves were foamy billows, running mountains high. Oh that the depths of the ocean had a voice, and that I might be the depository of the grand and wonderful secrets that have never yet been revealed to mortal!

*Enter JANE and her sisters.*

*Jane.* I fear we have kept you, Charles. The truth is, we have been expecting to see John bring in some of those huge pieces of rock now lying in the hall.

*Char.* For what purpose, Kate?

*Kate.* Oh, of course to illustrate the Lecture on Oceanic Rockmaking.

*Lucy.* And I peeped into the room half an hour ago, expecting to see the table covered with precious

stones and other things. But finding you had not arrived, I returned to Kate and Jane.

*Kate.* Dear Charles, when shall we begin? Shall I tell John to bring the things in?

*Char.* I have brought them with me; in fact, they are in my coat pocket. Here they are.

*Kate (laughing).* Oh, Lucy and Jane, I must laugh! Here is No. 1, a choice old flint; and No. 2, a very valuable and rare piece of lime or chalk; and No. 3 has all the appearance of a petty larceny from the kitchen-maid's sand-box; and, to conclude, No. 4 is so like the clay or gault from our brickfield, that one might safely vouch for their relationship.

*Char.* And these are the *rock-makers* of a whole earth! These, blended together, constitute almost every rock.

*Lucy.* Impossible, Charles! Soft clay make rock!—flint make rock—sand make rock! Quite impossible!

*Jane.* Pray, Lucy, have a little patience. Impossibility is a very common thing with young ladies. I recollect Lucy yesterday pronounced a new rondo “impossible” to learn; and Kate meets with impossibilities every time she walks out. Suppose we say improbable?

*Char.* Have patience with me, my dear girls. Every science is dry at first, and this rock-making especially so; as I must explain plain and familiar things to you, and gradually lead you on to others more difficult to understand.

*Kate.* But we understand all about these things already. Flint is dug out of the chalk.

*Char.* Stop, miss. Let us commence with No. 4. What is clay or gault?

*Kate.* Oh, clay is—yes, let me see—clay is gault.

*Char.* And where do you imagine all the clay came from?

*Kate.* The clay came from? How very ridiculous! Why, it was made there, to be sure.

*Char.* And the shells, and all other things, were made there too?

*Kate.* Oh, certainly. Why not?

*Char.* And this clay, in some parts of the earth hundreds of yards thick, filled with peculiar shells, was all made there?

*Kate.* Certainly.

*Char.* And now, fair lady, tell me of what it was made.

*Kate.* Oh, my dear brother, what nonsense to ask me about this nasty clay! If you really wish to know, I dare say the brickmaker can tell us.

*Char.* No, he cannot, Kate; and thousands, nay millions, of men, women, and children live and die in brick houses, made of this very clay or gault, without knowing what it is.

*Jane.* Pray tell us. Catherine's love of talking will for ever prevent her listening. I, like Kate, have hitherto thought clay was clay; but how it was made—how it came there—in what vast store-shop it was mingled together, I never knew, and, what is worse, never thought of.

*Char.* Oh, it's a beautiful thing, is this clay : pressed by a water press, compared to which all human presses are trifles, it becomes slate ; burnt by a fire, of vastly greater intensity than the hottest human furnace, it becomes the slab-stone upon which we walk ; whilst, in the hands of the potter, it has filled the earth with vases of porcelain and Dresden ware ; and from the kiln of the brickmaker this clay has covered the earth with palaces and cities.

*Jane.* But still we must inquire what it is, where it comes from, and what it has to do with rock-making ?

*Char.* It is made of everything, and comes from everywhere ! If huge fragments of rock fall into the sea, and, after the lapse of ages, become rolled and rubbed together till the angles and corners are worn off, the fine impalpable dust that is slowly worn off is *clay*. If the hard and hoary mountain rock crumbles down slowly under the hand of time, the crumbling particles, borne down by the stream into the sea, are gault. Look at all the countless sands of the sea—they are all *round*. Note the roundness of all the pebbles and boulders—they were all sharp, and angular, and square once. All that is worn off, has been carried away by water, and is now our clay.

*Kate.* Well, this is truly wonderful. Let me feel it again. Really clay is not very dirty after all.

*Jane.* Clay, then, is the ground of granite, porphyry, greenstone, gneiss, and limestone, mingled with water and shells, and pressed together ?

*Char.* Just so, Jane. Oh, Jane, there is something wonderful, and beyond all measure grand, in thus treasuring up old and apparently useless materials, and depositing them all over the earth as a "rock-maker!" The freestone, and the limestone, and the marble, are prepared for the hand of the rich; and by a blessed arrangement, the poor man, who is "ever to be in the land," is enriched by digging them from their quarries, and fashioning them into fitting forms and sizes. But the poor man himself needed a house; he has neither time to square the freestone, nor wealth to transport the limestone. These rocks are, therefore, many, many miles asunder—but the gault, the refuse of all the decaying rocks of all ages, is placed everywhere; so that you see our despised lump of clay is no unimportant agent in nature.

*Jane.* I am sure, Charles, we feel sorry we spoke a word disrespectfully of your specimens. Have you time to say a word or two on Nos. 1, 2, and 3?

*Char.* Clay is man's rock-maker. Flint, and sand, and lime, are the chief agents in making these ancient rocks, by the hands of God himself, the decay and decomposition of which have produced the clay. Have we not said enough to invest these apparently worthless substances with interest?

*Kate.* Thank you, dear boy. I know you think me a giddy, foolish girl.

*Char.* No, Kate, never foolish; perhaps a little giddy.

*Lucy.* Good night, Charles! Bless you!

*Char. (alone).* I have undertaken a task, I fear, beyond my powers. I never felt the luxury of communicating knowledge till this last hour. These simple girls have ever loved me as a brother, they now reverence me as a being superior to themselves. Whether I am successful or not in creating in them an increased love for the Divine Architect, I shall, at least, have the luxury of leading them on, step by step, through the boundless field of nature, and of throwing a beauty and an interest over things hitherto considered devoid of both.





## EVENING II.

## THE OCEAN AS POLISHER.

*Jane.* WITH what altered feelings have I trodden the sea-shore to-day! Every pebble, every grain of sand, every flint, is now teeming with interest. The sea has become a vast laboratory or workshop, in which every fragment is rounded and polished.

*Char.* Every tide that rolls, executing the double office of polishing the broken rocks as they fall into the sea, and storing up the waste, as it would be called, to enable man to do for himself everywhere that which is the first act of civilised man—build himself a house.

*Jane.* But, Charles, would the rocky boundaries of the ocean furnish stones in sufficient quantity to make all those pebbles, sand, and clay that are found, as you before remarked, all over the earth?

*Char.* Certainly not. When you and I were children, *Jane*, don't you remember the thousands of pebble stones we broke to pieces on the old stepping-stones? You was very learned at that time, and talked as glibly of granite, and gneiss, and mica slate, as the most learned geologist in his own society.

*Jane.* I remember. Ah! Charles, there have been no such happy days since. I recollect one afternoon

collecting some scores, and hammering away all the afternoon. Limestones I was thoroughly master of, but sandstones were my especial favourites: the harder pebbles were left for you.

*Charles.* But you well recollect that the inside of these stones were almost all different—no two alike. One white—hard and shining—?

*Jane.* Oh! quartz; that, too, was a favourite. It would scratch the school-room window like a diamond.

*Charles.* And granite. You well remember we little thought that these varied pebbles had been little angular or square fragments, and that the ocean had rubbed them into roundness.

*Jane.* But, Charles, you have forgotten to answer my question, “Where the stones and sand came from?”

*Charles.* The rocks that form the boundaries of the ocean furnish but few. Probably, the great supply has been from volcanoes, whose fires were all quenched before man was the inhabitant of this earth.

*Jane.* But that would be lava now. I recollect but very few of our youth-day pebbles were lava. There must be some other source.

*Charles.* When in South America I saw Cotopaxi, the most lofty of all the volcanoes in that quarter of our globe, its height being 18,858 feet. After one of the deluges caused by the melting of the snow, we were astonished to find the immense quantities of fine sand and loose stones that were brought down, as well as an immense quantity of mud called “enoya,” all of which are carried into the lower

regions, filling up valleys and stopping up rivers. Another source is the shattering of mountains by earthquakes. And in every historical record of active volcanoes, we read of rivers of mud and loose stones being thrown out.

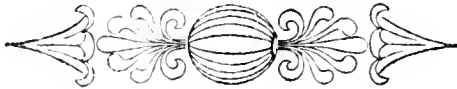
*Jane.* What extraordinary changes the earth has undergone! It seems as if it had been created and destroyed many times.

*Charles.* Not "destroyed," Jane. There is no destruction ever witnessed, except the swallowing up of a city and its inhabitants be called destruction. There is *change* everywhere visible. Nothing on earth is durable. The very soil upon which we tread is, much of it, solid rock eaten away by the sharp tooth of time.

*Jane.* I see, Charles, the simple subject of rounded pebble-stones leads us to contemplate volcanoes, earthquakes, and landslips — those striking evidences of God's displeasure with the wickedness of the world.

*Charles.* Nay, Jane! I have seen an earth-chasm in which was entombed the men, women, and children of a mighty and populous city, and could have wept over it, if I had not felt that the earthquake and the volcano were beneficent instruments in the hands of Him who overrules everything for our good. By the volcano, the earth has become fertilised; it has broken up the caverned roof which forms the floor upon which the ocean rolls, letting in its waters into the innermost parts of the earth, kindling up fires that rush with irresistible force through some chasm in the earth; and hurling into the ocean the broken

fragments of its own floor, in the form of mud, sand, and stones, portions of which are welded together by the pressure of the waves, and burnt into rock by subterranean fires. And others are rolled for ages and ages by the ceaseless tide-wave, until it is rolled into its resting-place as gravel.



## EVENING III.

## THE OCEAN AS A MAUSOLEUM.

*Jane.* As we strolled, to-day, through the beautiful scenery in the vicinity—enjoying every breeze that blew from the sea, with a freshness that none but the healthy can appreciate; I inquired of Charles whether the bottom of the ocean was as unequal and irregular as the land.

*Kate.* And he told me, Jane, that the very hill upon which I then stood, was formed at the bottom of the sea—and that it was the tomb of myriads of shell-fish.

*Mr. R.* And he might have told you that the very cliff upon which this house is built—the mountainous rocks a few miles off—were all built up slowly at the bottom of the sea.

*Jane.* There must be some wonderful things at the bottom of the ocean, Kitty! Should you not like to pay a visit to the mermaid sitting in state in her palace of shells?—in a diving-bell, of course.

*Mr. R.* The ocean might be found strewed with wrecks, and the bones of mariners that had escaped those hyænas of the deep—the shark; but its chief treasures are buried many a fathom deeper than human plummet ever sounded.

*Jane.* Nevertheless, father, the *unburied* wealth

lying waste at the bottom of the ocean, must be unbounded. Charles has a list of the British ships that are sunk yearly. Here he comes:—Charles, what number of British ships are sunk yearly in a time of peace?

*Charles.* For what purpose do you require it, Jane?

*Jane.* A proposition has been made to Kate to go down in a diving-bell to pay a friendly visit to the mermaids and dolphins, and inspect their sea-furniture.

*Char.* And she wishes me to present a catalogue of the articles to be seen. In the first list is a calculation of the merchant vessels belonging to British merchants, that have gone down to the dark unfathomed depths of the ocean, from 1793 to 1829: eighteen thousand nine hundred and twenty ships!—averaging 120 tons each; being at the enormous rate of 100,000 tons, annually, of *one* nation only.

*Kate.* Many of these richly laden with gold and silver, and precious stones!

*Char.* And spices—ivory and pearls.

*Jane.* Will this rich list tempt you, Kate?

*Kate.* No, I must have more yet; besides, they are probably so thinly strewed that I might not alight upon one of these treasure-ships. I must have something certain before I venture down, Charles.

*Char.* Out of 551 ships of the royal navy lost to the country, during the period above-mentioned, only 160 were taken or destroyed by the enemy, the rest having stranded or foundered, or having been

burnt by accident ; a striking proof that the dangers of naval warfare, however great, may be far exceeded by the storm, the shoal, the lee-shore, and all the other perils of the deep. Enough yet, Kitty ?

*Kate.* No ! Brass and iron guns, and wounded and mangled sailors, are not to my taste ! I want something wonderful and marvellous at least, if I cannot find anything precious.

*Char.* Think, Kate, of the horrible carnage of 150 species of shark, whose remains now strew the floor of the ocean. Think of the myriads of whales that swam in ancient oceans, and now lie piled up in vast heaps at the bottom. Think of the gigantic polypi, real and fabulous, with their thousand arms, ready to assist your descent.

*Kate.* Quite charming ! another such a temptation, and your list of choice and rare sea-furniture will be complete.

*Char.* Unfortunately the gigantic lizard race is extinct, so that there will be no chance of your diving-bell being cracked by one of these vast monsters, but their remains will probably satisfy you.

*Jane.* What an unreasonable body you are, Kate ! Such a bill of fare would tempt anybody but a coward like you.

*Kate.* Oh ! bless you, my dear sister, I expected the sea floor was all gold and delicate shells—that crystals of spar shot up like coral, and that the very water was bright with gold and silver fishes. I am not to be tempted by old ships and bones.

*Charles.* Oh ! the list is by no means complete.

There are cities which have been buried in the deep, and coral beds of exquisite beauty, shells of surpassing beauty and richness.

*Kate.* You may as well stop. The 150 species of shark that inhabit these lovely sea-palaces are enough for me.

*Charles.* But, my dear girl, they are all extinct but two or three.

*Kate.* So far as you know they may be ; but notwithstanding all you say, I believe the floor of the ocean is a horrible thing to look at—say nothing of the bodies of dead men, the ships, and the guns, and the rocks, and the volcanoes pouring out lava or something like it.

*Jane.* I am quite of your opinion, Kitty ; it is delightful to think that these things are accumulating at the bottom of the ocean, and that the result will be the formation of a new world for a future race of men ; but the process is one that should be carried on silently and secretly under the cover of the ocean, till the last wave of the departing sea recedes never to return.

*Mr. R.* Really, Jane, I am delighted with the justness of your views. The sea is indeed a vast mausoleum, containing the wrecks and ruins of animate and inanimate things ; the process of *entombing*. The loathsomeness of a sea charnel-house, the remains of which will constitute future lands, beautiful to look upon, is wisely hid from our sight by the billow that has for ages rolled over them all.



## EVENING IV.

## THE OCEAN AS VALLEY-CUTTER.

*Mr. R. WELL*, Charles, I think our plan succeeds admirably—the whole character of the girls seems undergoing a change. Without understanding anything connected with Geology thoroughly, enough has been said to make the sea and the sea-shore objects of deep interest.

*Charles*. I feel certain that science may be made thoroughly attractive to the most giddy and careless; but it must be science, not hard names. I wonder what has happened to the girls? They have hitherto been most punctual: I see them coming slowly up the walk in most earnest conversation.

*Lucy*. Charles! Charles! Jane and Kate have been trying to make me believe that the chalk cliff down below, is a mass of living insects, and that if I rub a lump on a black board, that thousands of perfect shells may be seen with a microscope.

*Charles*. Well, Lucy, there is very good reason for believing it to be so.

*Kate*. But our Sister Philosopher, Miss Jane here, has been trying to persuade me that my scissors, or the metal of which they are made, came originally from the wings of an insect.

*Mr. R.* Very probably. But, ladies, we must

adhere to our plan, which is to discuss subjects connected with the ocean. The first three are ended—what next?

*Kate.* Let me see. I select “*The Ocean as Valley Cutter.*”

*Jane.* And I “*The Ocean as Treasure Casket.*”

*Lucy.* And I, “*The Ocean as Lapidary.*”

*Charles.* “*The Ocean as Valley Cutter,*” shall be the subject for this evening.

*Jane.* We are becoming so much interested in the ocean and its works, that we propose to-morrow, if the day be fine, to remain out all day. I love to sit upon a hill and look down upon a valley, and fancy myself the inhabitant of an earth in its youthful freshness and beauty.

*Charles.* Finish the delightful picture, Jane, or shall I? “When the sea and land strove for the mastery—when the very hill upon which you sat was yet wet with the ocean-slime, and down the valley ran a stream in which all that was frightful and hideous on earth and sea—the lizard monsters of the deep and the winged lizard of the air basking on the new-land.”

*Jane.* I forgot: my dear fellow, when the valleys were forming, man was not upon the face of the earth.

*Mr. R.* That this earth assumed its present form by slow degrees; that the very hill upon which you sat rests upon other hills, at the very base of which are found fossil animals the like of which has never been seen by man, is proved by geologists—men whose

accuracy of observation is as undoubted as their piety is real.

*Jane.* I well recollect, father, how shocked I was when I *first* read that the earth was not formed in six days—I could not bring myself to believe it.

*Mr. R.* Very properly so, Jane. No man ought to *believe anything* that seems at variance with Scripture until he has examined the evidence. Moses did not write the previous history and formation of the various rocks, but of the last great change immediately *before* the creation of man.

*Char.* There will be many occasions during my stay with you to discuss these abstruse subjects. Let us lose no opportunity of observing and ascertaining the facts connected with this earth's formation, and then we shall be in a much better position for understanding many of the mysteries of its formation and growth.

*Mr. R.* Thank you, Charles; let us store their minds with realities and facts, and then there will be no danger of false theories or opinions.

*Kate.* I cannot exactly see what this conversation has to do with valleys.

*Lucy.* Nor I, Kate; nor can I see what valleys have to do with the ocean. The ocean as "Valley Cutter." Who knows that the ocean cut the valley through which we passed to-day?

*Char.* Firstly, Kate, because the top of the hill has layers of shells—sea-shells upon it. How came they there?

*Kate.* They were carried there of course.

*Char.* Of course by the sea.

*Lucy.* Oh yes, nothing else could have carried them there.

*Jane.* Then there is another thing, the layers of rock on each side of the valley correspond; how came that, Lucy?

*Lucy.* Oh! I dare say they were one mountain once, and were split asunder by an earthquake.

*Charles.* Very probably many valleys owe their origin to these mountain cracks; but we must not forget that the British Channel flows between the English and French shores, and the rocks correspond so exactly that there is but little doubt, at one time, they were joined together.

*Mr. R.* And in Auvergne, in France, the hard lava has been hollowed out into a deep river.

*Charles.* I have seen hundreds of valleys that show every mark of having been worn and hollowed out by the ocean wave, as perfectly as if it were the work of yesterday.

*Jane.* I cannot exactly comprehend why there should be hills and valleys at the bottom of the ocean.

*Charles.* You have read, Jane, of the thousands of tons of sand, and wood, and mud, that the Mississippi and other rivers bring down and cast into the bottom of the ocean. The *coarser* sand sinks first—the lighter, farther in the depths of the sea, although both in time cover the depths—the one is more easily worn away than the other.

*Kate.* I see the floor of the ocean is composed of rocks of different degrees of hardness.

*Jane.* And as the sea is ever changing its bed, the softer rocks have been carried away, and the harder remain.

*Charles.* This is the case not only under the waters, the hard rocks being the terror of the sailors, but it is also the case on land, when the sea has receded from the shore, leaving its old bed, as a residence for man and animals.

*Mr. R.* It then appears clear, my dear girls, that valleys are in part made in the ocean by sea-currents; that mountains are made deep in the sea by volcanoes, and drifting of foreign bodies from land; but the great probability is, that when the present dry land became land, that the softer chalks, the sandstones, and the clays, would be the first to be washed away; and in this way the ocean, in time, would be a Valley Cutter.

*Jane.* The time has expired.—What a majestic part does the ocean play, in forming the very framework of this earth!



## EVENING V.

## THE OCEAN AS TREASURE CASKET.

*Mr. R.* COME, Lucy, let me see your list of sea jewels.

*Lucy.* My dear father, I have no list. I have been thinking and reading all day about the ocean having treasures in it, and I can find none but the sunken ships, and anchors, and the gold and silver coins contained in these same ships.

*Mr. R.* I fear these treasures will be lost to this generation, although they will constitute the most precious relics in that which will follow us at some remote time; when the ocean, now rolling at our feet, shall roll over other sands, and the bottom of this sea be dry land.

*Jane.* In that view then, Lucy's list comprises the treasures for future lands and their inhabitants. I have mine here. I am half ashamed of reading it.

*Char.* Give it me, Jane; if there be anything ridiculous or wrong in it I will skip over it, and prevent that smothered laugh of Kate's which is just ready to burst forth.

*Kate.* Oh, Charles! that's quite a mistake, I am growing quite grave. I really do not think I have laughed the whole day. I am turning philosopher very fast.

*Char.* The laughing, or the crying philosopher, Miss?

*Kate.* I have not quite made up my mind yet ; but I rather think the crying.

*Mr. R.* My dear Kitty, pray laugh on. Gravity and tears are for the old and guilty ; laughter and smiles for the young, and thoughtless, and happy. Now, Charles, for the contents of Jane's sea-casket.

*Char.* Coral—pearls—whalebone. I must recall that last gem. I do not see the great value of whalebone, Miss Jane.

*Mr. R.* I must join Charles in his objection to whalebone. I often wonder, Charles, if it was customary to make a helmet of one universal size and shape, and that the young head should be squeezed into it ; and that notwithstanding all the headaches, and apoplexies, and deaths, and idiocies, that resulted from this insane custom, still all civilised nations persisted in wearing the fatal helmet : I wonder, I say, what the “barbarians” would say to this custom.

*Char.* If I was king of a Goth or Vandal nation, and conquered a country where the human head was cramped and moulded into this unnatural shape, I would build a vast asylum for the reception of insane mothers.

*Jane.* Oh ! my poor unfortunate whalebone ! Give me my list, Charles. I might have known that this is one of the points upon which our father holds strong opinions ; but that travelled and polished young gentlemen should presume to denounce thin and

genteel figures, and elevate corpulent and stout ones into awkward perfection, is to me passing strange.

*Mr. R.* Pray let me assuage the rising storm by asking Jane to read on.

*Jane.* Shells, isinglass, spermaceti. That is all.

*Mr. R.* A tolerable list ; but there is one thing I wonder you have forgotten. Come, Kate, let me see yours. Oh ! mine is the same as Jane's. Except pearls I could see nothing precious enough in the sea to put into a casket. Charles, I see you have a slip of paper in your hand. May I ask what it contains ?

*Char.* I too have a list. Over and above all the treasures of the deep, far exceeding in value all the gems that have ever glittered in the mine, is the *salt* with which the ocean is seasoned and freshened, and which is supplied to it in such vast abundance, that the supply is inexhaustible.

*Jane.* I quite forgot the salt.

*Charles.* And then there is the *lime*, of which all the shell-fish make their shells, and which the sea then piles into hills, and the sea-volcanoes build into mountains ; and in thousands, perhaps thousands of thousands of years after, a British House of Lords and Commons is built with this limestone. Oh ! lime and salt are, indeed, two ocean treasures.

*Mr. R.* And another treasure is the sand, worthless and countless as it may seem. Jane, you have seen the freestone window-sills in our house at —— ; the little kidney-shaped stones of which it is composed were all rolled at the bottom of the sea, and



became stone by its pressure ages and ages before man was created.

*Charles.* And then there is the granite, probably formed beneath the pressure of mighty waters, forming the rocky bed on which the ocean rolls, and bestowing upon man a stone for his palaces and bridge-building, that defies Time himself.

*Mr. R.* No, Charles, no. *Nothing defies Time.* Granite, porphyry, greenstone, sienite, magnesian, limestone. Palaces! and columns! that were the glory of Greece and Rome! Pyramids! that were the wonder of the olden times! The ruins that strew the deserts of Balbec, Palmyra, Thebes,—all have impressions of *Time's* tooth upon them, and will show more and more of his ravages, till the first slight chemical change, having gone on to disintegration, and that to rottenness and dissolution, pyramid, pillar (albeit built with a rock that may have resisted the lashings of the ocean waves for many thousand years), will fall; the heavier fragments forming the soil upon which the herb shall grow, and the lighter be wafted by the winds of Heaven to fall into other seas, where, again, the process of rock-making is in full operation, to be quarried again to build some future home for man, if he then be upon earth.

*Char.* Thank you, thank you. The evening has been a delightful one to me.

*Jane.* I am ashamed of my pitiful list of treasures of the deep!

*Kate.* And so am I. I look forward to our next evenings with feelings of pleasure that I cannot utter.

## EVENING VI.

## THE OCEAN AS LAPIDARY.

*Kate.* Pray, Jane, help me to lift my cargo of precious stones upon the table. I have wandered over many a long mile of sea-shore for them, probably to have the mortification of finding they are just nothing at all.

*Jane.* But, Kate, one thing is certain; they are all *polished*, some as brightly as if they were precious stones.

*Lucy.* My collection is a very small one; it has not a pebble in it, but is chiefly composed of shells and other little odd things.

*Char.* Well, ladies, you have been really industrious—all sorts and sizes—and some rather uncommon; here's a smooth and polished "*thunderbolt*," as children call them—a very fine specimen of sea-polishing.

*Mr. R.* I was reading yesterday, Charles, of these belemnites, as those curious stones are called in Dr. Buckland's Bridgewater Treatise, and find, when alive, they were a species of cuttle-fish, having ink-bags—the very ink-bags, in a fossil state, have been found after being entombed for thousands of years.

*Char.* Here are fragments of rolled flints.

*Jane.* Talking of flints, Charles, I broke one yesterday that had within it a mussel-shell.

*Kate.* And I another, having some other shell.

*Char.* Jane and I have often seen stones within stones, as a kernel within a shell.

*Lucy.* How can that be? Stones do, then, *grow* after all, Master Charles, although you laughed at me so heartily the other day when I said so.

*Char.* Not in your sense, Lucy. Stones never grow upon land—often in the sea; but these flints—what do you think they are imagined to be?

*Lucy.* Flints “imagined to be,” Charles? If Kate or I had asked that question, how you would have laughed! Flints, I presume, are neither more nor less than flints; but how the mussel-shell got inside, I know not.

*Char.* It is imagined that flints are sponges.

*Kate.* Sponges! Charles!!

*Char.* Sponges, I repeat; the spongy matter being gone, and the silicious or flinty being left in its place.

*Kate.* Well, really, this beats all the other wonderful things. How the flinty matter came there, and where it came from, are very very strange.

*Mr. R.* In due time, Kate, all will be explained to you. Flint is one of the most important materials in nature; it enters into the composition of almost every rock.

*Char.* I have looked through the whole of these smooth and polished stones, and find most of them are granite or limestone, or chalk: if Lucy and Jane

would chip off some pieces of chalk-cliff, they would probably meet with some beautiful shells; but there are also shells rolled and polished till they look like pebbles; and here and there a rolled bone that probably swam in the sea as part of a saurian or lizard, at a time when the rocks, from which these pebbles have been broken, were slowly forming at the depths of oceans—hundreds of miles from the place where you have found them.

*Mr. R.* But the evening is so very beautiful for a stroll, that we will close this subject, by again choosing subjects for the next three nights.

*Jane.* Is it possible that six evenings have passed away? How precious is time, and how often is it wasted! I am sure we owe a debt of the deepest gratitude to you and Charles for this great act of goodness and kindness to us.

*Char.* Jane, what next?

*Jane.* You shall choose for me, Charles.

*Char.* Here, then, “The Ocean as a *Pathway*.” Now, Kate?

*Kate.* Oh! I must have my favourite: “The Ocean as a *Palace-builder*.”

*Char.* And Lucy, yours?

*Lucy.* “The Ocean as *Volcano Quencher*.”



## EVENING VII.

## THE OCEAN AS A PATHWAY.

*Char. (alone.)* How difficult to bring one's mind down to treat of this "Wilderness of Waves" as a pathway! a mere highway for the ships to pass to and fro, after dwelling for years upon its higher and nobler works and ends; and yet its *present* work is a fitting end; a period of repose after ages of turbulence and disquiets! Having builded up the Earth into its present form and beauty, it has now become the medium of carrying the blessings of civilisation from clime to clime.

*Enter JANE and MR. R.*

*Jane.* I cannot look upon the sea without feeling a degree of adoration for its Divine Creator, akin to the devotion of the Persian enthusiast who worships the Sun.

*Char.* Bless you, Jane! I believe there are as many, perhaps more, offerings of silent, heartfelt praise and thanksgiving ascend to Heaven, from the bosom of the deep, as from the busy haunts of men in "populous cities pent!" I am sure my sincerest prayers have been uttered when sailing quietly in the midst of an ocean solitude—there seems but a step between us and death—and the spirit feels an unruffled calmness that the mere landsman must ever be a stranger to.

*Jane.* To me the Sea presents a more tangible image of Deity than earth can. Its illimitable vastness! Its giant power! The grandeur of its movements! stand out in bold relief to the puny works of man. If I doubted the existence of God, the sea and the earth would quite demonstrate it.

*Mr. R.* There is nothing new to be told of the ocean as it exists now. Its tides! its bays! its estuaries! Its trade-winds are the most elementary parts of our education. It is a blessed element to every shore that it washes—it links man to man everywhere in one common brotherhood.

*Enter KATE and LUCY.*

*Kate.* I fear we are late.

*Jane.* Indeed you are.

*Lucy.* We have been seeing a boat-race, and were struck with the absurdity of the losing crew throwing water upon their sails to make them heavier.

*Char.* What was the effect produced?

*Lucy.* Why the last boat gained upon the foremost, until it pursued the same practice, and then regained the lead.

*Kate.* I regret that we are late; but to tell the truth, Lucy and I voted it to be a capital subject for Charles and Jane, but rather dull for us.

*Jane.* Well, my dear girls, our tastes are wisely made to differ. I love, with you, to watch the bounding barque as it steals o'er the deep, and to see the gallant ship quit its native shores filled with brave and aching hearts; but I also love to dream over old oceans—oceans through which the keel of the navi-

gator never ploughed. Oceans lit up by a thousand volcanic glares, by whose light thousands of gigantic monsters rowed their way with paddles whose size and power bid defiance to adverse waves and winds!

*Kate.* Come, Lucy! Jane has been bitten by Charles. All this is, no doubt, beautiful, and undoubtedly very true, but still, not to be compared to the race between the *Nautilus* and the *Galatea* just ready to commence. Good night, Jane! my compliments to those horrible monsters, that you and Charles are so fond of.

*Mr. R.* I am not sure that the reproof is not just, Charles; we are but too apt to dream about old seas and primæval oceans, forgetting that, although matters of deep interest to us, "they are caviare to the multitude."



## EVENING VIII.

## THE OCEAN AS PALACE BUILDER.

DURING the whole day, the whole household was in a state of unusual bustle and hurry. Boxes that had hitherto been unopened, revealed their contents to the light of day; and packages that seemed travel-worn were broken up as useless for all future purposes. Kate and Lucy were incessantly occupied in carrying some choice specimens from the hall to their evening lecture-room, whilst Jane and her father were employed in the task of placing and arranging so much additional furniture. At length every thing subsided into its old, orderly quiet; and as usual they either rode or walked through the beautiful drives or walks in the neighbourhood, till evening brought them to the room which, somehow or other, was becoming a scene of greater interest daily.

As they entered the room they were struck with the exquisite beauty of the shells, and the infinite variety of the marbles, from the purest white to jet black; slabs of porphyry, greenstone, sienite; spars of translucent clearness, and polished pebbles, that had been picked up on every sea-shore he had visited.

*Char.* Now, ladies, I have redeemed the first part of the promise given in my letter, that I would show



you specimens from "the floors of ancient and modern oceans."

*Lucy.* But surely, Charles, you do not mean to say that all these beautiful pieces of sculptured marble have any thing to do with the sea or its floors? I thought marble, at least, was a solid rock, with which the sea had nothing to do.

*Char.* This beautiful little statue of the purest white statuary marble might have been, and probably was, common limestone once, and you know we have every reason to believe that all the limestones were deposited by the ocean.

*Jane.* I thought you told me, Charles, that some of the limestones are entirely composed of shells?

*Char.* I saw a number of houses in Northamptonshire the other day entirely composed of the broken shells of shell-fish, and formed at the bottom of the ocean.

*Lucy.* But, Charles, there is an immense difference between common limestone, such as we see burning in our lime-kilns, and the beautiful Parian marble of which this little statue is made.

*Char.* Not more, Lucy, than there is between the clay of which porcelain is made before it is baked and after. When limestone is subjected to the intense action of heat, as it is when near the burning veins of granite thrown up from the centre of the earth, it becomes white marble.

*Kate.* But there is a series of slabs of marble and stone like marble, on the table, having figures the most extraordinary in them, some like fishes, others shells and plants like coral.

*Char.* These three slabs, marked 9, 10, and 11, are from Auvergne, in France; they were taken from strata of limestone, marl, and sandstone, hundreds of feet thick, which contain nothing but fresh-water and land shells, together with the remains of land quadrupeds. Here are others composed wholly of *snail-shells*; this last slab was from the banks of the Rhine, although they are also found in Mayence, Worms, and Oppenheim.

*Jane.* I thought snails were land . . . animals, may I call them?

*Char.* So they are, Jane. When I was last summer on the lakes of Switzerland, and watched the little deltas where the mountain torrents entered the lake, I found the mud and sand there strewed with innumerable dead land shells, which had been brought down from the Alps by the melting of the snows of the preceding winter.

*Lucy.* Here, Charles, No. 27 is a very curious little slab.

*Char.* Oh that was given me by Prof. E., of B——; it is a flinty stone, called tripoli; it is used when powdered for polishing stones. What think you it is?

*Lucy.* I understood you to say it was flinty.

*Char.* So it is, but here is a new wonder; this little slab is composed of millions of skeletons, or cases of microscopic animalcules; the stratum from which this was taken extended over a wide area, and was no less than fourteen feet thick. When examined by a microscope the cases are found to be pure siliceous or flints, united together without any cement; they

are so exceedingly small that it is computed that there are 187,000,000 in a single grain.

*Mr. R.* At every stroke, then, we make with this polishing powder, several millions, perhaps tens of millions, of perfect fossils are crushed to pieces!

*Char.* Enough has been said to prove that for a vast period of time the stones with which we build our palaces, and the marbles for our statuary to adorn them, have been slowly forming for us at the bottom of the ocean. Millions of animalcules have lived their day, and died to form a single grain of stone; and yet it exists in such rich abundance, that other worlds might be filled with our spare material. Everywhere is the earth filled with marks of God's greatness and goodness. The most minute animalcule!—the delicate and fragile shell!—the broken and shattered stone!—the living and the dying fish!—have all become subservient to His one great mighty purpose, rendering the earth an ocean-made palace for man.



## EVENING IX.

## THE OCEAN AS A LIZARD'S HOME.

*Jane.* MY dear Charles, since yesterday I have spent some hours in poring over these stones and specimens. It is at least one hour before the usual time of meeting. I have a dozen questions to ask—shall I tire you?

*Char.* Oh, no, Jane! I wish, in future, you would stroll in here half an hour before the regular business commences; it would be the most delightful thing to me to talk to you about these old blocks of stone. Kate and Luey are good girls, but too young and giddy for serious talk.

*Jane.* Thank you, my dear boy. I feel an intense desire to know about the beginning of these things. I know, because every one is taught that now, that man was created six thousand years ago, and that the earth was slowly formed, as far as regards its rocks; but I firstly want to know, if the earth had inhabitants from the very beginning of time.

*Char.* It is generally believed not; as all the early rocks, the floors of ancient and modern seas, appear to have been formed by fire, and they have no remains of animals.

*Jane.* But even if animals had lived then on the new earth, and if their remains had been buried in

rock, as they are in many of the specimens on the table, would not the fire that formed the rock have destroyed the remains of animals and plants?

*Char.* Oh, certainly! It appears quite certain, however, that the sea was filled with living creatures at a very early period, or there would not have needed 150 species of shark to keep down the teeming produce of the ocean.

*Jane.* One hundred and fifty species of shark! One can scarcely believe that any man should be sufficiently skilled to discover in what the difference consisted.

*Char.* I recollect feeling just as you feel, Jane: I doubted the reality of all I read; and if I had not studied comparative anatomy, I should still have doubted.

*Jane.* Comparative anatomy, Charles? What is the difference, pray, between anatomy and comparative anatomy?

*Char.* One is the simple knowledge of the structure; the other is the comparison of the bones of living animals, as well as the flesh and sinews, with the fossil bones of extinct or long since perished animals.

*Jane.* I cannot think, Charles, that a little bony prominence, or a little groove in a bone, can enable any man to say one animal differs from another. I imagine all the large family of sharks differed merely in features, just as the human family do.

*Char.* No, Jane, it is not so; the species do not run into each other as you imagine. The connection

between different parts of the frame is so fixed and certain, that it requires only a small portion of any animal's remains to show its nature, and ascertain the class to which it belongs.

*Jane.* I wish I could feel convinced on this point. I have read of some very learned men, anatomists too, who mistook the bones of a salamander for a man's.

*Char.* And of others who could not distinguish between human bones and those of a newly-discovered animal—between a lizard and a fish.

*Jane.* Well, then, if these learned men made such blunders, might not your great authority, *Cuvier*, make others equally great?

*Char.* *Cuvier* doubted his own skill. He tried over and over again many experiments on fragments of the bones of known animals, and with a success so unvaried, as gave him implicit confidence in his method when he came to examine fossil remains. But here is our father, trying to persuade Kate to walk soberly, instead of running and jumping over everything.

*Mr. R.* Kate, you wild, untameable ass's colt! will you ever learn to keep silence?

*Kate.* Not with you, father, certainly never! why should I? I am as happy as the day is long with you; and I must show it. I don't want to be a philosopher, or look grave and learned. Do you, Lucy?

*Lucy.* There is no great fear of either of us being philosophers or blue-stockings; but as to being grave,

Kitty, who can see Charles and Jane without looking like gravity itself! They look as if they had been discussing the "Cosmogony; or, Creation of the World," with that celebrated personage, *Ephraim Jenkinson*, in the "Vicar of Wakefield."

*Mr. R. Pray*, Charles, what have you and Jane been discussing so very earnestly?

*Char.* Jane is sceptical on the subject of comparative anatomy; she even doubts the skill of the profound Cuvier.

*Lucy.* Really, I am ashamed to say, Charles, I do not know what this particular anatomy is; and I can answer for it that Kate and I never heard this profound gentleman's name before. Cuvier!—a Frenchman, I suppose!

*Char.* Not know Cuvier! The Cuvier who could take a hoof, a piece of horn, or a tooth, and could from that tell the form, size, figure of the animal; how it fed, what it fed upon; whether it swam in the sea; floated upon the surface of the water; basked in the midst of the slime; and rose and roamed through ancient forests, the sole and undisputed monarch thereof! Not know Cuvier, who sat down in the midst of a charnel-house of loose bones, and rose up, the all but Creator of new and strange forms, the like of which had long since left this earth!

*Kate.* I am sure, my dear Charles, I beg your and Monsieur Cuvier's pardon. If he really has done these wonderful things, I greatly wish to know more about him. He must have been a wonderful man to have been enabled to tell what sort of animal it was by merely seeing its little toe. (*Laughs immoderately.*)

*Jane.* Kate, you wicked girl, what are you laughing at?

*Kate.* Oh, Jane, forgive me, I was merely thinking whether Cuvier would be enabled to tell what sort of an odd creature I am, if I sent him one of my finger-nails.

*Char.* Laughable as it seems, I have no doubt that he could, if you enclosed, in the same parcel, the tooth you had extracted, the week before last.

*Katè.* The tooth, Charles! Why, soberly and seriously, my dear boy, of what use would that be to him?

*Char.* Of infinite use. From the form of the nail he would infer that you was an animal not fond of work; and the tooth would enable him to say positively, that you ate everything that came in your way.

*Mr. R.* To sum up all, his definition would be, an animal that lived at its ease, and that was omnivorous.

*Kate.* What a hard word.

*Mr. R.* Simply meaning—to eat everything.

*Char.* And now, ladies, after this amusing digression, suppose we return to the subject of the evening—“*The Ocean as a Lizard’s Home.*”

*Jane.* Surely, Charles, the ocean never could have been filled with lizards. It must have been a horrible sight to see.

*Lucy.* I never see these little black creatures without shuddering.

*Kate.* You mean the little black newts living in old rubbish and decayed brick-walls?



*Lucy.* Little crocodiles and alligators ?

*Char.* There is every reason to believe, that when the new earth-lands were rising out of the sea, long before the earth was solid enough for the growth of trees and fruits, myriads of these reptiles of gigantic size roamed over the new world, its undisputed possessors. The size of some is so vast as to appear incredible.

*Jane.* What could be their uses, Charles ?

*Char.* Uses, Jane ? Why to live and be happy, for one thing ; to feed upon the countless millions of fish, for another ; but chiefly to strew the floor of the ancient oceans with broken fragments of their sea-food, to form many of the rocks now lying on the table.

*Jane.* How very extraordinary ! Who could have thought that such hideous monsters as the ichthyosaurus, the plesiosaurus, the mososaurus, were created that they might be rock-makers for man. Wonderful !

*Char.* And there is another thing yet, my dear girls, still more wonderful, and that is the perfect and complete extinction and dying off of these monsters after they had answered the end for which they were created—and the creation of another race, and then their death, and then the creation of others.

*Mr. R.* My children, we can never conceive of God as we ought, as the Creator of all things, till we thoroughly understand the wonderful and successive creations, dyings off, re-creations ; every successive creation perfect in its kind, perfectly fitted for the *ocean work* it had to perform.

*Kate.* Really, father, you almost make me tremble. How came these vast monsters to die?

*Mr. R.* The Power that created them caused them to cease to live. Some were choked by the irruption of liquid chalk into the seas; others by the flowing in of mud; others by the agency of sea-volcanoes, the glare of whose light probably attracted myriads of these saurian monsters, to be destroyed by the lava, as it ran down the half-hidden mountain in torrents, and to be buried in the ocean of sea, mud, and ashes that were projected from its crater.

*Char.* Shall we proceed, at our next meeting, to consider our next subject, which is "*The Ocean as the Shark's Workshop.*"

*Kate.* No, no! I must really know more of these saurians, and their deaths.

*Lucy.* And I too vote for another evening being devoted to these strange creatures. Kate, we must really learn more of Charles's great favourite, *Cuvier*. I will certainly spend to-morrow in looking over his immense folio volumes.

*Kate.* And I too. I looked in one the other day, but thought it contained nothing but a collection of old bones.

*Jane.* Now, young ladies, Charles and I shall be happy to join you to-morrow afternoon at three. Good-bye.

*Mr. R. (alone).* At last we are entering upon matters and events the most profound and momentous. The last Creation of God gave birth to that most glorious of his works—*man!* and all the

animals now living upon earth with him ; all formed for his solace, his delight, and his happiness. To attempt an outline of the history of former creations and extinctions is indeed a lofty enterprise, and one that must lead to universal love and reverence for Him who has thus prepared, through countless ages, this earth as a home for man.

*Char.* Who shall say, after the experience of this day, that geology is a dry study ! Here have been three girls looking through the magnificent tomes of Cuvier with greater interest than the most ardent novel-reader would consume a new novel.

*Mr. R.* The great error we commit, Charles, is in teaching the *elementary parts of geology and fossil osteology first*. It is far more rational, and infinitely more successful, to excite an interest in the youthful mind by theorising, even if the facts themselves are rather questionable.

*Char.* The idea of *new creations, new species, and old creations dying off*, seem to have struck all the girls with amazement ! Jane's mind seems to stagger under the vastness of the idea. Here they come ! Well, Jane, what of the divine *Cuvier* ?

*Jane.* I never felt the infinite littleness of self as I do at this moment ! I seem to have lived to no purpose—for nothing, absolutely nothing. In one day Cuvier did the work of the lifetime of an ordinary man. In one *hour*, the life-work of a woman.

*Char.* I rejoice that you have appreciated the "god of my idolatry." There has always appeared to me something superhuman in the labours of Cuvier :

placing him above Laplace, Bacon, and Newton ;— none but himself his parallel.

*Mr. R.* Come, Charles, we must not soar into the clouds whilst we are upon earth. Lucy and Kate, how is this, quite silent ?

*Kate.* Quite silent, father ! Many of these things we do not comprehend ; but what we do, is wonderful beyond everything we ever read of.

*Lucy.* I confess I am very stupid, but I am exceedingly desirous of learning more.

*Mr. R.* It is impossible for the young mind to be brought into a more hopeful condition than yours, Lucy. A confession of ignorance, conjoined to a desire to acquire knowledge, never yet went without its reward. What has more particularly struck you, Jane, after looking through the plates of Cuvier's Fossil Osteology ?

*Jane.* After the first feeling of wonder passed away, I was struck with the sameness of form in the various bones.

*Char.* You mean that the fossil fin, or paddle-arm of some of the monstrous lizards, was not very unlike the arm or leg of a horse, or elephant, or man himself ?

*Jane.* Just so, Charles ; and yet, when clothed with flesh, as in living animals, the differences must have been extremely great.

*Lucy.* But I have been thinking all day, and dreaming all night, of the succession of animals from the first creation, down to the last—from the trilobite, I think it is called, or fossil-shrimp, down to

the mammoth, and mastodon, and megatherium. I feel that I must understand this.

*Char.* Nothing so easy. Here is a piece of rock—the lowest ever found with fossil remains imbedded in it. Examine it well. Take the next stone in the series; some few of the first animals remain, but many have disappeared; and so on, until the bones of animals now living are found at the top.

*Mr. R.* The greater portion of some of the rocks being composed wholly of some of the species of extinct animals.

*Char.* It would interest you but little to give all the names of rocks or their remains; but it is a subject of exceeding grandeur to think that God has, from time to time, filled the earth and ocean with inhabitants suited to its varying condition.

*Mr. R.* This is a subject that has yet received no attention from the public; and yet nothing can exceed it in interest.

*Jane.* The truth is, my dear father, that the hard names of the rocks, and the animals and fishes that lie buried in the midst of them, frighten the student at the very threshold. If we had been expected to learn the names of rocks and periods—if “Plutonic and Neptunian” theories had been discussed—if Eocene, Pliocene, Post-Pliocene, and Miocene eras had been required to be remembered, instead of wishing for each successive evening to arrive, we should have yawned through two or three evenings, and then abandoned them.

*Mr. R.* Perfectly just, Jane; names have no interest whatever; things cannot fail to excite it,

especially when brought before us in a new light. I was much struck with a remark of Charles's to-day.

*Char.* What was that, father?

*Mr. R.* With reference to the extinct animals and the new creations.

*Char.* Oh, I remember; I was saying to father how difficult it was to place these profound mysteries in a popular light; and I thought if I was a popular lecturer on these sciences I could do it.

*Mr. R.* The merit of your suggestion shall be divided between us, Charles: I shall never forget the effect I produced on an audience at H——, when lecturing on fossil remains and geology.

*Kate.* Oh, pray, father, do not keep us in the dark; tell us at once what interested your audience so deeply at H.

*Mr. R.* Willingly. I commenced by describing stratified and unstratified rocks, dividing the former into shales, limestones, oolites, chalks, &c., and the latter into granites, gneiss, hornblende, &c. I saw at a glance this would never do; and when I had explained that the animal remains found in each rock indicated its relative age—in fact, it was Time's seal impressed upon it—and proceeded to say that the animal remains found in B. disappeared in C., and those in C. were not found in D., the attention bestowed might have satisfied a mere paid lecturer; but I saw that I was addressing a languid audience. I called their attention to the fact of these vast changes in the animated beings on the earth and in the ocean, by asking them to believe that, instead of horses and

cows, there had never been seen by the eye of a man any other beasts of burden than the elephant and the camel—that on that night, every man went to bed, having seen his camel or his elephant either browsing upon the herbage provided for them, or stabled for the night—what would be the consternation of the *first* man who entered the *first* stable or paddock, and found the elephant or camel lying

“ with his nostril all wide,  
But through it there roll'd not the breath of his pride ;  
And the foam of his gasping lay white on the turf,  
And *cold* as the spray of the rock-breaking surf !”

How great would his astonishment be to find others in the street, lamenting for the loss of their beautiful camel, or favourite elephant ; with what awe would the assembled crowds of the awakened city look upon these noble animals lying dead in every pasture ! And how would this feeling rise, when, as successive coaches came in from York, and Manchester, and Nottingham, the first word that was uttered by the panic-struck passengers was, the death of every elephant and camel, not only in those cities, but also in every field by the road-side from thence to H. ?

*Kate.* I do not wonder that the audience should feel an interest in what you was saying.

*Lucy.* Nor I, Kate.

*Mr. R.* But half the wonder is not yet told, for on rising from their beds the next morning every stable, every common, every field, had in them new creations. Creatures of exquisite symmetry, and beauty, and usefulness—the horse and the cow ; and (not to

weary you), as every traveller came home, as every ship, whether from the Antipodes, from Russia, America, India, near and remote, landed, the first theme, the first sentence in every one's mouth, was this *extinction* of elephants and camels all over the world, and this creation of horses and cows in their stead.

*Char.* All occurring on or about this 16th of May, 1844.

*Mr. R.* Of course ! Wonderful as this may seem to you, it is small and trivial compared to the mighty changes that have been going on for myriads of ages. Trilobites and countless mollusks die, and are succeeded by lizards of vast and unwieldy bulk ; they die, and up spring enormous land animals—the megatherium, the mastodon, and the mammoth ; they die, and then follows the era when the extinct hippopotami and elephants were lords of the forest ; and, lastly, came the Lord of the Creation—*Man !*





## EVENING X.

## THE OCEAN AS FOSSILIZER.

*Jane.* WE have been examining your collection of fossil bones, Charles, and are struck with their weight. What is the difference between a fossil bone found in the rock, and a common bone buried in the earth?

*Char.* The difference is caused by a new deposit of flinty or limy matter.

*Jane.* That I know very well; but where did it come from, and how did it enter into the very substance of the bones?

*Kate.* Oh, I think I can tell very well; you know, Lucy and I put many things in the petrifying well in Derbyshire, and they came out perfect limestone.

*Char.* Not exactly so, Miss Lucy: your limestone was merely *left upon* the article placed there; in fossil bones and wood it enters *into* their very substance.

*Jane.* I cannot imagine how it is forced in, nor where it comes from.

*Char.* We will take the last first. From the composition of many of the early rocks we find silex, or flint, entered largely into their composition. There is every reason to believe that, although water cannot dissolve flint now, yet at one time, and under enormous pressure, it could.

*June.* Talking of enormous pressure, Charles, reminds me of a page I read in Captain Scoresby's work on the Arctic Regions; he says that, "On one occasion a whale on being harpooned ran out all the lines in the boat, which it then dragged under water to the depth of several thousand feet, the men having just time to escape to a piece of ice; when the fish returned to the surface 'to blow' (*breathe*), it was struck a second time, and soon after killed. The moment it expired *it began to sink*: an unusual circumstance, for, generally speaking, the quantity of fatty, oily, matter causes them to swim; this sinking of this vast mass of blubber was found to be caused by the weight of the sunken boat, which still remained attached to it. By means of harpoons and ropes, the fish was prevented from sinking until it was released from the weight by connecting a rope to the lines of the attached boat, which was no sooner done than the fish rose again to the surface. *The sunken boat was then hauled up with great labour; for so heavy was it, that although before the accident it would have been buoyant when full of water, yet when empty it required a boat at each end to keep it from sinking.* When it was hoisted into the ship, the paint came off the wood in large sheets, and the planks, which were of wainscot, were as completely soaked in every pore as *if they had lain at the bottom of the sea since the flood.* A wooden apparatus that accompanied the boat in its progress through the deep, consisting chiefly of a piece of thick deal, about fifteen inches square, happened to fall overboard, and though it originally consisted of the lightest fir, sank in the water like a stone. The

boat was rendered useless : even the wood of which it was built, on being offered to the cook for fuel, was tried and rejected as incombustible."

*Kate.* That is the way, then, that when a tree falls into a river, it swims at first, and then sinks ?

*Mr. R.* Yes, Kate ; its pores contain air ; after a time, water forces its way into these pores, the wood becomes water-logged, and sinks.

*Jane.* Captain Scoresby mentions other experiments he made ; I forget them.

*Char.* Give me the book, Jane. Here it is. " I sunk," says he, " pieces of fir, elm, ash, &c. to the depth of four thousand, and sometimes six thousand feet ; they became impregnated with sea-water, and when drawn up again, after immersion for an hour, would no longer float ; and what is very extraordinary, the *size* of the wood as well as its weight was greatly increased, every solid inch having increased one-twentieth in size, and  $\frac{2}{5}$  in weight."

*Mr. R.* You imagine, then, my dear Charles, that when bones and plants, or whole animals, fell to the bottom of the sea, that the silicious or flinty matter was forced into their cavities by the enormous pressure of the ocean ; probably there were springs of liquid flints at the bottom of the ocean ?

*Char.* I believe there were ; I think there can be no doubt of it, but that we will explain when we come to consider the " Ocean as a Floor."

*Jane.* This explanation takes away every difficulty ; the bones and plants were merely acted upon as Captain Scoresby's boat was.

*Lucy.* That will do very well, Miss Jane, for the deep seas; what will you do for the more shallow ones?

*Char.* Neither the botanist nor the chemist have been able to explain how wood, and other matters, become petrified; nevertheless, it is well known that the same process is now going on. When I was last at Rome, I procured a piece of wood from an old Roman aqueduct; here it is—in which you will see the woody fibre is converted into a chalky substance, or carbonate of lime. Some curious experiments of the celebrated chemist, Professor Göppert, of Breslau, all tend to show that the fossilization of animal and vegetable substances can be carried much farther in a short time than had been previously supposed.

*Mr. R.* Really, Charles! Have you any notes of these interesting experiments?

*Char.* I recollect the substance of them well. His processes went principally to prove that many of the fossil specimens are but *imitations*, in stone, of the originals; the old mould being destroyed in the process.

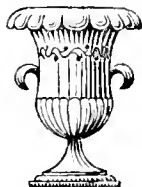
*Jane.* Do I understand you, that many of these fossil likenesses of plants and bones, now strewed upon this table, may be, after all, only imitations of the originals?

*Char.* Very probably, Jane. Professor Göppert placed ferns between soft layers of clay, dried these in the shade, and then slowly and gradually heated them till they were red hot. The result was the production of so perfect a counterpart of fossil plants as might have deceived an experienced geologist; some of these specimens are black, others brown.

*Mr. R.* That readily accounts for the apparent existence of plants in coal, but hardly for the fossil remains imbedded in other rocks.

*Char.* Other experiments consisted in dipping specimens of animal and vegetable substances in a mixture of blue vitriol and water, and also in silicious, calcareous, and metallic mixtures; they were then dried, and kept heated till they would no longer shrink in volume, and until every trace of their original organic matter had disappeared.

*Mr. R.* Thank you, Charles. We have only to imagine an ocean-floor covered with a layer of clay, into which the bones of marine and terrestrial animals are thrown down; and again, other and successive layers of clay, and then the tremendous subterraneous heat that is ever seeking a vent in the thinnest parts of the earth's crust—but must have found a much more ready one in the ocean depths, when that crust was thin, and when the “everlasting hills,” as they are incorrectly termed, were not.



## EVENING XI.

## THE OCEAN AS A SHARK'S WORKSHOP.

*Char. (alone.)* PERPETUAL destruction, followed by continual renovation, is a universal dispensation; it is the law by which the happiness of all created things is increased over the entire surface of the terraqueous globe.

*Mr. R.* Do I interrupt you, Charles?

*Char.* No, dear father; I was just reading the 13th chapter of Buckland's magnificent work, entitled "Aggregate of Animal Enjoyment increased, and that of Pain diminished, by the Existence of Carnivorous Races,"—it is a beautiful chapter.

*Mr. R.* Exceedingly so, and quite necessary to be read, to enable us to account for the enormous apparent waste of human life by the saurians and sharks that filled ancient seas. Read a small portion of the chapter, Charles; here are the girls just ready to enter.

*Char.* I fear they will not feel interested in it.

*Jane.* I see you have Dr. Buckland in your hand, Charles. I read his chapter on the utility of the carnivorous races, this morning. Until then it filled me with melancholy thoughts, to think that so vast a proportion of the animals of a former world were

created apparently for the sole purpose of effecting the destruction of life.

*Lucy.* I felt the same thing, Jane; I was quite horrified at the dreadful carnage.

*Char.* I am glad you have given me your thoughts. It is a subject that I have often thought upon; I will read half a page from Dr. Buckland, as my father wishes it. If you do not understand it, ask me to explain; never mind interrupting me in the middle of a sentence.—(*Reads*)—“The law of *Universal Death* being the established condition on which it has pleased the Creator to give being to every creature upon earth, it is a dispensation of kindness to make the *end of life*, to each individual, as *easy as possible*. The most easy death is proverbially that which is least expected; and though, for *moral* reasons peculiar to our own species, we deprecate the *sudden* termination of *our* mortal life, yet in the case of every *inferior* animal, such a termination of existence is obviously the *most desirable*. The pains of sickness and decrepitude of age are the usual precursors of death, resulting from *gradual* decay—these, in the *human race alone*, are susceptible of alleviation, from internal sources of hope and consolation, and give exercise to some of the highest charities and most tender sympathies of humanity. But, throughout the whole animal creation of inferior animals, *no such sympathies exist*; there is no affection or regard for the aged or feeble; no alleviating care to relieve the sick, and *the extension of life through lingering stages of decay and of old age*, would to each individual be a scene of protracted misery.”

*Jane.* How very beautiful and affecting, and how true! Until this moment, father, I had not quite forgiven you for taking the life of our old favourite horse. I thought he ought to have spent the remainder of his days frolicking about, having nothing to do.

*Mr. R.* You see now, Jane, that that was a false humanity; the world is full of the like.

*Kate.* Do you recollect those two beautiful white ponies that a friend of ours kept, until they were between thirty and forty years old?

*Mr. R.* Recollect, Jane? I shall never forget it. The mistaken humanity in these cases inflicted an amount of *pain* and even *hunger* upon these two worn-out faithful creatures, that was shocking to witness.

*Char.* Do you think, father, that a man having no further use for an old horse, or one that he has disabled for his work, or that has become blind, ought to *sell* him to others who have no kindly feeling for him, and would not treat him compassionately?

*Mr. R.* The world and I, Charles, have long been at issue on this point. I should almost doubt the Christianity of any man who could transfer a worn-out animal into the hands of the sordid and wretched beings who ill treat that most noble of all God's creatures, the horse.

*Jane.* But would you have every disabled horse killed?

*Mr. R.* Certainly. I wish I could rouse this *Christian* nation to a sense of the horrible cruelties



they permit others to practise upon animals after they have ceased to be the owners. I allude not to the horrible knacker's yard, because death is near then, but to the noble and beautiful animals, once the property of some titled or wealthy man, maimed in some brutal match, or still more brutal steeple-chase, that shock the feelings of every humane man as they drag our omnibuses and cabs through the crowded streets.

*Char.* Shall I proceed with Dr. B. ?

*Mr. R.* Yes, if you please.

*Char.* " Under such a system the natural world would present a mass of daily suffering, bearing a large proportion to the total amount of animal enjoyment. By the existing dispensations of *sudden destruction and rapid succession, the feeble and disabled are speedily relieved from suffering, and the world is at all times crowded with myriads of sentient and happy beings*; and though to many individuals their allotted share of life be often short, it is usually a period of *uninterrupted gratification*; whilst the momentary pain of *sudden and unexpected death* is an evil infinitely small, in comparison with the enjoyments of which it is the termination."

*Jane.* Believe me, Charles, this has been to me the most interesting of our evenings; until now the earth seemed to present a scene of perpetual warfare and carnage. The lion and the tiger and the leopard doing for the beasts of the forest, what man is everywhere doing to his fellow man.

*Char.* And there is another view, my dear Jane. If lions, tigers, sharks, saurians, and even pike, had not existed—if there had not only been the aged

and feeble, but also the young and strong and healthy destroyed—they would have increased infinitely faster than their food; they would ever be on the very verge of famine.

*Mr. R.* Oh it's a beautiful law! as beneficent and kind, to the right-thinking mind, as the dew and the rain and the sunshine.

*Kate.* And in the ocean—in the old ocean especially—warm as were its waters, and genial to reptile life, this same “police of nature,” as it has been beautifully called, was doubly necessary in an ocean whose waters were ever crowded with myriads of animated beings, the pleasures of whose life are co-extensive with its duration.

*Char.* Let me again quote. “Life to each individual is a scene of continued feasting, in a region of plenty; and when unexpected death arrests its course, it repays with small interest the large debt which it has contracted to the common fund of animal nutrition, from whence the materials of its body have been derived. Thus the great drama of universal life is perpetually sustained; and though the individual actors undergo continual change, the same parts are ever filled by another and another generation; renewing the face of the earth, and the bosom of the deep, with endless successions of life and happiness.”

*Mr. R.* If no other sentences had been penned, the 1000*l.* given by the late Earl of Bridgewater to the learned Doctor would have been well bestowed. I fear we must separate. Good night, God bless you all; to-morrow we will proceed with the ocean as a fish's battle-field.

## EVENING XII.

## THE OCEAN AS A FISH'S BATTLE-FIELD.

*Jane.* Do you ever regret, Lucy, the many happy hours we have spent with Charles? Do you ever wish for the gaiety of a large city—the ball—the theatre?

*Lucy.* To tell you the truth, Jane, the first few days disappointed me greatly; but now, the moment I rise I am unhappy till the time for strolling with Charles arrives, and I now feel no feeling but happiness, mixed with the saddening thought that it cannot last long.

*Jane.* But, my dear Lucy, Charles will now be ever with us. Our former tastes and pursuits were so trifling, so unlike his, that his letters were few and far between. He now feels, as he says, that he has three sisters to whom he can unbosom himself, to whom he can communicate the discovery of other extinct creations. Besides, we hope in a few months to travel with him.

*Kate.* Oh, Jane, what strange creatures we are! A few weeks since, it would have been a wearisome task to wander over hill and valley in search of fossil remains; but now—But Charles is himself just at the door.

*Char.* I have been thinking, Jane, if 150 species of shark, voracious fishes, a mixture of shark and

lizard, gigantic ichthyosauri, &c., were necessary to keep down the teeming fertility of the ancient oceans, what enormous numbers of fishes must have lived in them !

*Jane.* I had been taught to think the dark unfathomed depths of the ocean were sterile and solitary ; and if fish were only in the ocean as food for man, there would be no need to people its depths : but as the remains of fishes, devoured by these prodigiously ferocious reptiles, have been employed in building up the ocean-hills, ere the waters retired and left them dry land, the waters that even now cover three-fourths of the globe must be crowded with life.

*Char.* Yes, and perhaps more abundantly than the air and the surface of the earth ; and the bottom of the sea probably swarms with countless hosts of worms and creeping things—all living their appointed time, all destroying others feebler than themselves, and then falling a prey to others still stronger and more ferocious.

*Mr. R.* Recent discoveries have shown the more terrific of the reptile tribe to be feeders upon their own offspring and species. As the ocean was the agent in building up a new earth, it is filled with myriads of happy beings. The destruction of these is the office and end of the lives of others ; and there are contrivances the most wonderful to bring this about. In the dreadful conflicts that must have marked that era, teeth must have been broken, new ones sprang up in their stead, and the jaw containing them was braced and strengthened by a contrivance the most perfect and complete.

## EVENING XIII.

## THE OCEAN AS FERTILISER.

*Char.* WE have hitherto viewed the ocean under aspects, new indeed to the girls, but somewhat stale and old to geologists. The subject for this evening is new to me.

*Mr. R.* And also to me. I was induced to name it from the number of vessels that have landed laden with guano—the excrement of sea birds, found on barren and desert rocks, two or three hundred feet thick.

*Char.* Another instance of the glorious part the ocean is destined to play in fertilising a worn-out and exhausted world. Every one knows the sugar estates in the West Indies are incapable of producing sugar as they were wont to do; but who could ever have dreamed that the sea birds were treasuring up a manure so precious, that after paying its freightage across the sea, it still left a large profit to the owner?

*Jane.* But, Charles, what has the sea to do with it? The birds are sea birds, to be sure.

*Kate.* Oh, Jane, you know they drink sea water.

*Char.* And eat sea fish. Fish has long been known to be of high utility to barren lands, when spread upon it; but the process was tedious and offensive, and the capture of the necessary quantity

at the proper season very uncertain. You recollect, Jane, what has already been said relative to the solid rocks we have seen being composed of the *waste* of older rocks? there is the same law in operation here.

*Jane.* I see, my dear Charles! Everything is treasured up *in* the ocean, and converted into something that conduces to the welfare and happiness of man. This is an instance of beneficence and care for man that strikes me as wonderful!

*Char.* When sailing at early dawn, I have seen myriads of gulls start suddenly from a solitary rock: and when I left Edinburgh, in 1838, we passed Ailsa Craig at night, and when a gun was fired, an immense flock of sea-fowl left their secret hiding-places. I have seen thousands of penguins stand, like ocean sentinels, to guard the lonely steep upon which they lived; and solan geese in such incalculable numbers, that to guess at their number would be folly. A man might ask himself, of what use are all these sea birds?

*Mr. R.* Seeing that they fly from the habitation of man, and live only upon steeps that are all but inaccessible.

*Char.* It is a beautiful instinct that urges them to select homes on the naked and barren rock, surrounded by the ocean for their feeding-place; and the contemplation of this, as of every other ocean-work, fills the mind with feelings of wonder and delight. Here is a screaming sea-gull, scudding before the wind—there an island, once of unbounded fertility; but every law of nature being disregarded,

every product being *sent away*, and nothing in return *brought back* to fertilise, its fruits grow smaller and smaller—its products diminish, till ruin overtakes the cultivator, and he abandons it in despair—too poor to bring the rich composts from other lands, and too ignorant to look to science for a remedy. A solitary boat, manned by two active adventurous striplings, watch the sea-bird to its rocky home—climb the heights, with all the adventurous hardihood of youth, and find a strange mixture of dead birds and a substance having the odour of the common smelling-salts. A few handfuls are placed in their little barque, merely to induce those at home to believe their wild narrative, which is thrown as useless into the garden or field. The elixir vitæ, that professed to bestow immortal health, and the philosopher's stone, that was to transmute everything into gold, were valueless compared to this discovery. Unfruitful lands soon become fertile—corn, and wine, and oil, again gladden the heart of the husbandman—ships from all nations bring their costly merchandise in exchange for its fruits! And all this the result of a pair of sea-gulls, a pair of solan geese, having flown to a barren rock, that stood like an old castle out of the sea, everybody wondering, as they sailed past, why it came there.

*Jane.* Kate, what are you laughing at?

*Kate.* I hardly dare tell you, Jane; that is to say, I hardly dare tell that grave young gentleman by your side.

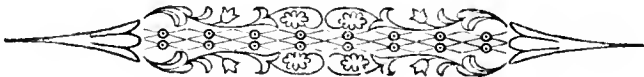
*Char.* And why not to me, Miss Kitty?

*Kate.* You are such a very learned person, that I am almost afraid of thinking when you are here, lest you should guess what it was about.

*Char.* Permit me to observe, Miss, that Jane's question, "What you were laughing at?" remains unanswered.

*Kate.* Oh, it's no use making a fuss about nothing: I merely laughed at the oddity of *manure* being a subject for discussion among young ladies—nothing more.

*Mr. R.* Oh! modern young ladies are so very very sensitive, so mincingly delicate, that such common things as a "*new manure*" furnished by the sea, and procured from off a sterile and dangerous coast, must not be alluded to in their hearing! "To the pure all things are pure," Kate. Alack-a-day! Charles, the age is becoming so full of a sickening and maudlin sentimentality, that a vessel loaded with this guano would throw a bevy of fine ladies into hysterics, if it sailed "between the wind and their nobility."





## EVENING XIV.

THE EARTH AS RENOVATOR.

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ON the morning of this day all was bustle and preparation. The next three days were fixed for a coasting party. To Kate was consigned the commissariat department; and, by the quantity of provisions stowed away in hampers, she evidently contemplated squalls and other dangers that befall those who go down to the great deep. Charles and Jane held up their hands with astonishment, and ventured to inquire, whether she contemplated the whole party being cast away on some desolate island.

Undismayed by their remarks, she too well understood the voracity of a sea-appetite to be at all regardful. Pile after pile was packed up, and carefully stowed away in the cabin of the beautiful little boat that was to carry them.

A party of young friends were to join them: and, during the hurry of preparation, Charles, his father, and Jane, held a council to arrange a little programme of the route and proceedings.

The first difficulty was the new-comers: what was to be done with them? To make it a purely scientific and geological sea-tour, would have no interest for them; and, on the other hand, to spend the whole time in frivolity and gaiety would not do for Charles or Jane. At last Jane hit upon a notable

plan that seemed to meet the difficulty. She proposed that Charles should deliver three Popular Lectures on Geology, illustrated by specimens, with which she was sure the visitors would be delighted, and which would, moreover, prepare them to feel interested with the "*Evenings at Sea*," which were on no account to be intermitted. The morning to be spent in sailing from place to place, looking at everything worthy of observation; in the afternoon, under a large awning, the party were to assemble to hear the Lecture; then there was to be a stroll in the evening, and then the peculiar business—the Discussion.

Her father and Charles were delighted with this plan, and the latter suggested that, on the first evening, "*The Ocean as Renovator*," should form the subject; and on the second, "*The Ocean as Destroyer*;" and Jane insisted upon having "*The Ocean as Island-Maker*," for the third.

All being assembled, the boat danced merrily o'er the waters, "like a thing of life," and all glided on as happily as light and jocund hearts could make them.

They sailed past the old ruins at H—, and landed for a few minutes to allow Charles to sketch and examine them. It was with no little wonder and astonishment that the F.'s and M.'s who were of the party heard that the stones of which the old castle had been built were formed out of broken shells at the bottom of the sea; and one young lady's face had something upon it very like an unbelieving sneer, when Charles having asked if she knew who built this old baronial hall? and having received for an answer, "the architect, she supposed," mildly said, "No, Miss, the Ocean built it all." There would be no interest in

recording how they fared and how they sang : suffice it to say, Kate's good cheer gave ample satisfaction. At last the word was given for a general clearance of the deck. The awning was drawn up ; by four o'clock all was anxiety to see Charles mount the little rostrum which had been built under the special superintendence of Jane.

It was a beautiful sight, and a new, to see that happy group ! For Charles, his father and two younger sisters had no anxieties. His thorough knowledge of what he was about to teach, and the facility of expression that was his most gifted attribute, convinced them that he would acquit himself well. But Jane had other reasons for anxiety, as she alone knew that in the midst of that little audience was one for whom she already felt a more than sister's love, and who had recently slightly weaned Charles from his excessive attachment to studies of this nature. At length, all being ready, he bounded laughingly into his little pulpit, and began with the old introduction :—

Ladies and Gentlemen,

If, instead of being a fidgetty young lady, Kitty had been a lean, shrivelled old woman, perhaps an Egyptian queen ! rolled all around her with spicy bandages—in a word, if she were an Egyptian mummy, instead of a laughing girl, what interest would be felt ! how anxiously would every one peep over the other's shoulder, to see every part of the process of unrolling her !

*Kate.* I presume, Sir, you are speaking for your-

self? I have no curiosity, even for a queen-mummy.

*Mr. R.* Pray, Kitty, remember, lecturers allow no interruptions.

*Kate.* Thank you.

*Char.* And if a locust, or a beetle, or a pin, three thousand years old, were to drop from the folds, how curiously would you examine them! Or if her name were marked on any portion of her dress, how greatly would the sort of stitch and the nature of the thread interest you! And yet, believe me, these things are trifling and insignificant, compared to what I have to show you.

For the convenience, however, of those who have not made the science of Geology their study, I shall divide the three lectures into—

1. The Facts.
2. The Inferences.
3. Probable Theories.
4. Less Probable Theories.

We have to do to-night with the real, undoubted facts of Geology. The facts to which I shall call your attention, are—

1. Central Heat.
2. Stratification of Rocks.
3. Order of Superposition of Rocks.
4. Fossil Remains.
5. Fossil Remains vary in different Rocks.
6. Primary rocks unstratified.
7. Violent Upheavings of Land.
8. That all these go on now.
9. That the bones of man, and animals fitted for his

use, are nowhere found in the primary, secondary, or tertiary formations.

The first fact, then, is the existence of *Central Heat*. This is as certain as that the sun set last night and rose again this morning. The early miner well knew, the deeper he worked the warmer the air he breathed. And the pitmen know well, that the deeper the coal runs, the warmer is the water that gushes from the rock. In deep borings for wells, it is a well known fact that the temperature increases 1 degree in every 45 feet. The geysers, or hot springs in Iceland, prove it; as do the depths of the very sea on which we are now reposing. Central Heat—a heated centre of the earth—is therefore a well-established fact.

*Mr. R.* What say you, Charles, to allowing the ladies to ask questions, between the divisions of your facts?

*Kate.* Thank you, thank you, father. All who are for the ladies talking now and then, signify the same by holding up their hands. Who seconds my motion? Come, Jane.

*Jane.* I do.

*Kate.* Carried unanimously. Well, Charles, we will be merciful to you. Not more than three of us shall talk at the same time. Here's a young lady here, sitting by me, dying to know how hot the centre of the earth is; and another, what is the nature of the burning things there; and—

*Char.* Oh! Kate, pray stop, whilst I tell you I know nothing about either.

*Kate.* Just one more, my dear boy. Are not we

in danger of being scorched, if there should be a large crack in the earth? It's really quite alarming!

*Char.* Why, a crack of sufficient depth to let out the imprisoned heat of the inner earth, is an earthquake or a volcano, and both of these we are mercifully freed from here. But we must hasten on to the *second* fact—

*The Stratification of Rocks*—a hard word, ladies, and simply meaning that the rocks are composed of layers, one lying upon the other. Here are many fragments of rock, all having lines darker or fainter, or something to show they were formed layer upon layer. Coal will split but one way, nor will slate, nor many other rocks. The *second* fact, that many rocks are layer-like made, or stratified, is as undoubted as the first.

No question? Then I hasten on to the *third* fact—

*That the order in which these rocks are laid upon each other never varies.* Rock A always lies above B; C above D; E, F, G always above H, I, J, and so on; and this has never been found otherwise in the whole habitable world. The last two facts are strikingly apparent in the cliff just at our boat's stern—layer after layer of different-coloured rock. Do you see them, Jane?

*Jane.* Oh, perfectly, Charles.

*Char.* And probably there are the same layers of rock on the opposite coast. Our *fourth* fact is, the existence of *fossil remains in rocks.* No one in their senses can doubt this. Every marble chimney-piece shows it. Limestone is almost wholly composed of the remains of animals and fishes; and the chalk

itself, so abundant here, is supposed to be made of fossil shells.

*Kate.* What! these immensely high cliffs formed of shells? Impossible.

*Char.* Impossible, Miss, is not a geological word. But we must hasten on to the *fifth* established fact in Geology—

That the fossil remains differ in different strata; that is, that the bones and shells of animals and fish in rock A are unlike those in rock C and D, and differ slightly from those in rock B, whilst those in rocks X, Y, Z are totally unlike those first named. To-morrow morning we will look over Cuvier's magnificent volume, and I will explain this more fully. I wait for questions.

*Mr. R.* The ladies, generally, I think, will prefer questioning Jane when we are gone, Charles. She, you know, is the depository of all your secrets.

*Char.* Be it so. The *sixth* fact is, that the rocks, the lowest down in the series—the T, U, V, W, X, Y, and Z rocks—are not stratified, not in layers, have no remains, no shells, no fishes. But we must hasten to a close. I fear I am wearying you.

*Jane.* Oh, no! dear Charles. We are all listening with breathless anxiety. Pray do not think so for a moment.

*Char.* The *seventh* fact is, that there have been violent upheavings of land—by earthquakes, volcanoes, and other causes; as we shall show when we treat upon the ocean as Volcano-lighter and as

Earth-quaker, in one of our forthcoming "Evenings at Sea"—

The *eighth* fact being, that this tremendous action goes on in a minor degree now; which will also be fully explained.

And *ninthly*, that *the bones of man have never been found imbedded in any of these rocks*; nor have the animals, such as the horse, and cow, and sheep, most useful to him. This, ladies, is the most astounding discovery of modern Geology, because it denotes that man and all the animals, and probably many of the fishes, were created six thousand years ago—exactly in accordance with the Mosaic narrative. (*Applause.*)

*Jane.* Thank you, dear Charles. This is a point that I could almost rise and speak upon myself. Oh! I love to dream over a slowly-forming world ripening into beauty and fitness for man's habitation; I rejoice that all the terrible monsters were extinct when our antediluvian forefathers were created; and I fervently believe that a new earth, far more lovely and beautiful than Eden itself, is now slowly forming beneath our feet—an earth where guilt and crime, and hatred and malice and envy, will never enter.

*Mr. R.* Why, Jane, who ever suspected you of all this visionary enthusiasm?

*Char.* Oh, father, I have bitten her, and she bids fair to become as rabid as I was.

*Mr. R.* Well, ladies, here ends our first attempt at lecturing. The sailors without the awning have, I have no doubt, been anxiously awaiting the issue. There is yet time for a ten-mile sail; the wind is fair, and we shall reach home in time for tea.



## EVENING XV.

## THE OCEAN AS RENOVATOR.

*Char.* I AM afraid that we have nothing very attractive to-night. We all know, because we can see it at every step we take, that the ocean has ever played the part of destroyer, but few view it as a restorer ; in other words, a renovator.

*Mr. R.* Except, Charles, on the floor of the ocean : everything is undergoing a renovation there.

*Char.* And so it is upon land, although more by the agency of rivers running into the sea than by the ocean itself.

*Mr. R.* The very place where we landed to-night is a case in point. The harbour is nearly "silted up," as it is called ; and it is well known that at the mouths of many rivers, where the tides are feeble, a bar of sand or mud is formed at points where the velocity of the turbid river is checked by the sea, or where the river and a marine current neutralise each other's force.

*Jane.* When I was in Norfolk last year I saw a quantity of posts or piers driven into the land, and then bound together with osiers or some other contrivance of the sort : this acted as your bar of sand, I imagine, Charles, for it retarded the flow of the tides, and covered the sands with a soft sea-mud.

*Char.* All estuaries have a natural tendency to silt up, owing to the opposition of the tides and the river current. But for this, the river mouths, where they enter the sea, would become deeper and wider.

*Jane.* If the sea be continually gaining on the land on the one coast, is it not as constantly receding from it on the other; so that, after all, there is about the same quantity of land and water?

*Char.* I believe the sea is enlarging its boundaries more rapidly than the land; still the gain of land from the ocean is undoubtedly great; and there can be no doubt but that the Baltic, the Adriatic Seas, and the Arabian Gulf, are gradually growing up.

*Mr. R.* I presume, Charles, there can be no doubt of the fact, that there has been an extraordinary gain of land at the head of the Red Sea?

*Char.* Not the slightest. In 1842, when I was there, the Isthmus of Suez had more than doubled its breadth since the time of Herodotus. In his time, and down to that of Arrian, Heropolis was on the coast; now it is as far distant from the Red Sea as from the Mediterranean. Suez, in 1541, received into its harbour the fleet of Solyman II., but it is now changed into a sand-bank; and the country called Tehama, on the Arabian side of the Gulf, has increased from three to six miles since the Christian era.

*Mr. R.* And there are other inland ports and ruined towns, which were once on the sea shore, and bore the same names.

*Kate.* The ocean seems to me to be a great robber.

*Char.* And it is also the receiver of stolen goods. The mud stolen from the banks of the Thames is carried to some distant lands, and the blocks and boulders of Norway are rolled upon our coasts.

*Jane.* Do you recollect, Charles, when we were in Cambridgeshire last, that we saw a number of men throwing a clay upon the land, dug up from considerable depths?

*Char.* Perfectly, Jane; and I said then, from examination, that it was sea-mud. I have since learnt that, under the influence of this sea-mud, the land has become prodigiously fertile.

*Kate.* But how came the sea-mud there?

*Char.* The same way as the ocean water. The lower part of Cambridgeshire was one of the great outlets to the sea. When the land-floods and the tidal waters were high, they would mingle together. A sand-bar, or any other barrier that would check the rapid flowing back of the tide, would flood the whole land, and then the thin stratum of clay or sea-mud would be thrown down.



## EVENING XVI.

## THE OCEAN AS DESTROYER.

THE experimental lecture of the preceding day being thoroughly successful, the whole party looked eagerly forward to the hour when Charles would recommence. The morning was spent as happily as mornings always are, where all are intelligent and desirous of pleasing. Stones and sea-weed were brought by the visitors in abundance for the inspection of Charles, who could always find proofs of Infinite wisdom and design in the most worthless pebble or the commonest sea-weed; and long ere the evening arrived, the awning was raised, and the conversation chiefly turned upon the lecture and occurrences of yesterday.

Precisely at the appointed hour he commenced his second attempt, by calling their attention to the Second Division of the subject,

THE INFERENCES to be drawn from the before-mentioned facts:—

The *first* being, that this earth was originally covered with water. Of this there was the most abundant proofs. The very existence of rocks in layers, or stratified all over the earth, prove that they must have been deposited there by water.

The *second* inference is, that the temperature of the ancient earth must have been much higher than

at present. This is proved by the fossil bones of animals, and the fossil fruits and leaves and stems of plants, being found in the latest-formed rocks just under the soil. Animals that would die in a climate as cold as ours, and plants that can only now be found in the Torrid Zone, or in hot-houses; in fact, all the plants of which coal is composed, were of species never found but in the hottest climates.

The *third* inference is, that this earth was SLOWLY formed for the habitation of man. The very appearance of the layers in many of the rocks, the delicate shells, and leaves of plants, prove how slowly they must have been formed.

The *fourth* inference is by far the most important. It is this: that the comfort and happiness of *man* was the object and design of all this arrangement. "I can never bring myself to think of this glorious part of our magnificent subject," said Charles, glowing with enthusiasm, "without feeling ennobled with the thought that I am *one* of those happy beings for whom this earth and all its buried treasures has been fashioned. I have often thought, if a palace had been begun to be built for a prince in the year 1744, and that it was to be completed in the present month, August, 1844, and that its occupant was to be born on this very 12th of August, with what interest would all the crowds of visitors look upon an edifice that had been *one hundred years* building! and how anxious would every one be to catch even a moment's glimpse of the royal babe within! But if, instead of being one hundred years in building, it had been begun by our Saxon ancestors, continued by the

Norman conquerors, and that even in the midst of the wars of the Red and White Roses, still the palace-building never ceased—that the troubles of Charles's time never checked it—that Oliver Cromwell added to it—how intense would be the interest with which we should view it, and with what awe would all nations look upon its inhabitant! And, to heighten the reverential feeling, if the tradition ran, that from the olden times the kings and queens of remote nations had sent gold and silver, and ivory, and pearls, and precious things, to adorn and beautify it, the mind seems unable to grasp so magnificent a thought. And yet all this is nothing to what the Creator has done for man, in the preparation of this earth as an abode for man. Foreseeing how helpless man would be in the midst of the monsters that peopled this earth in its infancy, He delayed his creation till they were extinct, and until a 'new earth,' clad with verdure, was partly formed of their colossal ruins—until all the animals that minister to his wants and gratifications could roam about in peace. Foreseeing his wants, ironstone and coal, and tin, and copper, and lead, were formed myriads of years before he was created. Stone of every quality was slowly growing solid, ages before man required a habitation; and the coral and other insects were building mountains of limestone in eras so remote from the present, that the mind reels under the attempt to measure the time. Surely I may be pardoned for saying, that all this vast preparation could never be for man, if he were to perish as the brute beast."

*Mr. R.* Thank you, Charles. Man is, indeed, a noble creature, destined for glorious purposes, even

upon this earth ; but also destined for higher ends in another world. It is evident that there have been vast and constant changes since the first germs of our present globe were created. Do you think, Charles, that after the next great change, it will still be the abode of animated beings ?

*Char.* I do indeed think it will. All this vast amount of creative power never can be lost or destroyed. I fondly hope and believe that the next great change will fit this earth for far nobler and purer beings—men who have regained the lost image of God—who shall walk through the whole earth as one vast Eden, where sin and sorrow, and selfishness and remorse, shall never mar their happiness !

END OF SECOND LECTURE.

## EVENING XVII.

## THE OCEAN AS DESTROYER.

*Kate.* I AM sure, Jane, I would rather hear Charles lecture to-night, than discuss any subject.

*Jane.* But pray, my dear girl, have a little mercy upon him. I am convinced that the subject of this evening will interest you greatly.

*Kate.* Yes, Jane, it would before yesterday. But after what we have heard this afternoon of the glorious purposes for which this earth was created, everything must be dull, and almost stupid. Besides, I know very well the ocean is a destroyer of ships, and boats, and rocks, and sailors, and all other things that are upon or near to it.

*Jane.* Well, be patient, here is Charles. Charles, I know of no subject so calculated to alarm the ignorant inhabitant of a country, as the feeling that the ocean is rapidly destroying portions of the lands and rocks that bound it.

*Mr. R.* It is not a very comfortable thought, by the bye, to those who profess some little acquaintance with these things.

*Char.* Although we may call the ocean a *destroyer*, seeing that it carries away large portions of our coasts, it is but a *borrower* after all. The useless rock toppled down into the waves yesterday, will



soon become the rock or sand of a new earth now in progress of making.

*Kate.* Charles ! Charles ! impossible ! What can the chalk cliff that fell into the sea last year have to do with a new earth, even supposing the said new earth to be in process of forming ? — which I never can believe to be the case, notwithstanding all you have yet said on that subject.

*Char.* Jane ! Jane ! surely all that you have heard and seen of late has convinced you of this one simple truth—that this earth is slowly melting away, and that a new earth, with its marbles, its coal, and its rocks, is as slowly forming ?

*Jane.* I believe, Charles, she is affecting to be ignorant. Come, Kate, you wilful girl, is it not so ?

*Kate.* I have forgotten all about rocks, and granites, and gneiss. Fossil remains interest me not. Porphyries and jaspers are become vain things to me.

*Mr. R.* Heigho ! Kate among the philosophers ! Pray, my dear girl, what has brought about this change ? What can have robbed all these things of their interest ?

*Jane.* Oh, father, she is quite enraptured with “new creations, and extinctions of races” long before man, and with the length of time employed in preparing this earth for man’s resting-place—for what she calls the “Poetry of Geology.”

*Char.* That is to say, she loves the ideal better than the real. Come, my dear Kitty, let me give you one piece of advice :—Store up every fact in Geology

before you begin to theorise, and you will then revel in the midst of theories and speculations as useful as they are astounding.

*Mr. R.* Come, Charles, we at least are anxious to hear what you have to say about the ocean as a destroyer.

*Char.* I might take up the whole evening with telling you of its destructive powers. Bring the map, Kate, and find the Shetland Islands: there can nowhere be seen the destructive effects of the sea-wave more than there.

*Mr. R.* I recollect being particularly struck with the steepness of the cliffs, which are everywhere hollowed out into deep caves and lofty arches—almost every promontory ending in a cluster of rocks imitating columns, pinnacles, and obelisks.

*Jane.* How is that to be accounted for, Charles? One would have supposed that the action of the waves and tides would have destroyed the rocky coast equally.

*Char.* So it would, Jane, if the composition and nature of the rocks had been similar, which is not the case. In some parts of the coast the rock is granite, in others gneiss, mica, slate, serpentine, and greenstone: all stones, as you well know, hard enough to resist tides for ages.

*Mr. R.* They certainly have a fair trial of their enduring qualities there, for they are exposed to the uncontrolled violence of the Atlantic, and there is no land between them and America.

*Char.* And the prevailing westerly gales must aid in

destroying them, by dashing the sea spray over them.

*Kate.* But I do not see how the columns, and pinnacles, and obelisks, are made by the sea.

*Char.* Nor should I be able to tell you if all the coast were composed of hard rock. On the contrary, when they were formed, under a sea far more ancient than the one that is now destroying them, there were mingled with them softer rocks, such as sandstone, &c.

*Kate.* Oh! I see; and they are more easily carried away by the sea. Very simple. The soft rock being gone, a cave or a pinnacle may readily be made.

*Char.* But the sea also removes immense masses of rock on the same coast. Huge blocks of stone have been carried to distances quite incredible.

*Mr. R.* It would be wearisome to point out every instance on the map where the sea has for ages been destroying coast-rocks. Yorkshire, Lincolnshire, and especially Norfolk, all are gradually falling a prey to the ocean. It is far more interesting to leave the present and look at the past.

*Char.* It is indeed. Suppose, as was probably the case, the earth was formed flat, and smooth, and level, the ocean has been the instrument by which the valley has been scooped out — by which the mountains has been piled up. France and England were probably one part of the same continent. The ocean, in furtherance of the divine Architect's plans, dug out the channel, and, by making this portion of

land insular, bestowed upon it all its greatness and its strength.

*Kate.* And to where, do you imagine, the ocean has carried all the rock and earth that formerly connected us with France?

*Char.* Filled up many an ocean valley; or, perhaps, closed some vast chasm in the floor of the ocean, through which agents the most destructive to animal life found entrance.

*Jane.* Do you mean sea-earthquakes, if I may use such a strange expression?

*Char.* Yes. Perhaps all that is now *upon* the earth—if not all, certainly a portion—has been ejected from the centre, and therefore there may be supposed to have been vast chasms and hollows, gigantic chambers, through which the earthquake-thunder would reverberate from pole to pole.

*Mr. R.* Beautiful, Charles, as a theory, and not very inconsistent with facts.

*Char.* There can be no doubt of the fact, that in regions less blest than this, that the earth is still hollow, or how can the rumbling of the earthquake be felt and heard at such enormous distances as it is in volcanic regions? I have always believed that, although we, in common with all other countries, have passed through the volcanic period, during which our granite mountains and hills were thrown up, yet that the caverned chambers have been solidified with the ruins of ancient rocky coasts, and that the ocean has been the prime agent in the destruction, as well as the carrier of the materials into the ocean depths.

*Jane.* When we were at Hull last year, the sites of old towns of note were pointed out to me ; one called Ravenspur was at one time a rival to Hull, and a port of such size that in 1332 Edward Baliol and the English barons sailed from hence to invade Scotland. Henry IV. in 1399 made choice of this port to land at to effect the deposal of Richard II. ; yet the whole of this has been destroyed by the merciless ocean.

*Mr. R.* Not merciless, Jane—merciful ; its whole end and errand is one of mercy ; every storm, every tempest, has a mission to fulfil, whether it be to topple down a cliff, or to gradually wear away the hardest rocks, or to spread the ocean floor with sands and mud ; every wave that displaces a useless atom *here*, carries it to a point where it will be useful *hereafter* !



## EVENING XVIII.

THE OCEAN AS ISLAND MAKER.

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ACCORDING to preconcerted arrangements, the whole party assembled at a very early breakfast. The mail of the preceding evening had added four visitors to the party, and it was matter of debate between Charles and Jane whether, for a few days at least, their "Evenings" should not be postponed; Charles inclining to the opinion that it should, whilst she as strenuously resisted and combated every argument he employed to convince her. The morning, cloudy in the beginning, became gusty, and long before noon the rain fell heavily.

During this "aside" discussion the matter was cut short by Kate, who came in person to present a petition from the visitors that Charles would resume his lectures; and that above all things the evening should be devoted to subjects so interesting in themselves, and especially so to one of the visitors, who had recently returned from the British Association, smitten with a new love for everything connected with the structure of the earth.

*Mr. R.* Say no more about it, ladies. If the day had been fine, one day at least must have been devoted to "lionising;" but this rain, which, by the bye, bids fair to continue, demands that something

must be done. The subject was, "The Ocean as Island Maker."

Ladies and gentlemen, be seated.

*Char.* With submission, father, I think we will defer that subject till evening. Our friends here will require some little preliminary instruction, which Jane, Kate, and I shall be happy to give.

*Mr. R.* Agreed, Charles. I have promised to call upon an old friend who is unable to get out, and I shall turn over the ladies to you.

It would be tedious to go over ground so recently trodden; all that was interesting was explained—all that was amusing was laughed at with a heartiness that smacked of health and youthful spirits; the dinner bell rang loudly twice before they obeyed the rather unwelcome summons.

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In the evening the company assembled at an early hour. Kate had, by the permission of her father, obtained leave to have the tea brought into the room where they met.

*Mr. R.* Charles, my old friend L—— has lamented his inability to spend an evening with us, in consequence of an attack of his old inveterate foe the gout, but he invites us all to dine and spend the evening with him to-morrow. He is devotedly attached to scientific pursuits, and in youth pursued them with an ardour and a success that brought him the friendship of men whose fame belongs to Europe—to the world.

*Jane.* That will indeed be delightful.

*Kate.* Not a whit the less, Jane, because he is a bachelor.

*Char.* And a rich one. He is also rich in specimens, and has a cabinet of fossils of great value. We will certainly accept his invitation. Let me see, Jane, what shall be our subject?

*Jane.* Oh, I have it; here—this—“The Ocean as Mermaid’s Hall;” it will follow our to-night’s subject well.

*Char.* And it will be short, giving us plenty of time to discuss his wine and fruits, which are choice, and to examine all the treasures that he has collected with no ordinary care.

*Mr. R.* I have been thinking, ladies, what wisdom has been displayed in the formation of islands, and how beautifully they were formed and fitted for man, when he began to acquire something more than flocks and herds.

*Char.* As a cheap defence—as a pathway for ships—as a storehouse inexhaustibly supplied with food—the ocean was far better adapted than any other agent; but that is not our business to discuss to-night. It is the part the ocean plays in forming, not only the island upon which we now stand, but all the other islands that stud the vast oceans of the north and south hemispheres.

*Miss O.* Jane, Charles surely does not mean to say that the island of Great Britain was made by the ocean—the German Ocean?

*Jane.* Oh yes he does, Caroline.



*Miss O.* Well, that is extraordinary; is it not, Louisa?

*Louisa.* Everything is extraordinary here, Carry; nothing more so than our friends having given up dancing, cards, and concerts, to talk about old bones and stones, and all those sorts of things.

*Miss O.* Fie, Louisa! I know you would like to know how the ocean makes islands.

*Louisa.* Oh, my dear girl, I know all about it. I have read all about coral islands and reefs, and how they form lagoons for sharks. You remember reading a beautiful description in Montgomery's "Pelican Island."

*Jane.* Yes, Louisa, I have often admired it; but there are many islands that are not coralline.

*Char.* It is a very simple idea to build a coralline island, although man could never have dreamed of employing such an insignificant agent; but in other islands, where there are no traces of coralline origin, there are, as you know, evidences of wisdom, and forethought, and design, a million times greater than merely building up an island as the coralline islands are built.

*Mr. R.* What a wretched place would England have been, if its origin had been either volcanic or coralline!

*Louisa.* My dear Mr. R., I do not precisely see that; Auvergne, in France, is said to be volcanic, and yet it is beautiful enough.

*Mr. R.* It will, perhaps, be difficult to convince so vivacious a young lady; but we will, if you please,

imagine two families leaving a shipwrecked vessel, the one being thrown upon a coralline island, the other upon one like our own dear England.

*Louisa.* Oh, my dear sir, pray do not imagine me to be cast ashore in the coral island; I have a great horror of those monstrous sharks.

*Kate.* Oh! we all thought you would prefer that to this.

*Louisa.* Not at all, my dearest Kate; it's very well to sail quietly and safely into harbour, but as to floating on a raft into harbour with a convoy of sharks, pray don't mention it.

*Char.* Well, at first, their cases would be nearly parallel; or rather, the condition of the coral islander would be the more enviable.

*Kate.* Why so, Charles?

*Char.* Simply—he would be warmer without fire; but supposing him to have discovered that agent, as he would not have many wants to gratify, he would bask in the sunshine, and soon become little better than the penguin that stood upon the shore. Not so with the group that were thrown ashore *here*; the cold would compel them to build, and that would lead to wood-cutting, and brick-making, and stone-quarrying; and in performing of this latter, they would discover the iron, the coal, the copper, the tin, that are found in such rich abundance here.

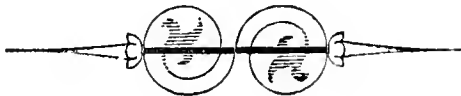
*Miss O.* But how came the iron and the copper, &c. here, any more than in the coral island?

*Char.* Simply this, Caroline: that England was not an island from the beginning, as coral islands are,

but a PORTION of a vast continent, where for ages and ages coal, iron, tin, zinc, salt, &c. were slowly forming.

*Kate.* But how did it become an island?

*Char.* After the ancient seas had grown the timber and plants of which coal is made, and carried the freestone, and pressed down into such perfect solidity the slate stones, mountains were thrown up, and into them was thrown, with tremendous force and power, those valued metals, gold and silver, and copper, lead, and tin. So you see, dear Kate, that to make an island something more is required than coral insects or marine volcanoes, especially if it be an island like England, whose boundless wealth lies many fathoms below the surface. Many a "dark, unfathomed cave of ocean" has been filled with these subterranean riches by seas whose very inhabitants are now only to be found imbedded in the solid rock ; and many a "gem of purest ray serene" is buried far lower than human plummet ever sounded.



## EVENING XIX.

## THE OCEAN AS MERMAID'S HALL.

WITH what spirit do Time's coursers dash along when gay and buoyant Hope is charioteer ! Although Kate and Jane professed to feel no diminution of pleasure at the setting in of each successive evening, and although Charles still discoursed as eloquently as ever upon fossil remains, as they fell in his way, yet there was a brightening up, an alacrity in all their movements, that was visible to all, although remarked by no one.

Never did a happier group bound over the green-sward ! never was "dull care" driven farther away ! The idea of quizzing the old bachelor was uppermost with Louisa and Kate, both insisting upon it that they were profound believers in the existence of mer-maidens and mer-men.

Mr. L. was what, in worldly language, is called a "disappointed man ;" not that his happy face indicated any remaining traces of that morbid feeling, but he had abandoned all those amusements and pleasures which are considered indispensable to the young and wealthy. He had chosen the life of a solitary ; and, with the exception of Mr. R. and two or three choice friends, he had not, he often boasted, "a friend left upon earth."

His fine fortune enabled him to gratify his taste for

costly furniture ; and his walls were hung with gems of ancient and modern art. But that upon which he prided himself most was a sort of ocean hall, composed entirely of polished stones, shells, fossils, and ores the most rare and costly, lying in costly confusion upon the marbled tables and floor.

To this splendid room he had given the name of the "Mermaid's Hall ;" and with the exception of the friends above alluded to, and his old valet, John, who had accompanied him in all his travels, no one had hitherto been permitted to enter this part of his beautiful villa.

No wonder, then, that the cheek of Charles even was flushed as he and his friends in succession were welcomed by Mr. L., as he rose with difficulty from his seat to receive them.

*Mr. R.* We feel honoured, dear sir, in accepting your kind invitation ; and we have availed ourselves of the postscript, and have brought our daughters' friends, the Misses O.

*Mr. L.* Welcome, welcome all ! I never thought to have seen women—young women, too ! in this house ; but I am told that your tastes, and habits, and pursuits are congenial ; and for the sake of her that is gone, I again welcome you all.

*Mr. R.* I have told Charles that you have known all our movements—the very subjects which we have discussed.

*Mr. L.* In a word, Catherine and Jane, your father has been playing the part of talebearer, and has won my heart with his recitals of your sayings and doings. My old enemy had laid siege to my foot,

or I should have dropped in to see and hear for myself. I have enjoyed solitude so long that the sound of female tongues almost unmans me.

*Mr. R. (aside to Charles.)* Take the girls away for half an hour—something moves him strongly. I will give you a signal when to return.

*Mr. L.* Excuse me ; I thought myself a man, and am, in truth, but a baby. Jane is the image of her mother and her mother's first friend.

*Mr. R.* Jane and Kate are all that the fondest father could wish. But what distresses you so greatly ?

*Mr. L.* Oh, nothing, nothing !—a mere twinge of the mind—a recollection that was barbed like a dart. Call them in again : I am myself again, and must not delegate the hospitality of this house to that fine young fellow, whom you call Charles. I long to have some talk with him. Let the ladies see the housekeeper, whose presence has not been required here of late, John being my valet, butler, coachman, and housekeeper.

*Mr. R.* I feel assured that this little brush will do you good. Man, intellectual man, was never meant for solitude ; and life is but a dreary passage through a sorrowful world, unlit up by the smiles of the young and happy, and uncheered by that “soft voice,” that the most profound of observers has truly called “an excellent thing in woman.”

Evening stole on. Each one watched the time-piece narrowly, as if to chide the lagging hours. Charles, determining to draw the old gentleman out, plumed himself upon the opportunity that would be

furnished for doing so. Kate's feeling was one of overpowering and irrepressible curiosity. Every entrance-hall and staircase teemed with strange and wondrous things;—but that superb “Palace of Shells”—the far-famed “Mermaid's Hall”—could she see that? If that were invisible to her, this day would be nameless and blank in her calendar.

How her heart bounded when she heard it announced by Charles, that their evening theme was to be discussed in this very hall—in fact, that the old bachelor had been wheeled there already, and waited for their arrival.

*Mr. L.* Charles, my dear fellow, do you believe in mermaids?

*Char.* No, no! Oh, no!

*Mr. L.* Kate, do you?

*Kate.* Oh, fervently; and Jane, too, has a sort of a belief.

*Jane.* It is, indeed, but a sort of belief—very indistinct and glimmering.

*Mr. L.* Well, I believe it firmly. I have talked with sailors who have seen them; and I believe that they are the supreme intelligences that rule the ocean inhabitants, as men do the inferior creatures upon land.

*Char.* But you cannot seriously entertain this belief?

*Mr. L.* Why not? There is nothing incredible nor impossible in it. These exquisite shells, that have grown into loveliness, would never have glowed with such lovely colours if the eye of some intelligent

ocean-being had not been destined to live and look upon them.

From the earnestness with which he spoke, it was evident that this was one of the harmless delusions they had been prepared to see. A belief in the existence of ocean-men, called mermaids and mermen, was so strongly impressed upon his mind, that he built a suite of apartments for their reception ; and never abandoned the hope that, some day or other, he would be the happy possessor of the beings he had so long and so earnestly coveted to see.

The hall itself glowed with blushing and rosy-coloured shells: from the sparry roof hung pendent vast stalactites of every hue and shape, the intervening spaces sparkling with the richest metallic ores. The floor was entirely composed of ammonites, exquisitely polished, and of most elaborate pattern and design, having the appearance of snakes of every size and colour, coiled up and turned into glittering metals. The slabs were of the purest white Carrara marble, supported by irregularly-shaped blocks of marble, from jet-black to that which is little more than a conglomerate mass of broken shells. From the centre swung a candelabrum, composed entirely of shells, the lamps burning from the pearly nautili, that served admirably for that purpose. The walls were covered with thin slabs of every species of granite, freestone, and shale—the latter polished and shining like a burnished mirror.

And this was the “Mermaid’s Hall,” thought Charles, and this is the *delusion* for which L. has lost caste with society—for which he lost *her* for whom he lived ; and in losing her, lost everything besides.



Who, in early youth, has not built a "*Mermaid's Hall*," as useless, as unsubstantial, as unreal as this? How many day-dreams of happinesses to come, to be enjoyed, vanish into thin air at the cold touch of the real world without, bursting, like the child's bubble, just as the light had begun to play upon its surface!

The party being seated upon chairs, fashioned after the most grotesque patterns, Charles was called upon by Mr. L. to introduce the promised subject, which he instantly responded to by proposing

"*The Ocean as a Shell Factory.*"



## EVENING XX.

## THE OCEAN AS A SHELL FACTORY.

*Char.* OF all the aspects under which the sea can be viewed, there is nothing more attractive than the thought, that within its depths, of its materials, and by its inhabitants, these beautiful shells are fashioned.

*Mr. R.* Come here, Kate and Louisa; on this large slab are some of the most extraordinary—on the adjacent one, some of the most beautiful.

*Mr. L.* Oh, ladies, some of those are from seas recently dredged for shells: they are too new yet to name.

*Char.* What a treat for conchologists! Quite apart from the beauty they give, they afford the finest pleasure to him who has made this branch of science his peculiar study.

*Jane.* What is to me a matter of special wonder is, that the outside markings—the form of the waving lines—never vary in the same species. I hardly know how to express myself, but if you will turn to the beautiful plates in Buckland, you will see at once what I mean. The *Nautilus striatus* has everywhere the same outer marks, and so has *Nautilus obtusus*; but what I mean is beautifully seen in the variations of forms of *Ammonite* in the 37th plate.

*Mr. L.* Oh, Jane! you may well wonder; but it

is no more extraordinary in shells than in fishes, and plants, and flowers. One would have thought the pattern of the shell of an animal in the sea might have varied in every possible way. If the formation of the most insignificant shell, or animal, or plant were but for one hour left to *chance*, the creations of that hour would exhibit the most monstrous and incongruous shapes that imagination could picture.

*Char.* The sameness of shells does indeed prove the existence of a creative Power—sleepless, unwearied, eternal!

*Louisa.* Pray, Charles, let us pass on. I want to look over all the lovely things here. The night will be all spent in talking, and to-morrow we shall all regret that we saw but a small portion of the treasures of this room.

*Mr. R.* Suppose we allow each individual to do as he or she pleases? My old friend and I shall certainly sit here—he enchained by the gout, and I by the almost magical effect of the lustres and stalactites from the roof. Charles, gallantry requires you there. Show cause why you remain with us.

*Char.* Oh, father! Jane is an admirable cicerone since she has learnt some of the most common shells—they prefer her to me.

*Mr. L.* The most extraordinary, as well as unaccountable thing to me, is the enormous quantity of lime that must have been in ancient seas.

*Char.* There can be no doubt but that it was a volcanic product, and that, as sea-volcanoes must have been of very frequent occurrence, immense portions must have been mingled with the waters.

*Mr. R.* From which the marine animals found lime to fabricate their shells.

*Mr. L.* But it is a difficult problem, to account for the source of the enormous masses of chalk and limestone that compose one-eighth of the coast of the globe.

*Char.* There can be no doubt but that the immense beds of limestone in fresh-water lakes of the tertiary period (that preceding man), were formed during seasons of intense volcanic activity.

*Char.* Just glance at Jane and her party! They have just discovered that the floor is entirely composed of ammonites; they are evidently trying to discover if they are alike in external markings, although dissimilar in size.

*Jane.* We are struck with the enormous variety.

*Mr. L.* No two are alike in figure, although they be in size: of the ammonites alone there are 223 species, varying from one inch in diameter to four feet. They are a splendid collection of seals, upon which the history of the world has been engraven; and their structure is one of the most wonderful and intricate contrivances by which a shell, the size of a waggon wheel, could float or sink at the will of its inmate. But John tells me supper awaits us. This has been a mere show-night.

Under the genial influences of good cheer, this acquaintanceship, begun but to-day, was destined to extend over a few days. His old habits broken up, he extorted a promise from them to pay him daily visits till all his curiosities had been explored.

“What you have seen to-day, is nothing compared to what your father and I, in days of yore, called ‘The Crocodile’s Play-ground.’ Be early to-morrow, and I will show you how, on a congenial theme, an old man can lecture. Saurians, you know Mr. R.,” said he, tapping him on the shoulder, “Saurians, living and dead, have ever been my delight; Charles Waterton himself never bestrode a living cayman with half the zest that I have laboured to disentomb the fossil remains of this splendid group of sea-animals.”

There is no disputing about tastes, thought Kate; this is probably another of the old beau’s crotchets!



## EVENING XXI.

## THE CROCODILE'S PLAYGROUND.

THE strange sights and scenes of yesterday had been the theme of general conversation: the courtesy and kindness of the old gentleman were gratifying to the girls, whilst his intelligence and vast store of information were matters of especial interest to Charles and Mr. R.

*Char.* It is a singular taste, to fit up a room with fossils, and shells, and stones; to abandon all modern upholstery, and to frame everything out of the hewn rock.

*Mr. R.* In itself it is beautiful, but when we remember that everything there—the coal, the stalactites, the shells, the ammonitic floor, and the nautili lamps—were all formed by water, by seawater, our admiration for the ocean is indeed heightened.

*Jane.* I anticipate more to-day than yesterday.

*Louisa.* And so do I, Jane. I hope some of these crocodiles are alive. I'm tired of fossil this, and fossil that; we shall have fossil beaux soon, I suppose! though for the matter of that, the young gentlemen have flinty, stony, fossilised hearts already.

*Kate.* Receiving no impressions, and making none.

*Char.* What are you ridiculous girls laughing at?

*Kate.* Louisa was just observing that she believes yours is a fossil heart.

*Louisa.* For shame, Kate! My curiosity simply extends to the wish to know whether these antediluvian monsters we are to see to-day, are alive or fossilised, which is I believe the phrase for not only being *dead*, but also *buried*.

*Mr. R.* I am bound to secrecy. Let us take a long stroll over these downs, so that we may be there before he becomes anxious for us.

*Char.* Will you oblige us, my dear father, by announcing our arrival in a short time? I am challenged by these giddy girls to run a race with them down a hill.

*Jane.* And Charles being half ashamed of the thing, as being unphilosophical, and therefore unwise, would fain do it as secretly as possible. These mad-cap girls are at the appointed place, eager for the race.

How the race terminated—whether the philosopher was defeated, or whether victory sat upon his brow—is matter of no great public interest. At the appointed time, the happy and excited group were thundering loudly at Mr. L.'s door, and were requested to wait a moment in the hall.

For a moment they wondered at this uncourteous reception, but for a moment only, for the hall was gradually darkened; and then came the creaking of sliding doors in all directions, and they were startled by the appearance of half-lit up caverns proceeding in all directions from the hall, as from a common centre. The illusion was perfect. Strange and monstrous creatures were dimly visible, and the

skeletons of vast and unwieldy animals were placed around.

In a moment all was flashing with a flood of light. "And this," said Mr. L., seated behind a sort of screen, "this is our 'Crocodiles' Playground.'"

*Jane.* Oh, Charles! this is surely some enchantment.

*Mr. L.* No! lady, no! It is merely a museum—a reptile museum—where all the Saurians, the gigantic lizards of the old world, are placed in a fossil state side by side with the crocodiles, the caymen, and the alligator of the present era. Lizards of all species, living and dead, are here.

*Char.* But why hide them from public view, unless on special occasions?

*Mr. L.* Partly for whim, which is an omnipotent motive with me, and partly because of their native hideousness.

*Louisa.* But—(pray keep near me, Jane and Charles)—but what could induce you to frighten us?

*Mr. L.* Whim again, Miss. He who invades the domicile of a bachelor, must take things as he finds them.

*Louisa.* Well, you're a horrid man, I must be permitted to say. I feel as if that gigantic monster, with those remarkably delicate-looking legs and the shield on his back, were not altogether safe, even to look at.

*Jane.* Oh, the Megatherium or Giant Sloth!

*Louisa.* And that other odd-looking wretch with



his eye out certainly, but with an opening for that organ large enough for a good-sized tea-table.

*Char.* Oh, the Ichthyosaurus.

*Louisa.* If I had the naming him, I should call him the Pike Crocodile; no other animal of my acquaintance than the aforesaid pike, or jack, being furnished with such respectable jaws.

*Kate.* And his teeth. What a dreadful creature he must have been! that interesting creature with the long arching neck, must have been deemed an antediluvian beauty, in comparison.

*Jane.* The Plesiosaurus?

*Char.* These creatures are the most deeply interesting—as is everything connected with the whole Lizard tribe.

*Mr. L.* Now, dear ladies, we will adjourn to the drawing-room; and Charles shall tell us all he knows of these strange creatures. Come, Miss Louisa, shake hands.

*Louisa.* Have you touched these monsters, the last week?

*Mr. L. (laughing).* Why?

*Louisa.* Because if you have, I won't, till I put my glove on. I should feel, like Lady Macbeth, that the "spot would n't come out."

*Char.* You wilful creature! Let me show you into the room.

*Louisa.* Oh! not for worlds, Charles! The very idea of even dreaming about these huge reptiles is frightful enough!—but to touch them—to put

one's finger upon their colossal bony carcasses—to look into that immense eye-hole of your favourite Ichthyosaurian monster—the sight of their jaws and teeth—are frightful. Pray, Charles, if you are not a monster yourself, insist upon anything rather than that.

*Char.* Here comes Mr. L. Surely you will not be so uncivil as not to *admire* where he worships.

*Louisa.* Hush, Charles! Hush! I am frightened, in the very presence of the keeper of such horrible reptiles.

*Mr. L. (musing).* One! two! ten! twenty years! of *heart-hardening*, and yet soft and ductile as ever! The cherished treasures of years—the spoils of twenty years of bitter war with the world—the fossil Louvre purchased, not pilfered, from all nations—but yesterday I sate in the midst of these relics of primeval oceans, as a being superior to the mere worldlings that ran and shouted down the adjoining cliffs: and to-day I am become a child—a mere little, drivelling, little child. Hah! Charles!

*Char.* I have been in search of you. With the exception of Jane, all the girls shudder at what they have seen to-night.

*Mr. L.* And does n't Jane?

*Char.* No! Oh no! Jane is wonderfully smitten with all she has seen. She is now tempting Louisa to look at the beautiful structure of the paddle of the Plesiosaurus and the immense opening for the eye of the Ichthyosaurus.

*Mr. L.* Charles! Charles! Hold the light up. There! there! What do you see?

*Char.* See—Oh ! nothing !

*Mr. L.* Look again ! Now !

*Char.* Oh ! nothing ; except a good-looking gentleman of some fifty years !

*Mr. L.* Ay, Charles, there's the rub ! Fifty years ! Five-and-twenty years *wasted !* lost ! gone for ever ! Did you say Jane was *really* smitten with what she had seen to-night ?

*Char.* Look for yourself. There she stands, one hand upon the monstrous reptile, from which Louisa shrinks in disgust ; and the other pointing to the unrivalled collection of sharks' teeth, that is at her right hand.

*Louisa.* Charles, this is indeed a most mysterious place. Here is Jane quite beside herself, Kate and her father walking in the garden, and I am alone, looking as stupid as I feel. Between ourselves, I should advise a walk in the garden, to leave the genii of the place (*i. e.*, Jane and Mr. L.) an opportunity of deciding which of these odious creatures is most beautiful.

*Char.* With all my heart. Stop just one moment at the door. With what exquisite taste is it arranged ! How the light falls dimly upon the head of the furthest skeleton, and how it flashes upon the living, and green, and moving type of these ancient denizens of the deep ! It is, indeed, a delusion—a mere cheat, that wealth has purchased as a happiness in his dreamy days, to wake up with the thorough consciousness that all, all is vanity !

## EVENING XXII.

## THE OCEAN AS LIZARD'S GRAVE.

THE change that circumstances had wrought in the character of Mr. L. had, by deranging all previously concerted plans, changed the whole course of operations. The "Evenings," once so cherished, now became spiritless and dull, and Jane, the life and soul of all movement, seemed satisfied with no arrangement that did not include Mr. L. Charles and his father, who saw the great interest which Jane had excited in the mind of their bachelor friend, were desirous of withdrawing from this constant intercourse; but Louisa and Kate were determined to make the most of his acquaintance. It was therefore decided that several evenings should be spent at Mr. L.'s, and that all previous engagements should be considered at an end. Evening came, and the party found the old bachelor in high spirits; all his old preciseness had disappeared, and the only thing that could have reminded his visitors of the recluse and the philosopher, was the table that groaned with exquisite specimens of shells, and a splendid model of stratified rocks that ascended from the floor of the room in which they sate to the very ceiling.

Tea passed happily by, giving that exquisite quiet and calm pleasure that it ever does to a thoroughly healthy body and mind; and in the midst of a dis-

cussion between Mr. L. and Jane, as to the uses of the vast tribe of primeval sharks, Charles called upon Mr. L. to redeem his promise in delivering a short lecture upon the *extinction* and *creation* of the animated beings whose fossil remains were arranged before them.

After some little hesitation, and some little coquetry as to seats, between Kate and Louisa, Mr. L. began—

“ Ladies and Gentlemen,

“ One life has been spent in collecting the fossil remains of animals. I must take care that another is not lost in being their mere keeper. One great object with me in collecting remains has been to illustrate the *great fact*, that all that were created in the infancy of the world, myriads of ages ago, became extinct whilst the world was yet young, and that fish after fish, monster after monster, mammalia after mammalia, were created, and became extinct long before the creation of man.”

*Char.* I am delighted, Mr. L., with the subject ; I do hope you will, to-night, place this mysterious subject in a clearer light.

*Mr. L.* I have always felt, Charles, that no man could comprehend the meaning of the word GOD until he *knew* that every part of the earth that was intended for the benefit or happiness of man was formed by SLOW PROCESSES ; that to form the rock from which man was to hew the block, to build his *palace*, myriads of reptiles and fishes should have lived happily, and died to add their remains to the slowly accumulating stony mass, and that later rocks

should contain the remains of animals totally distinct from those that had gone before ; and that they in their turn should die, giving place to other beings who lived their day, and then gave place to others.

*Char.* Oh ! it is a beautiful theory of the earth's formation, that it should be the mere dead ruin—the mausoleum of myriads of happy beings.

*Mr. L.* This *successive creation and extinction* of species is one of the most wonderful revelations of modern geology. Men read of it, and pass it by, as if it were the mere talk of the pigmy philosophers of the day, instead of being the recorded, burnt-in, innermost opinion of the first minds of this era. To make it interest the multitude, one must bring it down to their capacity ; one must liken it to things that pass daily before them. Suppose that on some given day all the countless myriads of flies and ants were to cease to live, and that locusts and spiders should suddenly and for the first time swarm about our windows and rooms, and that in a few days they should all disappear, and that their places should be filled with scorpions and vampire bats, and that the great work formerly performed by flies and spiders or locusts, should still be carried on by these newly created things—we should wonder ; and our admiration would be more intense, if we learnt that the flies and spiders, all over the world, died or became extinct about the same time ; but our wonder would be still greater, if we found the flies and the spiders becoming slowly consolidated into rock and stone, and that the scorpion ran over a chimney-piece filled with the remains of dead flies, just as we see the shells and even skeletons of fish

in many species of marble in daily use. This would appear a miracle ! but Geology reveals to us a series of such miracles, quite as astounding, if they were noted down and reasoned upon. First comes the trilobite—it disappears ; then in other rocks are found the remains of others, differing in size and structure ; succeeding rocks are the very mausolea of other creations ; then follow lizards of vast size, and of capacious character ; they die to give place to the Mammoth, the Mastodon, the Dinotherium, the Megatherium, and finally Man is created, springing into new life and happiness ; everything noxious and hurtful buried in the rock beneath his feet, and all that would add to his happiness—the horse, the cow, the sheep, feeding on the herbage that springs up at his feet.



## EVENING XXIII.

## THE OCEAN AS VOLCANO QUENCHER.

JANE, Jane! said Charles, as the evening approached, what are those lines on friendship that our father quoted yesterday?

*Jane.* Oh, let me see—Goldsmith's, I think:—

“And what is friendship but a name—  
A charm that lulls to sleep?  
A shade that follows wealth and fame,  
And leaves the wretch to weep!”

What of them, Charles?

*Char.* Oh, nothing particular—nothing: but in the friendship of Mr. L. there is a reality, “a charm” that lulls not “to sleep,” but to the awakening from the dream that the cynic and the philosopher are incapable of true friendship.

*Jane.* There are noble traits in our new friend's character—that are hidden from the world: his travels in search of happiness—his hair-breadth escapes—his wonderful perseverance in overcoming difficulties—and his princely benevolence to those who have aided him in making this vast collection.

*Char.* He has certainly made you his confidant, Jane. To me his conversation, although always delightful and original, has never contained a vestige of his personal history.



*Jane.* Oh, you men are strange creatures ; there is no detecting in your sex, at a glance, the hidden spirit that often inhabits a tenement of the most unprepossessing exterior : with us, half an hour's converse reveals the whole character, habits of thought, likes and dislikes, general and particular included.

*Char.* Jane, do not be too severe on yourself. That transparency of character that is a blot and blemish in man is a pearl of great price in woman ; we admire and reverence a Mrs. Somerville or Madame de Staël, but as to loving, that is quite out of the question.

*Jane.* Where are these laughing girls ? Lucy and Kate have become so grave that it requires the utmost efforts of Louisa to keep them cheerful and happy.

*Char.* It is ever thus with real knowledge—not that mockery that consists in names and unrealities. Do not imagine, Jane, that with a change of pursuits, and a change of the sources of amusement and happiness, Lucy and Kate's perceptions of pleasure are less vivid ; believe me that true pleasure does not consist in bursts of jocund laughter, or in the sparkling wit and repartee, but in the quiet soul-serenity that is the certain result of an acquaintance with the works of nature—a high and holy feeling that makes its votaries feel that they are not fulfilling their destiny, unless their delights and gratifications are graven in deeper characters in their minds when they dwell apart from the crowd, and hear but the unceasing hum of the pleasure-seeking mortals beneath their feet !

*Jane.* I could not interrupt you, my dear Charles, but our father and the girls are half-way to Mr. L.'s.—A moment and I will be with you.

*Char.* What a strange mystery is mind! How one thought dropt at random amidst a thousand crude ideas, merely conglomerated together, reduces the whole to order, and harmony, and beauty; like the solitary crystal drop into the liquid mass of saturated salts; or, to be less pedantic, like the mellow note of a solitary horn, that wakes up from their hiding-places the echoes of a thousand hills.

The chair of the old bachelor had this night been wheeled into an inner apartment filled with the products of volcanic action, collected by him in every part of the world—basalts, lava of every hue and density—in a word, specimens of all the volcanoes now in action, as also of extinct volcanic vents, that lit up our earth anterior to its present form.

*Mr. R.* Charles, Mr. L. and I have been engaged for the last quarter of an hour in chalking out a plan for the future. He insists upon our being his daily guests until we return home.

*Lucy.* Home! father! home?

*Kate.* Did you say home? our old home?

*Mr. R.* Yes, the real home, where, no doubt, you remember the many happy days you spent there, and——

*Jane.* Happy! father. Oh! what a mistake we made! why, I am ashamed to confess I had forgotten we had a home.

*Char.* The wise man's home is everywhere.

*Jane.* But the wise man's friends are not everywhere, Charles. Alas! that happiness should have its shade as well as sunshine; that a summer like this must be trodden on the heel by a winter like the coming one.

*Mr. R.* But hear our plan. Our friend is so well pleased with his last lecture, that he has volunteered to gratify us again.

*Kate.* Oh! thank you, my dear Sir; you are too good! I am sure if your house were large enough to admit lodgers, Louisa and I would take your lodgings the moment they were ticketed 'to be let.'

*Mr. L.* Well, my dear girls, you have made me happy once more; your smiles have banished half a century of care; I am so happy that I must be garrulous: if you do not choose to listen to my sense, you must have nonsense. I am like the old soldier who fought all his battles o'er again.

*Mr. R.* Pray, my dear friend, be seated. We will be all ear. Let our first subject be

“*The Ocean as Lava Lighter.*”

*Mr. L.* Ladies, whenever I formerly entered this room, I felt like a man in a mine, shut out from the world indeed! but shut in with the most wonderful of God's works. What is a volcano? A burning mountain. What are Vesuvius—Ætna—Hecla? Volcanoes. What is lava—trachytic, or feldspathic? ask the spectacled philosopher. What are porphyry, greenstone, sienite, basalt? the products of volcanic action! Good! What more—but let that pass—one ought to try to love even that lowest

order of philosophers, whose knowledge is but the names of things. Come, Charles, you can tell us what a volcano really is.

*Char.* Oh ! my dear sir. Pray tell us in your own language.

*Jane.* Pray Charles, do. Mr. L. is in too excited a state ; we must not forget he is an invalid.

*Char.* Jane, your wishes are commands. The volcano is to the earth its safety-valve, and its treasure-bearer. If the volcano had never been, this earth had been an arid and desolate waste ; rocks would have subserved one great end of their formation—the becoming sea-boundaries—but they would neither have had the precious metals injected into the crevices that wind around their very core, nor would they have been carpeted with a vegetation that refreshes the eye when wearied with care, or worn out with labour.

*Mr. R.* Mr. L., this will never do ! this high and overwrought state of excitement must end. Charles must take this little course of lectures, and you must talk over what he is to discourse upon, *quietly*. I repeat it—quietly. To-morrow night the subject will be, “ The Ocean as Lava Lighter.”



## EVENING XXIV.

## THE OCEAN AS LAVA-LIGHTER.

*Char.* MR. L. has consented to become part of our audience, reserving to himself the right of questioning the lecturer, and explaining whatever he thinks needs explanation.

*Mr. L.* I have taken Jane's advice, and intend to sit still. Lecturing is like dram-drinking—a thing so soul-absorbing, so thoroughly the work for an enthusiast like me, that I must give it up. The faculty of thinking on one's legs has been truly called a God-like gift. Now, my dear boy, for this Lava-lighting; the room is crowded with specimens of lava. How was it lit up?—by whom, or what?

*Char.* In my last I hinted that the mountain would have been barren if the volcano had not existed. I might have said the very mountain itself was often nothing but the result of many thousand years of silent oceanic-volcanic action.

*Jane.* But how was the lava lit up?

*Char.* There can be no doubt but that the centre of the earth is composed of substances that, although heated to an intense degree, yet exhibit no violence, no turbulence of action, until water, ocean-water, reaches them; whether through some crevice formed during the drying and hardening or baking of rock,

or whether through a rent, produced by another dread agent, whose violence has been experienced in all ages : and this brings me to consider the ocean in another aspect. Jane, you know what the earthquake, or internal action like the earthquake, has done ?

*Kate.* Pray let me speak. One would have thought that politeness would have induced you to ask Lucy, or Louisa, or your humble servant.

*Louisa.* There 's no stopping these gentlemen when they begin to talk. Lucy, my dear, we will get John, the gardener, and Mary, the housemaid, and two or three little boys from the charity school, and lecture to them.

*Kate.* About earthquakes ?

*Mr. L.* Pray, Kate, go on. Charles shall be John the gardener, Jane shall be Mary, and I and the girls will be the little boys from the school.

*Kate.* Ah ! you may laugh. I can lecture very well—(*Mocking Charles*)—Gentlemen, the earthquake is caused by the metalloïd substances called potassium, sodium, calcium, existing in great quantities, which have a great affinity for water, which—which—Louisa, pray help me.

*Louisa.* Which bursts the earth, lifts up the land, buries the cities. There, you see, with a little practice, Kate and I should put some of you to the blush as lecturers.

*Mr. R.* Of course, this specimen is original ?

*Louisa.* Of course ; that is to say, quite as much

so as our friend Charles's, who pilfers Lyell, Buckland, and Murchison, without mercy or compunction.

*Char.* You wilful girls, when and where ?

*Kate.* Why, my dear Charles, you have a very pretty habit of turning down the corners of books of science, and taking notes on little slips of paper, and losing them. Lucy, Louisa, and I, have picked up these precious relics, and just caught you—that 's all.

*Char.* Confessed. I borrow everything, just as the moon borrows the garish light of the sun to reflect it softly on the tree and flower.

*Jane.* That is a beautiful line in Romeo and Juliet—speaking of the moon-beam—

“That silvers o'er with light the fruit-tree top.”

The evening business, once broken in upon, degenerated into *group-talking* ; and, as illustrating one of the modifications of the beautiful law of attraction, Jane preferred the wisdom of the senior sages, Mr. R. and Mr. L., whilst the younger ones clustered around Charles, until the witching hour of night was almost at hand.

“Good night—good night, all !” said the old beau ; and whispering to Charles, “how delightful to catch hold of the skirts of departing Happiness, and to bring her perforce into the presence, clothed anew in robes of light and beauty. These are the real angels' visits ; may they be neither ‘few nor far between !’”

## EVENING XXV.

## THE OCEAN AS EARTH-LIFTER.

*Mr. R.* THERE can be no doubt, Charles, that the earth is gradually rising in various parts.

*Char.* And has ever been so. The sea is destroying everywhere, encroaching everywhere: fixing its relentless tooth into the very hardest rock, and crumbling it down, to strew it on the ocean-floor as dust.

*Mr. R.* The fact is undoubted, that the earth is slowly rising up in many places.

*Char.* Not the slightest doubt can be entertained. Large and vast areas, some several thousand miles in circumference, in Scandinavia, the west coast of South America, certain archipelagos in the Pacific; whilst others, such as Greenland and parts of the Indian and Pacific Oceans, are as gradually sinking, especially parts in which atolls or circular coral islands abound. That all existing continents, France, Spain, Germany, and also submarine abysses and caverns, may have originated in movements of this kind, continued through incalculable periods of time, is undeniable.

*Mr. L.* And, my dear Charles, there can be no doubt but that much of our dry land has been gradually pushed up by subterranean action, and in

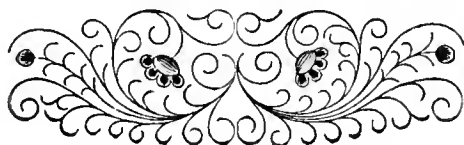


this way valleys have been cut of every size and form by the action of running water.

*Mr. R.* But these are the effects of upheavings on flat and table lands; the effect is more striking on some of the lofty mountain ranges. Lofty hills, like the Andes, the western part of South America, have risen at the rate of several feet per century; while the Pampas, on the east, have only been raised a few feet in the same time. In Europe we have learnt that the land at the North Cape ascends about five feet in a century; while, further off to the south, the movements diminish in quantity, first, to a foot, and then, at Stockholm, to three inches in a century, while at points still further south there is no movement.

*Kate.* I wish yawning were permitted in polished assemblies. My dear Charles, forgive me, but you are excessively stupid to-night.

*Lucy.* Pray, Charles, let us have something more lively and entertaining; I feel quite stupid. Louisa! Louisa! Asleep? Happy girl!



## EVENING XXVI.

## THE OCEAN AS EARTH-BURSTER.

*Char.* WHO but the supreme Creator of all could have devised a plan by which order and beauty should cover the earth, that myriads of happy beings should swim, or fly or crawl, over its surface, and that, when their happy day was ended, they should die, and that their graves should be the very sporting places, the playgrounds where myriads of others should live and die, and be entombed, and so on, for ages and ages?

*Mr. R.* And again, Charles, that these should be broken up and rent asunder—that in the very chasms new animals and fishes should sport and die, and again be burst and torn, until everything rocky in our quarries seems to have been heaved to and fro with irresistible power and energy.

*Char.* How would an artist or a mechanic who had fashioned a piece of ingenious mechanism feel, if some other artist broke his machine into fragments, under the pretence of remodelling and improving it?

*Jane.* Take this watch or musical snuff-box; how beautiful the melody of the one—how true the time-keeping of the other; dash one against the floor, and the other burn with fire, and bring me the artist who can convince me that out of these broken

and incinerated fragments he will make a chronometer or a snuff-box, evincing higher skill and workmanship than the last?

*Louisa.* Ay! bring such a man, that we may behold him. Our friend's belief in mermaids and their sea-spouses would be nothing to the sheer impudence of the charlatan who should attempt it.

*Char.* And yet this is nothing to what passes daily under our very eye—nothing to what has been going on for ages. Given an “earth without form and void,” to quote the exquisitely appropriate language of scripture, how, and by what special agency is it to be brought into fitness for the home of man? If in man could be vested omnipotent power, he would doubtless have created it perfect at once, passing from its formless to its present beauteous condition at a bound. The Deity had higher and nobler ends and aims. The earth was to increase in size as well as in fitness: myriads of shell-fish were created, and so on, to the creation of man. The acts of creation may be looked upon as a stupendous pyramid of happiness, man himself being the top-stone.



## EVENING XXVII.

## THE OCEAN AS BRICKMAKER.

THE evening being wet and cloudy, the ladies petitioned that Charles might remain at home, and having readily complied with their request, he announced, amid the derisive laughter of Kate and Lucy, that he should say a little on that beautiful aspect of the ocean—its acting as a Brickmaker.

*Kate.* Oh! extremely beautiful!

*Lucy.* Remarkably clean!

*Louisa.* Interesting to ladies—very!

*Char.* Thank you, ladies. If I were called upon to say in what part of this earth's solid substance there was shown the most profound design and foresight, I should at once say it was exhibited in the universal deposit of clay almost all over the world.

*Kate.* My dear fellow, you know we could have lived in tents, or log-houses.

*Lucy.* Or built houses with stone.

*Char.* Ah! you could have done so; but what a paltry substitute for bricks to build houses with, which may either be a palace for a prince or a hovel for a pauper.

*Mr. R.* And look at its other uses. Every cup, every vessel, vases of exquisite shape, glowing with

colour and splendour, are also framed from it. Without clay, man would have been a poor, wretched being. If his house were not of stone, which it could not often be, he could never have dwelt in cities, where freedom was cradled—those fastnesses where the lamp of learning was kept duly burning, when it had been put out in baronial halls and castles.

*Kate.* For my part, I cannot see anything so extraordinary in it.

*Char.* What is clay, or gault, Kate?

*Kate.* Why, my brother dear, it is clay, and grew there, undoubtedly. You might as well ask me what grass is, or any other ridiculous question.

*Jane.* Pray, Charles, tell us what it is. Its properties of being hardened by fire are truly wonderful. Every man having clay, has within his reach, by the help of fire, a quarry of infinitely greater value to him than stone itself.

*Char.* The history of this brickmaking clay, this unctuous, dirty matter now on the table, is a wonderful one.

*Kate.* Ha! ha! Pray excuse me, Charles; but the history of a piece of dirt is rather ludicrous.

*Louisa.* Oh! Kate, I shall laugh when I like, for all the philosophers in Christendom. I shall laugh when I like. I am not your sister, indeed.

*Jane.* My dear girls, laugh by all means, and at all times; but let us hear the history of this laughed-at substance.

*Char.* (*Taking a lump in his hand*) How many years ago this clay was a portion of a mountain of

vast extent and height, I dare not even guess. Probably the earthquake rent a small chasm in the topmost peak, or it might be riven asunder by the lightning's flash. The very peak that attracted the lightning, brought near the thunder-shower, and the crack was filled with water; the frost commenced the work, and never ceased till it had dislodged this rocky fragment, to be shivered into angular fragments as it fell into the sea: thousands, myriads of these fragments pave the sea-floor.

*Jane.* But I cannot see what this has to do with clay.

*Char.* Stop, Jane—let Kate be impatient if she will—remember the pieces of rock that fell into the sea were angular-pointed. How did they become round, either as boulders of large size, or as pebbles of every size and colour?

*Jane.* They undoubtedly became smooth by being rolled by the waves of the sea until they rounded each other.

*Char.* But what became of the fragments—the waste that was gradually rubbed off, Lucy?

*Lucy.* It became dust, I suppose—a sort of wet dust.

*Char.* And where was it laid?

*Lucy.* At the bottom of the ocean.

*Char.* And became what?

*Lucy.* I am sure I cannot tell.

*Char.* Think.

*Louisa.* I see! I see! it became gault clay.

*Char.* Precisely so; but there are other sources of supply: the abrasion of rock by the mountain stream—the rocky morsels gnawed off by time—the decay of ancient rocks—all help to fill up this vast magazine of clay.

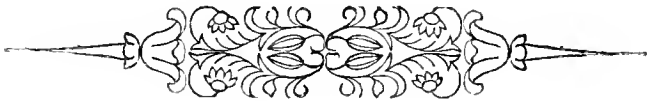
*Jane.* Oh then, clay is powdered stones of every sort and kind?

*Char.* Probably so; gneiss, basalt, granite, and a thousand others that may be seen in every gravel heap, have been rubbed into pebbles, and the refuse, as it would be called, is specially treasured up by the ocean for the happiness of man.

*Mr. R.* And yet we hourly pass by this treasure-bequest, a thousand times more valuable than gold to man, and look upon it as worthless as a mere scum or a vile sea-weed. Oh, I often think we do not employ the faculties God has given us aright, by not bringing these subjects more vividly before the young. Here is a substance gathered up with care for ages. Who has seen God in this? Kate and Lucy, what would you say if every time the knife grinder's-wheel goes round, every time the knife blade *wore off*, some little dusty fragments from the circular piece of rock sandstone that constitutes his grind-stone—what would you say if *little hands*—fairies' or cherubs', if you please—were seen gathering up every drop and atom as it fell, and carrying it to some secure spot; and wherever and whenever the grinder's stone was in motion, that these little bodiless members were actively at work?

*Kate.* I should certainly wonder, and I fear feel afraid.

*Char.* And yet this is what is and has been done for man. Surely the time is coming when Science will be as the index finger-post, pointing to the Supreme Being who weighed the dust in a balance, and the sea in the hollow of His hand !





## EVENING XXVIII.

## THE OCEAN AS MOUNTAIN-BUILDER.

*Louisa.* OH, this rain! this rain!—surely it will cease soon. A day within doors was always a horrible thing to me; but to be wet this day seems scarcely to be borne.

*Jane.* Very complimentary to us, Miss Louisa.

*Char.* And to me especially. I feel jealous of the gay old bachelor, and I shall tell him so.

*Louisa.* Pray do; and add, for his especial benefit, that you know a young lady who thinks one rich old bachelor worth two young beaux, who are crammed so full of wisdom that they have no time to dance, and romp, and talk romance with distressed damsels on a wet day.

*Char.* Suppose for once we try what a whole day of frolic and fun will do. Ha! ha! ha! Let us begin to laugh. Come, Kate, why don't you laugh? Ha! ha!

*Kate.* Give us the least phantom of a joke, and I'll laugh as immoderately as you please.

*Jane.* Really, Charles, how ridiculous of you: what can you be laughing at?

*Char.* At Louisa's vexation—at the rain—at Mr. L.'s disappointment!

*Louisa.* You ill-natured monster !

*Char.* I have a great mind to tell——

*Louisa.* Oh, quite welcome. I'll save you the trouble. Kate and I and Lucy have received a polite note from the old beau, inviting us to take tea with his housekeeper, that she might show us all over his mansion—his cabinets of metals and fossils, together with all the antique furniture.

*Kate.* We had promised him to leave nothing unexplored. The rain still goes on pattering against the panes as if it would never cease ; and here comes our father ; he professes weather wisdom. Any hope, my dear father, of the weather clearing up ?

*Mr. R.* None whatever.

*Jane.* Come, Louisa, make a virtue of necessity. Cheer up. Charles, you have often promised us a narrative of some of your travels—what say you ?

*Char.* Anything—talking, singing, dancing—anything save and except wisdom. Miss Louisa has vetoed that for the day.

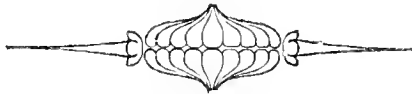
*Louisa.* I'm quite penitent—let there be peace between us. The rain is coming down in such good earnest that the torrents from the heights are beginning to be amusing.

*Char.* You talk of torrents and heights, Louisa : —I remember when ascending one of the highest mountains in India, being dreadfully alarmed at a mountain-torrent ; rain had fallen for days, every stream was swollen. When I had escaped from the most imminent danger, I thoroughly enjoyed the sublimity of the scene.

*Mr. R.* There is something inexpressibly grand about these mountains; their origin at the depths of the sea—their gradual rise for ages and ages! their hoar antiquity—the mighty purposes they serve, and the beauty they everywhere confer upon the landscape.

*Jane.* And then to think that here again the ocean has been the worker—that one ocean builds up the boundary mountains that are to hold the waters of smaller oceans.

*Char.* Thank you for the idea, Jane; and having walled in a minor ocean, they in their turn become its prey, and are carried hither and thither, at the mighty behest of Him at whose command every atom rolls into its appropriate place.



## EVENING XXIX.

## THE EARTH AS BASIN-FILLER.

THE morning being auspicious, the young ladies who had been so disappointed yesterday were on the alert. The sun shone with uncommon splendour, and after strolling over the beach, and having recourse to every conceivable method of pushing "Time" on, the happy hour at length arrived. They ran down the slope with the wild glee of giddy, unthinking youth, having previously extorted a promise from Charles to fetch them at an early hour.

Jane and Charles were left alone, and as was always the case, she had a thousand questions to ask.

*Jane.* In what was said yesterday, Charles, of mountains, no mention was made of their vast utility in upheaving the level and horizontal rocks—*that* seems to be the most mysterious part of their uses—and one which it is extremely difficult to comprehend.

*Char.* There can be no doubt however of the fact, that if it had not been for the violent upheaving of mountains—if they had not exerted an upward force in breaking and dislocating and almost making perpendicular various rocks—a force so infinitely greater than man can comprehend or calculate—man would have been a wretched wanderer upon the earth, the

object of scorn and derision of the chimpanzee and the baboon, who would have disputed with him, successfully, the title to be the "Lord of the Creation."

*Jane.* I have often thought, Charles, what ruin and confusion would have been the result of one act of *forgetfulness* in this earth-fashioning, if one can without irreverence conceive that possible which is altogether impossible.

*Char.* Oh, Jane! how trippingly the tongue speaks the word **GOD!** How unsolemnly we talk of the Divine Creator, and yet how illimitable, how boundless, how vast the distance between Him and us! To have built a beautiful earth like this, with its mountains and seas and rocks, would require a mind coeval with this planet in age and co-equal with the Divine fabricator in wisdom. Oh! how it brings proud man down, and yet how it elevates him. There is, in very deed, a soul-ennobling feeling that flows from these pursuits that mere literature can never bestow.

*Jane.* But you promised to say something about the part the mountain formed as a basin-filler.

*Char.* We will defer that till our next meeting, Jane, when we shall discuss the part the ocean plays as "Coal carrier;" but that must be at Mr. L.'s, for he has some splendid specimens of coal and slates, polished, and forming the chief ornaments of one of his upper rooms.

## EVENING XXX.

## THE OCEAN AS SLATE-MAKER.

*Kate.* OH, Jane, you should have been there; there were chairs of the oddest fashion, stools and beds so grotesque and fantastical, that I cannot, even now, think of them without laughing.

*Lucy.* And, Jane, the floors were all of polished slate, of every colour, from blue to jet black.

*Louisa.* Shale or schist, my dear Lucy, not *slate*. Now that we are philosophers, and think with the wise, we must on no account talk with the vulgar.

*Kate.* I could almost go into hysterics at the thought of that old sofa.

*Lucy.* Carved and cut out after the fashion of the ugliest of the Saurian monsters—the Megathen-something Saurian.

*Louisa.* I have pencilled the horrid creature's name down on this card—"The Megalosaurus." I am quite in love with the names of the wretches. How I shall bother poor Mary when I return home, with Pentacrinites, Briareus, and Belemnosepia. (*Mimicking*). Mary, bring in the Loligo.

*Jane.* Oh, you wicked girl, what will she know about Loligo?

*Louisa.* I'll *explain* it, as those learned Thebans,

Charles there and your father, often do, by changing one hard word into a harder. Bring in the *Sepia officinalis*, Mary, with the *Loligo*.

*Kate*. You mean the pen and ink ?

*Louisa*. The very same. There's progress for you. I read all about this wonderful substance in Dr. Buckland this morning, when I stole into Charles's library, ostensibly to look for a book, but in reality to see if Charles was there.

*Char*. You are past mending, Louisa ; but I am glad you read that chapter on the fossil remains of ancient cuttle-fish.

*Louisa*. I should have skipped over it if I had not read a note so complimentary to Miss Mary Arming, of Lyme Regis, for having done so much for science in bringing to light these fossil reptiles.

*Mr. R*. Nothing that the industry of Miss Arming has enabled her to discover is more wonderful than this—that not only is the animal itself fossilized and preserved, but also the ink which enabled it to elude the pursuit of the monsters of the primæval ocean.

*Char*. It was hardly to be expected that we should find, amid the petrified remains of animals of the ancient world (remains of which have been buried for countless centuries in the deep foundations of the earth), traces of so delicate a fluid as the *ink* which was contained within the bodies of extinct species that perished at a period so inconceivably remote.

*Jane*. I read one day, Charles, that Cuvier drew

his figures of the recent cuttle-fish with fossil ink from the ancient species.

*Mr. R.* And you also, perhaps, remember that as the ink-bags are frequently full, it is thought that they died *suddenly*, and were quickly buried in the sediment that formed the strata in which they are now found.

*Jane.* A most delightful interruption certainly ; but pray, Louisa, tell us all about the slate you mentioned.

*Louisa.* Miss Jane, I must remind you that slate is vulgar ; I have micaceous schists and common ones, written down, with notes from Mr. L.'s description.

*Jane.* Did you actually take notes ?

*Louisa.* Did I, indeed ? yes, and of other things too. Did you remark, Lucy, how concerned he was when I told him Jane would not come with us ?

*Lucy.* And how often he addressed me as Jane ?

*Kate.* And how he told us that she reminded him of a portrait up-stairs ?

*Char.* It's all badinage, Jane, merely to consume the time ; Louisa has pencilled down half-a-dozen names, and like other persons I have known, can make nothing of them. I will help her out—shall I, Louisa ?

*Louisa.* If you are in such a great hurry, pray do ; I suppose ladies are not to be permitted a few seconds to read their notes—a privilege specially to be con-



ceded to gentlemen—and they need it often enough, as everybody knows.

*Char.* Perhaps it will be better to defer this shale or slate discussion till to-morrow, when we can connect with it the far more interesting one of the formation of coal.



## EVENING XXXI.

## THE OCEAN AS COAL-CARRIER.

*Char.* JANE, what an evening for preparing the mind for dwelling upon the beneficence of the Deity ! There is such exquisite rapture felt in this unfolding the mysteries of ages long, long past—a feeling so elevated, so pure and serene, that care and trouble, the inheritances of man, are forgotten.

*Jane.* I often think, Charles, that the pleasures experienced in the study of the works of Nature will not *cease* with this life, that they will still constitute the delights and pleasures to be experienced in another world ; but heightened by the beholding brightly and clearly all that we now see “as through a glass darkly.”

*Char.* Do you, indeed, think so, Jane ? Strange that this sentiment should never have found utterance before. Oh, Jane, this feeling is ever present with me ; gilding the refined gold of past recollections, and painting the lily of present enjoyments. I make no parade of a knowledge that all might acquire if they once experienced the pleasure it brings. I can reveal to no one the exquisite gratification afforded by these stray glimpses adown the dim and hazy vista of Time ! My thanks to the Giver of all for the bestowment of a mind susceptible of these Divine enjoyments, ascend unuttered, unheard. My yearn-

ings after more and more knowledge, and my desires that a clearer insight into the hidden mysteries of creation might be given, are all hid from mortal eye, too sacred for utterance ! but their results are open to you—to all ! perfect content with everything, and a constant, joyous, happy buoyancy of spirit, at the very sight of which dull care and melancholy fly away !

*Jane.* I think no one is happy who has not some one *pet* study. Do not you ?

*Char.* Nothing is more strongly impressed upon my mind than the truth that the idle hours of the mind should always be spent in riding some favourite hobby-horse, no matter what. Geology, conchology, carving antique faces on umbrella handles, or music, or painting. I have seen some extraordinary instances of the development of latent mental energy by the devotion to the acquisition of some one science. Of all dreadful things, a mind unoccupied with some one darling pursuit is the most dire affliction.

*Jane.* You, Charles, cannot tell what it is, having never experienced it.

*Char.* Not exactly, Jane ; but I have seen it in others. Oh, that dreadful, mental yawning, that proceeds from the vacuity of a mind *unoccupied* with the achievement of some one grand project of a life, after the daily labour is over. Oh, the miseries of a night spent in mere sleeping, and awaking just to travel over the old round and sleep again ! this surely is not living as if we believed body and mind were united ; but as if the immortal mind were chained to the body, like a corpse bound to the

body of a living man. But here comes father, with the girls.

*Louisa.* Very pretty indeed, Mr. Charles ; remarkably attentive to your visitors ! your humble servant, of course, has no pretensions to be able to converse with such highly polished and intellectual people, but——

*Char.* But—nothing ! Are you ready to go ?—Come, Louisa, take my arm. Surely we are good friends—are we not ?

*Louisa.* Upon probation only, instantly to be discarded if disapproved. I mean to attach myself to the gay old bachelor all the evening ; but still you may walk with me, if you will ; but promise to listen to me.

*Char.* Granted—now begin.

*Mr. R.* Pray cease talking, and let us hasten to our friend ; if I am not mistaken, he has been on the look-out for the last half-hour.

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Nothing could exceed the cordiality of the greeting. There was a spruceness in his appearance, a modernizing, that afforded Louisa a fund of amusement. The gout had capitulated, and he insisted upon handing the tea to several of the young ladies, amidst the loudest protestations to the contrary.

*Mr. L.* Pray let me be happy my own way, girls. If I'm still I shall weep, or some such nonsense (*brushing away a tear that stole down his cheek*). Bless me, it seems true—once a man and twice a child !

*Mr. R.* My dear friend, do as you please ; your

happiness is ours, but we must remind you of your promise.

*Mr. L.* Come, Jane (*offering his arm*), I have not forgotten it. This is the last freak of my past mad days—Open, Sesame!—Hah, Jane! why start?

*Jane.* Oh, how beautiful!

*Louisa.* Let me stay, Charles: I will stay, to look upon it at a distance.

*Mr. R.* Let Mr. L. and Jane go on. Charles, this was as he says his last freak; the whole of the furniture here is coal and slate; and the drawings that hang from the walls are the plants of which coal is chiefly composed.

*Char.* Look here, Louisa! look at these magnificent palms.

*Louis.* A gigantic houscleek; surely, Charles, houseleek has nothing to do with coal. Do you imagine that the coal trees and plants grew where they are found, or elsewhere, and floated down some river or sea?

*Char.* Both, probably; here is a beautiful model of a coal mine; enter this tunnel. I fancy myself in a fairy land; see how beautifully the jetty columns sparkle with light.

*Lucy.* Extraordinary! the foliage from the roof, the fruits and flowers that hang pendent, are added, I suppose, to give effect?

*Char.* Oh dear no! In some coal mines no sculptured tracery can be more beautiful than the fossil plants that are preserved in the shales; plants and

trees that exist also in the coal, but have been either destroyed by heat, or hidden by the mixture of some pitchy or bituminous matter to make it coal.

*Mr. L.* Charles, now you have ciceroned the ladies through my colliery, bring them here. Here is a little collection of ferns, palms, and plants, found in coal. I was once, Jane, an amateur in coal mines. I have seen more splendid things in a coal mine than anywhere upon earth.

*Louisa.* Really, Mr. L., are you talking seriously? beauty in a coal mine—impossible! You forget, sir, there are no ladies there.

*Char.* Oh, I quite believe it, Jane. I recollect in Bohemia, the most elaborate imitations of living foliage upon the painted ceilings of Italian palaces bear no comparison with the beauteous profusion of extinct vegetable forms with which the galleries of these instructive coal mines are overhung. The roof is covered——

*Louisa.* Pardon me, Charles. It seems amazingly like something about page 458 of a certain Bridge-water Treatise—nameless, of course.

*Char.* The roof is covered as with a canopy of gorgeous tapestry, enriched with festoons of the most graceful foliage, flung in wild irregular profusion over every portion of its surface. The effect is heightened by the coal-black colour of these vegetables, with the light ground of the rock to which they are attached. The spectator feels himself transported, as if by enchantment, into the forests of another world; he beholds trees, of form and characters now unknown upon the surface of the earth, presented to his senses

almost in the beauty and vigour of the primæval life ; their scaly stems and bending branches, with their delicate apparatus of foliage, are all spread before him, little impaired by the lapse of countless ages, and bearing faithful records of extinct systems of vegetation, which began and terminated in times of which these relics are the infallible historians.

*Mr. R. Jane ! Louisa ! Lucy !* behold the grand natural herbarium, wherein these most ancient remains of the vegetable kingdom are preserved in a state of integrity, but little short of their living perfection and beauty.

*Char.* Recording not only plants themselves, but also the conditions of our planet which exist no more.



## EVENING XXXII.

## THE OCEAN AS SEED-FLOATER.

THE recent chafing of the ocean had strewed the beach with fragments of rock and weed ; no inconsiderable curiosity was excited by the fact of a cocoa-nut being observed floating in the midst of some gluey substance, with which the girls were not acquainted. On their return home, they determined to seek out Charles, and ask him whether it were possible that this cocoa-nut could have swam from the island upon which it grew ; and not a few questions were to be put relative to the glue in which it was enveloped, or rather with which it was covered.

*Jane.* I incline to the opinion, that it has floated here from some island upon which it grew.

*Louisa.* Who ever heard, Jane, of these a being one of the agents employed in carrying seeds from one part of the earth to another ?

*Jane.* Why, Louisa, there can be no doubt but that the sea transports seeds from the fertile and cultivated island to the more lonely and desolate shores where vegetation is in its infancy, to shores yet untrodden by the beast of the forest, or by his lord and master.

*Char.* The whole business of dispersing and protecting the seeds of plants and trees is most wonder-



ful; here we have the seed raised on a tall stalk that the wind may waft it away from the parent plant; these wings, the most buoyant and feathery, are given for a like purpose; in others, they are preserved whilst passing through the alimentary canals of animals, or they cling to the coats of animals, or they float in water, or, by an elastic spring, they are forcibly thrown from the parent plant.

*Jane.* How beautiful to think, that the very wave that chafes the naked coral rocks of the great Pacific Ocean, is the bearer of the seed that is to clothe them with vegetation, and to fit them for the habitation of man! Surely, Lucy, this could not be the result of accident.

*Char.* Oh! dear no, Jane. The buoyancy of the cocoa-nut, the resisting investments, and the vitality of seeds, were not necessities; but without these wonderful contrivances the islands themselves would have been created for no purpose, and the wonderful plan of forming new continents and new islands out of the ruins of the old would have been thwarted.

*Mr. R.* Of the composition of the mucilage that adheres to these and other sea-seeds, but little can be known. It is a gum which water cannot dissolve, but which enables the seeds of the fuci to adhere to whatever solid body they touch; even, as seamen know too well, to the very copper with which they attempt to protect their ships from this invasion.

*Char.* Let chemistry name another mucilage, a substance which water cannot dissolve, though apparently already in solution in water, and then ask if this extraordinary secretion was not designed for the

special end attained ; and whether also it does not afford an example of that Power which has only to will, that it may produce what it desires, even by means the most improbable.

*Louisa.* Thank you, Charles. You have said nothing of the down of the willow-seed—a tree everywhere the inhabitant of rivers—a seed that is both ship and balloon, a precious freight for posterity in the most distant regions ; sailing on the bosom of the crested wave, and wafted by the breeze that is employed in its conveyance to the destined spot where it is to take root, and become the parent of trackless forests, and the maker of jungles and miry sedges, where the tiger loves to lie in wait for his prey.



## EVENING XXXIII.

## THE OCEAN AS CORAL-FEEDER.

EARLY in the morning, a large box arrived from Mr. L., and a note to Charles from the same quarter, intimating that he should be his self-invited guest for a few days. This was looked upon by Charles and Jane as a triumph of no ordinary magnitude.

*Jane.* The whole seems to be a dream, Charles; it seems but as yesterday, that our dear friend was deemed by us as a sort of harmless lunatic, unfit for the society of polished and intellectual beings, having no sympathy with his kind; and we find him to be one of the most estimable of men.

*Char.* Mr. L., Jane, is a fair sample of a small class of men, for which the world, in its superior wisdom, would long ago have prescribed a strait-waistcoat. In their eyes *I* am mad; and when they know your new tastes and pursuits, Jane, they will deem you so too.

*Jane.* I shall bless and thank them for it, if exclusion from their society be the punishment—but what further says the note?

*Char.* Read it for yourself. (*Reads*)—"I have enclosed some specimens of coral and coralline rock, and shall be happy to discuss with you in the evening the subject of coral formations, a subject to me of the deepest interest."

Throughout the whole day preparations and arrangements on an unusual scale were apparent—Jane was as usual the presiding genius—but upon Louisa and Lucy fell the burden of diffusing an air of cheerfulness over the whole household. Life was to them one long sunny day—Jane's was beginning to have its clouds. Every one having performed her allotted share of the work, was ready to receive Mr. L., and just as Louisa was bantering Jane on the plainness and neatness of her evening costume, he drove to the door, surprising everybody who had seen him hobbling through his apartments two or three weeks before.

*Mr. L.* Well, Jane, where is my old enemy and tormentor?

*Louisa.* Here, at your service—but pray let me wheel the old chair that is especially reserved for you, with all the *et ceteras* of cushions and footstools.

*Char.* What an antediluvian memory you have, Louisa! Gout and care are extinct species of bodily and mental maladies; and happiness, and hope, and health, are our new and living creations.

*Lucy.* My dear Mr. L., there is an intention to surprise you this evening—a plan has been concocting all day to get up something like your Mermaid's Hall on a small scale;—they have shut me out, so I revenge myself by telling you.

*Mr. L.* Never mind, Lucy, I will avenge your quarrel by appearing unmoved at all they show me—but here comes Charles.

*Char.* My dear sir, we are greatly obliged by the

present of this morning. The pentacrinites and the lily encrinites are beautiful. Jane has placed them in her room as her especial property.

*Mr. L.* Every thing connected with the interior of the earth is beautiful: but let us walk in your garden—I have so long enjoyed the sea-breezes that I cannot live without them.

---

All were impatient for the evening to set in. The fire blazed with unwonted brightness—each face was radiant with happiness—the table in the centre was filled with specimens of coral—and the general happiness seemed complete, when Mr. L., accompanied by Charles and his father, entered the room.

*Louisa.* I must and will speak first, Jane. I lay claim to this magnificent piece of coral.

*Lucy.* And I to this.

*Mr. L.* Pray, ladies, consider them all your own. Perceiving that Louisa and Lucy would be enamoured of these corals, I have brought Jane one of equal size and beauty, but already cut into beads.

*Louisa.* Oh, how large! how beautiful! After all I do not think these on the table so very beautiful.

*Lucy.* Nor I.

*Mr. L.* Indeed! then I must open another little packet here.

*Louisa.* Oh you tantalizing and tiresome man! Two others, not quite so beautiful as Jane's, but labelled, "For Louisa and Lucy, friends of L."

*Mr. L.* Say not a word. Who would ever have thought of building a barrier to the sea-wave by the agency of a little polyp something like our sea anemone?

*Charles.* There is nothing in the formation of the earth more wonderful than this; imagine a solitary polyp wandering through the ocean-depths, alighting at last upon a submarine rock, or volcanic cone, or ridge, and commencing its solitary work! As it grew, thousands of young polypi peeped out from their little homes, each one taking up the parent office of building up reefs and islands—the one for a home, and the other for a sea-barrier from hostile armaments, for man.

*Jane.* Some of these reefs are of enormous length.

*Charles.* Oh yes! of many hundred miles.

*Louisa.* I cannot see the utility of these coral-reefs.

*Mr. L.* Not see them? why their uses are very numerous; but you must read the work of Mr. Ellis on corallines, and afterwards Montgomery's beautiful poem, "The Pelican Island."

*Louisa.* Thank you. Pray, Jane, take a memorandum of these books, and read them for me, my dear girl. There is really so much to do every day that Lucy and I have no time for reading. We shall drop in to-morrow morning, Jane, to inquire about Messrs. Ellis and Montgomery.

*Mr. L.* What do you think, Jane, is another purpose for which these industrious coralline polypi were formed?

*Jane.* I know not,—until within a few days or weeks, I have known nothing of them beyond their being connected with coral beads.

*Mr. L.* They are the scavengers of the ocean, Jane; of the lowest class, indeed, but perpetually employed in cleansing its waters from impurities that escape the crustaceous fishes, in the same manner that the insect tribes upon earth, in their various stages, are destined to find their food by devouring impurities caused by dead animal and vegetable matter upon the land.

*Charles.* I recollect well, that Mr. De la Beche observed that the polypes of the *Caryophyllia Smithii* devoured portions of the flesh of fishes; seizing them with their tentacula, and digesting them within the central sac that forms their stomach.

*Mr. L.* We have before said that they cannot work above the water; there is reason to believe that the action of the air and water upon the upper layer decomposes it, and that it falls down to the depths of the sea as common chalk.

*Jane.* Common chalk, Mr. L.? Chalk the result of decaying coralline? Wonderful!

*Mr. L.* Jane, everything is wonderful that is new. But let us drop this subject for the present, and talk of a plan for a sea-voyage next month. To Charles alone have I revealed the rough outline of the plan.

All discourse about corals and polypi of course came to an instant conclusion, the girls grouped round Mr. L., and the night was far advanced before they retired to rest.

## EVENING XXXIV.

## THE OCEAN AS A ROOF.

THE announcement of a sea-voyage to the Isles of Greece ; to the romantic shores of the Mediterranean ; to wander through the classic land of Italy ; to see actual volcanoes ; rendered the " Evenings " tedious and irksome to the girls, with the exception of Jane ; hour after hour was spent in asking questions, the appetite for knowledge grew with what it fed on. After attempting to bring all the family together two evenings in vain, the plan was given up as far as regards the fair sex, and the trio of philosophers, Mr. R., Charles and Mr. L. determined to draw one another out as usual.

*Charles.* I have been thinking this morning, Mr. L., that the ocean plays a very important part as a sort of Earth Roof, by the immense pressure of which the imprisoned gases and other heated materials are confined within the bowels of the earth.

*Mr. L.* I look upon the waters of the ocean as pressing upon a yielding and elastic earth-covering, acting like a vast hydrostatic machine, and compressing the fluid contents beneath until they find vent in some distant mountain range.

*Charles.* It may be so ; but I imagine the pressure is caused by the ignition of the imprisoned metal-



loids, caused by the rushing of water through the numberless fractures in the ocean's floor.

*Mr. R.* What an object of wonder and curiosity must this same ocean-floor be, saying nothing of its riches—of its ruins—its argosies—its living and dead inhabitants! What mighty changes are going on there! What sleeping thunders are awakened up when the earthquake rumbles through its hollow bosom! What destruction, when fragments of ocean-floor are hurled up by a volcanic cone just piercing through the rocky crust!

*Charles.* The floors of ancient oceans must have been the scenes of perpetual turbulence and ruin. If the sea was, as I believe, thickly studded with volcanoes, what destruction of life must have resulted therefrom!

*Mr. L.* When you call to see me again, Charles, you must look at my specimens of ocean-floor—fishes suddenly deprived of life by liquid rock, that burst in upon them, others choked by an irruption of mud or fluid chalk, but all furnishing specimens of rock and stone, susceptible of polish.

*Charles.* Who could ever have conceived the plan but the Maker of Heaven and Earth! The exquisite marbles that adorn our fire-places, and the statuary that bestows immortality alike upon the hero, and the temple that contains all of Him that Time has left for mortals to look at; who would have ever dreamed that a material so exquisitely beautiful was the result of the bursting of the sea-floor and the destruction of myriads of fishes?

## EVENING XXXV.

## THE OCEAN AS EARTH-QUAKER.

*Mr. R.* AMONG the truths that are becoming quite common-place, may be classed the just and rational ideas now prevalent on the subject of earthquakes.

*Charles.* True of rational men in civilised countries, where earthquakes are not ; but not so of countries where they are frequent.

*Mr. R.* Of course the earthquake must ever be an object of dread, just as the storm, and the hurricane, and the simoom, and the tornado are ; but no more.

*Mr. L.* I have no recollection of any event that appeared to bring me so immediately into the presence of God as the first earthquake I felt, and the first eruption of a neighbouring volcano that followed it ; but this feeling soon wore off, and I now look upon the earthquake as a telegraph announcing to me that the beneficent purposes of the Deity in forming new lands, and in fertilizing the Earth, are not yet come to an end.

*Charles.* This is indeed one of the sublime uses of philosophy, that it reveals to us the universal benevolence of the Divine Architect. If a shoal of fishes are choked by volcanic mud, it is to form a slab of

rock for man; if lava overrun a desolate rocky steep, it is that it may decompose and become rich and fertile soil. If stones and rocky fragments are hurled into the air, it is that they may fall upon the ocean-floor, be chafed with the surging wave, and finally moulded into fitness and beauty for man's purposes. Every act, whether the creation of a coralline polyp, or the bursting forth of millions of tons of liquid lava—all attest the same glorious fact that "God careth for Man."

*Mr. L.* I find these Evenings must come to a close; the girls' heads are evidently turned with the prospects of our autumnal sea-voyage. We must therefore close with another Evening. I regret that the list, the original list, cannot be completed.

*Charles.* The list! what list?

*Mr. L.* Oh! Charles, a friend of yours, and a very particular friend of mine, has furnished me with notes of the whole Evenings. I shall never cease to regret that so many precious days were lost to me. Oh! the Ocean Caverns would have been a beautiful subject, how they were lit up by phosphoric lights. How they, tenantless and lone, were moulded silently into fitness and beauty for their future inhabitants! How—

*Mr. R.* But, my dear Sir, we must have an Evening for the Ocean as Sea-sun, and then we must cease for a season.



## EVENING XXXVI.

## THE OCEAN AS A SEA-SUN.

*Mr. L.* MY dear Mr. R., after the excitement of last evening, let this be one of quiet and repose. I am like a man who, having composed himself to die quietly and decently, suddenly finds himself growing stronger and stronger, and having an increased relish for life and its enjoyments. I still seem to have a work to do; and, if life and health be given me, I WILL do it.

*Mr. R.* There spoke out my old friend. After a quarter of a century of mind-hybernation, it is delightful to see the awakening. It has ever been my fervent wish, that you should leave to posterity something that the "world would not willingly let die."

*Mr. L.* Thank you! thank you! "no more of that, Hal! an' thou lovest me." I shall be a child again! Pray hold your tongue, Charles! I know what you would say. Did you see the dead fish thrown up by the waves last night?

*Charles.* I had the curiosity to have large portions of it brought to me, and, as the night came on, it was perfectly luminous; even the very knives with which it was cut shone with a bright blue light.

*Mr. L.* In going back to the era when the sea

teemed with life, and probably before the rays of the sun illumined the surface of the waves, it was necessary that the eye of the voracious shark or saurian should direct him to the dead and living fish upon which he was to prey.

*Mr. R.* How was this to be performed? I have but a faint idea myself.

*Mr. L.* Picture to yourself an earth whose atmosphere was dark, with dank and sulphurous and noisome vapours, but whose ocean depths of 6000 feet teemed with life. Eyes of gigantic size were bestowed upon the fiercest pursuers, and eyes were also given universally to the pursued. Why? Whence came the light in either case?

*Charles.* He who created the difficulty invented the remedy. In some tribes they are *luminous* during life; but in all, long before they are too putrid for food, they become phosphorescent.

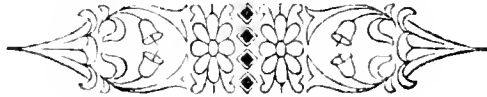
*Mr. L.* Or, in plainer words, they become sea-lamps, lighting up the depths of the ocean, to enable myriads of fishes to discover their daily food. But this is not all; the very water itself has the faculty of dissolving the light-giving body, and making the surface-wave bright and luminous.

*Mr. R.* Is the colour of the light ever the same?

*Mr. L.* Oh no! Sometimes snow-white, or else electric-blue, or of a greenish tinge, or reddish, or yellow.

*Charles.* I recollect, when sailing in —— Bay, in the year 1840, that every flash of the oar seemed to gild the wave with a scarlet light. There seems

a striking analogy running through the whole creation. Man dies, and it is all but an instinct to remove him out of our sight. Animals die, and the keener-scented are gifted with the instinct of detecting the death-odour even during life—whilst the duller are allured by the decomposition from immense distances. In fishes the process of decay is stopped, that the floor of the ocean may be lit up with undying and unfading lights.



## EVENING XXXVII.

## THE FAREWELL.

THE last Evening on Land, after the lapse of three days to enable each party to pack up all that would be required for a short sea excursion, Charles announced that on the morrow their vessel would be ready. He was also the bearer of a message from Mr. L., inviting the whole party to spend the last Evening with him, and to embark from thence at early dawn.

This last Evening had long been anticipated by all, but by no one with more anxiety than Jane. To Louisa and Kate every change would have been delightful, but to Jane this voyage, for many reasons, was especially so.—As Mr. R. had promised to see all the luggage on board, Charles and his sisters bade farewell to their sea home, where the rare art of studying each other's happiness had been practised with success.

They found Mr. L. in a state of despondency that almost alarmed them. He spoke gloomily of the forthcoming voyage, and hinted that it was late in the season for an old man to go to sea. Charles, who knew how strongly his mind clung to his fossil treasures, foresaw this, and endeavoured to lead his mind away from the objects of its present fondness,

but dilating with rapture of the exquisite gratification he would have in revisiting the scenes of his early youth, and the certain additions that he would be enabled to make to his unrivalled collection.

*Charles.* In addition to all this, there will be the delightful office of communicating all you observe to minds in some degree prepared for it.

*Louisa.* And Mr. L. you know, you and I are under an engagement to peep into the first volcanic crater we come near—always provided it has been still and quiet for a month before our visit.

*Mr. L.* Ah, Louisa! promises are made to be broken. When this was made, I felt young again, now I am little better than a feeble old man.

*Louisa.* Remarkably feeble, certainly! and old enough to be one's father, without doubt! but the oddity of the thing is, that the attack of old age and debility has come on so very suddenly. Come, I must turn doctor I see. How far did you walk yesterday, Sir?

*Mr. L.* Four miles.

*Louisa.* What did you partake of for dinner yesterday?

*Mr. L.* Let me see.—Fish, fowl, and a tart or so.

*Louisa.* And wine?

*Mr. L.* Yes, miss, wine!

*Louisa.* And until last night slept soundly?

*Mr. L.* Very soundly!

*Louisa.* Very bad symptoms, truly! Are you not ashamed of yourself? Hypocrisy is barely en-



durable in a young lady, but in a very old and feeble man quite shocking!

*Mr. L.* What do you prescribe, Miss?

*Louisa.* Oh! that you shall be compelled to listen to all the nonsense that Kate and I can utter for the next three hours.

*Mr. L.* I feel the virtues of the prescription already. Really I am not so very feeble after all.

*Kate.* But still very old, "little better than a feeble old man."

*Mr. L.* Come, girls, a truce to this. I was in a melancholy mood; the sight of you all has cured me. Come, Kate and Louisa, I will challenge you to jump over one of those packing-cases now lying in the hall.—But where's Jane?

*Charles.* Jane has caught your gloominess, but the clouds are brightening up apace.

*Mr. L.* Charles! Jane! pardon me. At this moment I feel that one of the great ends of living is to make others happy. If my life is spared, I will devote myself to this one object, with an energy that shall atone for years and years of selfish and solitary unfriendliness with my fellow beings.

*Charles.* Would that this sentiment were universal!

*Jane.* Would that all men devoted themselves to the happiness of others as zealously and as usefully as you have, Charles! Oh, what a happy world would it be.

*Charles.* The secret was revealed to me when a boy, that no happiness could be greater than making others so. Manhood has vastly multiplied the

means, and has brought with it increased desires to live in the midst of a joyous circle—the happiness-maker of all within my reach and influence.

NOTE.—If this humble attempt to interweave the warp of science with the woof of fiction should be as favourably received as our former little volume, “*The ‘Sea Voyage’ of Charles and his Sisters*” would furnish materials the most ample for another volume.

THE END.

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