Alice Leane

Dec 27 1861

Age 14 yrs
Alice Leane

VESSELS AMONG ICEBERGS.

THE

MIGHTY DEEP.

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In the Mosaic account of the creation we are informed that the waters reigned over the formless and chaotic world; and that the "Spirit of God moved upon the face of the waters"—

> "With mighty wings outspread,
> Dove-like, sat brooding on the vast abyss,
> And made it pregnant;"

and that in obedience to the command of God, "Let the waters under the heaven be gathered together unto one place, and let

the dry land appear," order arose out of confusion, light out of darkness, and the earth, emerging out of the waters, became a beauteous residence for man and other animals, adorned with every variety of vegetable life.

The Rev. R. Montgomery thus describes the birth of creation :—

"Before the glad stars hymn'd to new-born earth,
Or young creation revel'd in its birth,
Thy Spirit moved upon the pregnant deep,
Unchain'd the waveless waters from their sleep;
Bade Time's majestic wings to be unfurl'd,
And out of darkness drew a breathing world."

The body of waters flowing over the surface of the earth was on the third day collected together, when that portion of the world above the level of the sea formed the dry land, the sea occupying a vast plain or valley. The destruction of the world by the flood was a mighty effort of the great deep, when in one unbroken swell the waves flowed over the solid land; and of all the race of man none were left but Noah and his family, who were shut up in the ark, drifting on the waves, and preserved by God until dry land appeared, when Noah

went forth from the ark to inhabit the new world.

Geologists have adduced various arguments to prove that the deluge did not extend over the *whole earth*.

The following are the opinions of celebrated divines on this subject, without the slightest reference to geology,—men renowned for their learning and piety. Bishop Stillingfleet says :—

"I cannot see any urgent necessity from the Scriptures to assert that the flood did spread itself over all the surface of the earth. That all mankind, those in the ark excepted, were destroyed by it, is most certain, according to the Scriptures. The flood was universal *as to mankind*, but from thence follows no necessity at all of asserting the universality of it as to the globe of the earth, unless it be sufficiently proved that the whole earth was peopled before the flood, which I despair of ever seeing proved. And what reason can there be to extend the flood beyond the occasion of it, which was the corruption of mankind? I grant, as far as the flood extended, all these (the

animals) were destroyed, but I see no reason to extend the destruction of these beyond that compass and space of the earth where men inhabited; because the punishment upon the beasts was occasioned by, and could not but be concomitant with, the destruction of mankind. But (the occasion of the deluge being the sin of man, who was punished in the beasts that were destroyed for his sake, as well as in himself) where the occasion was not, as where there were animals and no men, there seems no necessity of extending the flood thither." The bishop further argues, that the reason for "preserving living creatures in the ark," was that there might be a stock of the tame and domesticated animals that should be immediately "serviceable for the use of men after the flood,—which was certainly the main thing looked at in the preservation of them in the ark, that men might have all of them ready for their use after the flood, which could not have been, had not the several kinds been preserved in the ark, although we suppose them not destroyed in all parts of the world."

The Rev. Matthew Poole, an eminent Nonconformist divine, wrote as follows:—

"It is not to be supposed that the entire globe of the earth was covered with water. Where was the need of overwhelming those regions in which there were no human beings? It would be highly unreasonable to suppose that mankind had so increased before the deluge as to have penetrated to all the corners of the earth. It is, indeed, not probable that they had extended themselves beyond the limits of Syria and Mesopotamia. Absurd it would be to affirm that the effects of the punishment inflicted upon men alone, applied to places in which there were no men. If then we should entertain the belief that not so much as the hundredth part of the globe was overspread with water, still the deluge would be universal, because the extirpation took effect upon all that part of the world which was inhabited. If we take this ground, the difficulties which some have raised about the deluge, fall away as inapplicable and mere cavils; and irreligious persons have no reason left them for doubting of the truth of the Holy Scriptures."

The Rev. Dr. John Fleming, a divine of the Church of Scotland, says :—

"There is reason to believe, from the writings of Moses, that the ark had not drifted far from the spot where it was first lifted up, and that it grounded at no great distance from the same spot. I entertain the same opinion as Linnæus on this subject; nor do I feel, though a clergyman, the slightest reason to conceal my sentiments, though they are opposed to the notions which a false philosophy has generated in the public mind. I have formed my notions of the Noachic deluge, not from Ovid, but from the Bible. The simple narrative of Moses permits me to believe that the waters rose upon the earth by degrees; that means were employed by the Author of the calamity to preserve pairs of the land animals; that the flood exhibited no violent impetuosity, displacing neither the soil nor the vegetable tribes which it supported, nor rendering the ground unfit for the cultivation of the vine. With this conviction in my mind, I am not prepared to witness *in nature* any remaining *marks* of

the catastrophe; and I find my respect for the authority of revelation heightened when I see, on the present surface, no memorials of the event."

Professor Hitchcock says:—

"That a transient deluge, like that described in the Scriptures, could have produced, and brought into its present situation, all the diluvium which is now spread over the surface of this continent, will not (it seems to me) be admitted for a moment by any impartial observer. It has obviously been the result of different agencies and of different epochs; the result of causes sometimes operating feebly and slowly, and at other times violently and powerfully. But the conclusion to which I have been irresistibly forced, by an examination of this stratum in Massachusetts, is, that *all the diluvium which had been previously accumulated by various agencies, has been modified by a powerful deluge, sweeping from the north and north-west over every part of the State, not excepting its highest mountains;* and since that deluge, none but alluvial agencies have been operating to change the surface."

The Rev. Dr. John Pye Smith, has written at great length on this subject, also the Rev. Professor Sedgwick, Dr. Chalmers, and a host of others.

Of the destruction of the Egyptians passing through the Red Sea, Bishop Heber says:—

"Fly, Mizraim, fly! From Edom's coral strand
Again the prophet stretch'd his dreadful wand:
With one wild crash the thundering waters sweep,
And all is waves—a dark and lonely deep.
Yet o'er those lonely waves such murmurs past,
As mortal wailing swell'd the mighty blast;
And strange and sad the whispering surges bore
The groans of Egypt to Arabia's shore."

The waters of Jordan were again divided, and a similar event to that of the opening of the Red Sea took place, when Elijah the prophet passed over on dry land to the other side. We read that the prophet Jonah, in the belly of the whale, plowed the mighty deep. Dr. Young beautifully describes it:—

"The trembling prophet, then, themselves to save,
They headlong plunge into the briny wave;
Down he descends, and booming o'er his head,
The billows close—he's numbered with the dead.

The whale expands his jaws, enormous size!
The prophet views the cavern with surprise,
Measures his monstrous teeth afar descried,
And rolls his wondering eyes from side to side;
Then takes possession of the spacious seat,
And sails secure within the dark retreat.
Now is he pleased the northern blast to hear,
And hangs on liquid mountains void of fear,
Or falls immersed into the deeps below,
Where the dead silent waters never flow;
To the foundations of the hills convey'd,
Dwells in the shelving mountain's dreadful shade;
Where plummet never reach'd he draws his breath,
And glides serenely through the paths of death;
Two wondrous days and nights through coral groves,
Through labyrinths of rocks and sands he roves:
When the third morning with its level rays,
The mountain gilds, and on the billows plays,
It sees the king of waters rise and pour
His sacred guest uninjured on the shore."

Our Saviour rebuked the stormy deep, and walked on the watery element. Grahame expresses it thus:—

"Loud blew the storm of night; the thwarting surge
Dash'd boiling on the laboring bark; dismay
From face to face reflected, spread around—
When lo! upon a towering wave is seen
The semblance of a foamy wreath upright,
Move onward to the ship. The helmsman starts,
And quits his hold; the voyagers, appall'd,

Shrink from the fancied spirit of the flood;
But when the voice of Jesus with the storm
Soft mingled, 'It is I, be not afraid,'
Fear fled, and joy lighten'd from eye to eye.
Up he ascends, and from the rolling side
Surveys the tumult of the sea and sky
With transient look severe. The tempest, awed,
Sinks to a sudden calm; clouds disperse;
The moonbeams tremble on the Face Divine,
Reflected mildly in the unruffled deep."

History informs us of Xerxes, the Persian monarch, that when about to invade Greece, he ordered fetters to be thrown into the sea, to curb its stormy waves. And Canute the Dane, who sat upon the throne of England in the year 1017, was told by a flatterer in his train that the sea would obey him; upon which, sitting down, he commanded the tide not to wet his feet, and having stayed there till the water approached him, he turned to the flatterer and said, "See here! how vain is earthly grandeur, and how weak all human force! God alone is king of the land and of the sea! Him let us worship and adore."

CHAPTER II.

REFLECTIONS ON THE MIGHTY DEEP—PROPORTION OF WATER TO LAND—NAMES OF OCEANS—TIDES—INFLUENCE OF OIL ON THE SEA—RIVERS SUPPLIED FROM THE SEA—TEMPERATURE—DEPTHS OF THE SEA.

THE mighty deep is a world within itself, containing thousands of hidden objects that the curiosity of the human mind has never reached. The sea is a stupendous effect of creative skill and wisdom, and holds a prominent place among the sublimer objects of nature. It astonishes every beholder who surveys the vast expanse of its mighty waters, glittering and dancing in the summer sun, then lifting its foaming waves and roaring in the winter storm; the flux and reflux of its tides, governed by the greater or lesser influence of the moon; and the consideration that on its ample bosom the stately ship bears the fortunes of thousands, displays the wonderful adaptation of nature to the wants of man.

It is probable that the bottom of the ocean is similar to the dry land, having

valleys as far below its surface as mountains are in height above the level of the ground. It has been calculated that the sea occupies nearly three-fourths of the surface of the globe. Or suppose the surface of the earth to be divided into 1000 parts; there are then 266 of land, and 734 of water. This fact may be ascertained by taking the covering of an artificial globe, and cutting out all the parts representing land, and weighing them, after which weigh the remainder, which will of course be the water. The sea comprises five oceans: the Atlantic, (so named from the Atlas mountains;) the Pacific, (from *pacificus, peaceful;*) the Portuguese gave it this name because of its tranquillity when they entered it. Balboa, in 1513, discovered it from the summit of the mountains which traverse the Isthmus of Darien. Magellan sailed across it from east to west in 1521. The Indian, (so called from its proximity to India;) the Arctic, (from the Greek word *arktos, the bear*, or the *north;*) and the Antarctic, (from the Greek word *anti, opposite to*, and *arktos*.) The Pacific Ocean

is the largest, and the Arctic the smallest. The Pacific occupies more than half the surface of the globe. As these form only one body of salt water, there are no precise limits at which it can be said that one ocean terminates and another begins.

The tides are supposed to be produced by the revolution of the earth on its axis, the action of the winds, changes of temperature, inequality of evaporation, and the attraction of the sun and moon. It has been observed, that the current has a tendency towards the west. During Captain Parry's voyage to the polar regions, he noticed that the ice, large and small, had at sea a slow but sure motion towards the west, and that this motion was kept up against strong breezes from the west. It is found that the waters of the ocean are higher upon the eastern than upon the western coasts. It is said that the waters of the Red Sea maintain a constant elevation of four or five fathoms above the neighboring waters of the Mediterranean, at all times of the tide; and that in the Gulf of Mexico and the Caribbean Sea, the surface is higher

than the surface of the Pacific Ocean on the western coast of America. The ordinary velocity of the tide is calculated to be about one mile and a half per hour, though in some countries near the shore it runs at the rate of from two to three hundred miles per hour. The tide appears to extend to no great depth below the surface, and its great force is only felt near a coast. It is not unusual to see currents running close by each other in different directions. The highest tides in the world are said to be in Bristol Channel, England; and in the Basin of Mines, in the Bay of Fundy, on the coast of Nova Scotia: at the former place it rises and falls forty-two feet, and at the latter place sixty feet. At the late meeting of the British Association, an important paper was read by the Rev. Dr. Scoresby, whose name and fame as a mariner and scientific observer are so well known. In this paper Dr. Scoresby gave a description of a storm which he had witnessed on the Atlantic, and stated that the result of his observations on that occasion was, that he had discovered that the height

of the waves from the trough to the crest was forty-three feet, and that their average velocity was thirty-three and a fraction miles per hour. This, it was stated, confirmed the observations made on the velocity of the waves reported to the Association in 1845, by Mr. Scott Russell, who set down their velocity at from thirty to thirty-one miles per hour.

It is difficult to conceive of the immense force which is exerted by the waves of the sea, when driven on by a strong wind. How feeble are the strongest works of man when opposed to the fury of the mighty deep! At the last meeting of the British Association, Thomas Stephenson, civil engineer, gave the result of his observations on the force of the waves, made by means of the marine dynameter. The greatest result registered in the Atlantic Ocean, was at Skerrymore light-house, during a western gale on the 29th of March, 1845, when the force was 6083 lbs., or three tons per square foot. The greatest result registered in the German Ocean was 4013 lbs., or about one and a half tons per square foot. On the

30th of November, 1827, in a heavy ground-swell after a storm, solid water rose at the Bell Rock light-house, one hundred and six feet above the level of the sea, irrespective of the depth of the trough of the wave. The force then which urges the lower courses of the Bell Rock, must have been nearly three tons per square foot,—a force which, when exerted upon a large extent of surface, becomes almost inconceivably great.

Dr. Franklin, about seventy years ago, introduced to the notice of scientific men the peculiar smoothing action of oil upon rough water. All sailors know that oil tends to calm the billows of the ocean. Small vessels employed in the seal fishery on the coast of Newfoundland, when lying to in a heavy gale of wind, frequently have a cable passed over the bows extending along on the surface of the water sixty or seventy fathoms, to which is attached twenty or thirty seals, that are, the blubber or fat, with the skin attached, which in a great measure destroys the force of the waves.

All the water which the rivers supply to

the sea, is drawn from the ocean by evaporation, and raised imperceptibly into the air, whence it descends in fertilizing showers to water the thirsty earth, and give life to vegetable nature. The change of temperature is less frequent in the ocean than in the atmosphere; the temperature of the sea is about eighty-six degrees. In high latitudes, the sea has been found to be colder in the southern than in the northern hemisphere, and the ice is said to extend farther from the south than from the north pole.

At the Scientific Convention held in the United States in 1851, Captain Wilkes, late commander of the United States Exploring Expedition, gave the following as the result of his observations. He said he preferred to start from well-known landmarks, adverting to the theories and hypotheses in relation to winds and temperature, of those distinguished men, Hadley and Halley. These theories had been proposed after several centuries of experience, and have been since generally received. Franklin laid it down as a postulate, that the winds first felt came from the point from which

they appear to blow. Captain Wilkes exhibited a chart, showing the areas of temperature of the ocean from 75° to 96° Fahrenheit, which demonstrated that a belt of hot water surrounds the globe. These results were based upon the observations of the Exploring Expedition.

Admitting that a large portion of heat is constantly generated from this remarkable belt, it will account for the heat we find in the tropical zone; and this is constantly going on at night as well as during the day. It will readily be perceived, that the belt must cause an immense evaporation, and evolve great heat. The large mass of rarefied air thus engendered, must be supplied by air rushing in from the poles on both sides, which fully accounted for the lower currents; Captain Wilkes could not admit that the heated air that rises, goes back to the poles. There were no facts to prove it, and the air soon lost its temperature in the higher regions. He showed, that in the evaporation from a large surface generating heat, cold air rushes in naturally, as into a heated room. He was not prepared to say

how high, or at what contact with the air, this was effected; but believed that it is effected, and that it could be proved that it does occur.

The proportion of heated water is greater in the northern than in southern latitudes, and the trade-winds of the South Pacific are found more irregular than at any other point. The south-east trades of the Atlantic and the north-east trades of the Pacific Captain W. had found the most regular. Now, this belt of heated water was the great cause of these winds; but there were anomalies in the variableness of the trades, which he ascribed to the immediate action of the sun, evident also in the diurnal variation of their strength, after passing the zenith and nadir points; and this effect is just sufficient to account for the anomalies, but no more. Captain W. went on to prove that the south-east trades, particularly in the Atlantic, occur somewhat similar to the north-east trades in the Pacific. He called attention to another phenomenon; namely, the regular evaporation and moisture, or deposition, that is constantly occurring.

From such a vast area of water, a vast evaporation must necessarily be going on; but we find winds blowing from the same direction both wet and dry. In different countries there is a dry coast and a wet coast; so that the hypothesis of moisture being borne by wind from one part of the globe to another Captain W. could not admit. He did not believe such clumsy water-carriers would be employed by an all-wise Being, when the moisture can be so easily conveyed in other ways, and even propagate itself against the currents of air. He adduced a number of instances in proof of this assertion; and detailed a number of curious facts, resulting in the conviction that the moisture, on rising to the higher regions, in part loses the velocity of the earth, and is thus in effect transported westwardly by the earth's passing under or away from it, which shows the reasons why the easterly sides of the continents should be subjected to a greater quantity of rain than the western sides, from the deposition produced by encountering different temperatures over the land first taking place on

that side, and that in consequence the western continent received its supplies from the Atlantic, while the eastern was supplied from the great caldron of the Pacific.

Various navigators, for years, endeavored to ascertain the depth of the ocean; but until recently, had arrived at no satisfactory results. In 1840 the sea was sounded by lead and line, in latitude 57° south, and 85° 7′ west longitude from Paris, by the officers of the French ship, Venus, during a voyage of discovery, at a depth of three thousand four hundred and seventy yards, or nearly two miles. No bottom was found, the weather was very serene, and the hauling-in of the lead took sixty sailors upwards of two hours. In another place in the Pacific Ocean, no bottom was found at the depth of four thousand one hundred and forty yards. During Captain Ross's "Antarctic Expedition," soundings were struck by the plummet at a depth of two thousand six hundred and seventy-seven fathoms; in another place, the line was veered out more than four thousand fathoms; and yet, with all this scope, no bottom could be found.

Captains Scoresby and Parry found the basin of the Polar seas very deep, but unequal. Scoresby did not touch bottom at the seventy-sixth degree of north latitude, with a sounding-line of seven thousand two hundred feet in length. Captain Charles H. Davis, United States navy, in 1848, sounded at a depth of seven thousand eight hundred feet, about two hundred and fifty miles south of Nantucket; and Lieutenant G. Bache, thirteen thousand feet, in 34° north latitude. Thermometrical soundings were taken by Lieutenant R. Batch, off Cape Hatteras, giving a depth of three thousand fathoms, or nineteen thousand eight hundred feet, without reaching bottom.

Lieutenant Walsh, United States navy, under the direction of Lieutenant M. F. Maury, director of the Observatory at Washington, executed the following sounding:—On the fifteenth of November, 1849, cast off the Bermudas, 31° 50′ north latitude, and 58° 43′ 25″ west longitude from Greenwich, in the immediate neighborhood of the position assigned to the rocks called the False Bermudas, the weather being calm

and beautiful, the lead was sunk to the depth of five thousand seven hundred fathoms, or thirty-four thousand two hundred feet, without reaching bottom. A still greater depth would have been reached but for the breaking of the line. This is the greatest depth ever ascertained, and reveals to us some of the wonderful abysses of the mighty deep.

It is found that in the neighborhood of the continents the seas are often shallow; thus the Baltic sea has a depth of only one hundred and twenty feet between the coasts of Germany and those of Sweden. The Adriatic, between Venice and Trieste, has a depth of only one hundred and thirty feet. Between France and England, the greatest depth does not exceed three hundred feet, while south-west of Ireland, it suddenly sinks to two thousand feet. The western basin of the Mediterranean appears to be very deep. In the narrowest parts of the Straits of Gibraltar, it is not more than one thousand feet in depth. A little farther towards the east, the depth falls to three thousand feet. On the north-west of Sardinia,

bottom has not been found at the depth of nearly five thousand feet. West of the Cape of Good Hope, sixteen thousand feet have been found, and the plummet has not found bottom at twenty-seven thousand feet west of St. Helena. Doctor Young, relying upon the theory of the tides, considered himself justified in assigning about fifteen thousand feet to the Atlantic, and about twenty thousand to the Pacific.

By virtue of an act of Congress, authorizing the vessels of the United States navy to co-operate with Lieutenant Maury in procuring materials for his investigations into the phenomena of the great deep, a circular letter was, with the sanction of the Secretary of the Navy, issued by the Chief of the Bureau of Ordnance and Hydrography, requiring the commanders of the United States navy to get a deep sea-sounding whenever calm, in whatever part of the ocean. The *Albany*, Captain Platt, has run a line of deep sea-soundings across the Gulf of Mexico, from Tampico to the Straits of Florida. The basin which holds the waters of this Gulf, has been ascer-

tained to be about a mile deep, and the Gulf Stream in the Florida Pass about three thousand feet in depth. The *John Adams*, Captain Barron, has also, in some measure, ascertained the shape of the great Atlantic basin between Virginia and the Island of Madeira, showing it to be about five miles and a half deep. Thus the greatest known sea-depth, added to the elevation of the highest mountain on our globe, gives us the thickness of the layer of our world. Captain Barron says, in his letter to Commodore Warrington, dated Madeira, May 29, 1851:—

"*May* 3. Latitude 33° 50′ north, longitude 52° 34′ west; temperature of the air, sixty-four degrees; water, sixty-five degrees; had a fair "up and down" sound with two thousand six hundred fathoms of line. Time of running out, one hour twenty-three minutes and ten seconds; one thirty-two pound shot on the line.

"*May* 9. Latitude, 32°; longitude, 44° 47′ west; temperature of the air, sixty-six degrees; water, sixty-eight degrees. Got bottom with five thousand five hundred fathoms of line out. Time of running out,

two hours forty-four minutes and twenty-eight seconds. Drift of ship, three miles. Lost two thirty-two pound shot, and five thousand five hundred fathoms of line.

"*May* 10. Latitude 31° 1′ north, longitude 44° 31′ west; temperature of the air, sixty-eight degrees; water, sixty-eight degrees. Got bottom with two thousand three hundred fathoms of line out. Time of running out, one hour four minutes and thirty-five seconds.

"*May* 17. Peak of Pico, bearing north eighteen degrees east, distant twenty-four miles; found bottom with six hundred and seventy fathoms of line. Time of running out, twelve minutes and four seconds.

"*May* 21. Latitude 35° 07′ north, longitude 25° 43′ west; temperature of the air, sixty-five degrees; water, forty-six degrees; one thousand and forty fathoms found bottom. Time running out, nineteen minutes and fifty-eight seconds. Made frequent other casts; but in consequence of the swell and motion, and large drift of the ship, without any satisfactory results."

Science is indebted to the United States

for the above valuable and interesting physical discoveries, which, for centuries, have commanded the attention and occupied the thoughts of eminent philosophers.

It is said that the Banks of Newfoundland extend to between sixty and seventy miles of the western coast of Ireland, at an average depth of eight hundred feet, upon which it has been proposed to extend a line of telegraph from the Old to the New World. The cost of such an undertaking has been estimated at three millions of dollars.

CHAPTER III.

BITTERISH SALTNESS OF THE SEA—ANALYSIS OF SEA-WATER—SALTNESS OF THE SEA—COLORS OF THE WATERS OF THE OCEAN—PHOSPHORESCENCE OF THE SEA—LIGHTS SEEN ON THE WATER.

That peculiar bitterish saltness which characterizes sea-water, has engaged the attention of the naturalists of every age. Some have attributed it to one cause, and others to another. It is supposed, however, to originate from the putrefaction of those vegetable and animal substances which are

known to exist in sea-water. This bitterness does not appear to reach beyond a certain depth. A pint of sea-water has been analyzed, and found to contain two hundred and sixteen grains and a half, something less than half an ounce, of common salt, eighteen grains and one-third of Epsom salts, eleven grains and a quarter of sulphate of lime, and other substances. The water of the Atlantic Ocean contains, in five hundred grains,—

Pure matter of water	478.420	grains.
Chloride of sodium (common salt)	13.3	"
Sulphate of soda	2.33	"
Chloride of calcium	0.995	"
Chloride of magnesium	4.955	"

The salt of the great deep, which is like that in common use, (chloride of sodium, or muriate of soda,) may be procured by evaporation, either by the action of the sun or by boiling. In warm countries salt is obtained by allowing the sea to overflow fields, where it is left exposed to the influence of the sun. Pan salt is obtained by boiling sea-water in an iron pan. The greater part of the salt manufactured in the

United States is obtained by boiling the brine taken from salt springs in the interior of New-York, Virginia, and other States. The salt manufactured in Massachusetts is obtained from sea-water.

Salt is found in most countries in a solid state, in which cases it is termed rock salt. It is said that the salt mines near Cracow, in Poland, contain more salt than would supply the wants of the whole world for thousands of years. The greater part of salt, however, that is used, is obtained from sea-water. It is said the saltness of the sea is less towards the poles than near the tropics. Bodies floating upon the sea are more buoyant than in fresh water, because the sea has a greater specific gravity, that is, salt-water is heavier than fresh water. The saltness of the sea appears to have been co-eval with the creation of the world, and is a wise provision of the Almighty, that the great world of waters, occupying more than two-thirds of the globe, should be thus salted for its own preservation, and for the existence of its inhabitants. From repeated experiments, however, it has been ascertained that the

present degree of saltness is not sufficient alone to preserve the waters of the mighty deep: hence the "troubled sea is never at rest." If the sea were salt enough to render agitation impossible, the density of the waters would be increased to such an extent as almost to prevent navigation, besides which, the amount of vapors would be so lessened as to retard the growth of vegetation. On the other hand, if the sea were deprived of its saltness, and its purity were to be preserved by commotion alone, such would be the agitation, that no vessel could cross the mighty deep, and as a consequence, all commerce would be at an end; such would also be the increase of exhalation from such an immense body of fresh water, as to produce a flood on the land.

The water in the ocean is of a dark bluish green color, which is said to arise from the same cause as the blue tint of the sky. The color of the sky is owing to the rays of light passing through vapor in the atmosphere; and the rays of blue light being the most refrangible, pass through the water in greater quantity, undergoing a great refrac-

tion on account of passing through such a mass of water. The color of the sea near the shore is generally green, but this is owing to the nearness of the bottom, and other local causes. Near the shore in some countries the sea is beautifully transparent. Objects can be distinguished lying on the bottom at a great depth. Sailing up Bristol Channel (England) some years ago, I observed that large spots of green, blue, red, yellow, brown, and almost every variety of color covered the surface of the water. Remarking this to the captain, he said he never saw the water assume such a singular appearance before. These colors were produced probably by swarms of marine insects, mixed up with earthy substances, floating in the water at the time. Various causes are assigned for the discoloration of the oceanic waters; but that which generally contributes to make the different colors, is the hue of the rocks of which the bottom is composed, and the animal and vegetable matter near or upon the surface.

All who frequent the sea are familiar with the sparkling or phosphorescence of its

waters. I have frequently in the night dipped a rope overboard, which came up like a string of the most brilliant gems. One of the grandest displays I ever saw of this phenomenon was near the Western Islands, when the whole surface of the sea appeared as if emitting flashes of lightning. It was indeed a magnificent scene, to view the waves rolling their fiery crests all around us. Some marine insects have the power of emitting light when irritated. It is said that the night-shining nereis emits a light of great brilliancy, as do several kinds of mollusca. Some of these minute animals attach themselves to the scales of fishes, and thus frequently render them exceedingly luminous. The *cancer fulgens*, discovered by Sir Joseph Banks, is enabled to illuminate its whole body, and to emit vivid flashes of light. Many of the medusæ also exhibit powerful phosphorescence. These phosphorescent animalculæ are exceedingly minute, several thousands being found in a tea-cup of sea-water. They float near the surface, and when disturbed, they give out scintillations, often leaving a train of light

behind them. By microscopic examination it has been discovered that these minute beings contain a fluid which, when squeezed out, leaves a line of light upon the surface of the water. I was spending an evening at the house of Mr. John Butler, at Port-de-Grave, in the Island of Newfoundland, in the summer of 1841, when Mr. Butler observed, "We shall have a gale of wind from the north-east." As there was no appearance of it at the time, I asked him how he knew? He said, "I saw the light." I inquired, "What light?" Upon which, he informed me, that previous to a gale of wind from the north-east, they always saw a light moving about on the surface of the water. I immediately went out of the house and saw it apparently about five miles distant, in the direction of Kelly's Island. It was a pale light, larger than that seen from a lantern. It was moving very slowly to the westward, on the surface of the water. About a week after this I saw it again, when I remarked to Mr. Butler, that we should have a north-easter. In about ten minutes my prognostication was verified by

the whistling of the gale around the house. William Butler informed me that he had once seen it approach very near the shore, and suddenly burst out into a mass of awful and most brilliant light. He described it as being about the size of a dwelling house.

It is conjectured by some that the lights seen on the surface of the water are caused by an innumerable multitude of small luminous insects sporting in or over the water. If this were the cause of the light I have described, these minute creatures must (like the larger animals) have a presentiment of the change of weather, for the light always precedes a gale of north-east wind. It has been observed by men in all ages, that previous to a change of weather, birds and animals are in some degree affected, and assume various changes and motions. But if this light were produced by insects, it is strange that they should always be seen in the one place, viz.: between Port-de-Grave and Kelley's Island. The more we look at the great arcana of nature the more are we astonished at its mysterious operations. It is true the taper of science has lit up many

a mystery of the age of darkness and superstition; but alas! how little do we know of the great temple of nature.

The luminous appearance of the sea has been explained by a diversity of causes. Some have ascribed it to fish-spawn and animalculæ connected with the oceanic salts,—muriate of soda, and sulphate of magnesia; others to putrefaction and friction: but the most probable cause of the phosphorescence of the sea is supposed to be owing to that grand agent in all the operations of nature, electricity.

CHAPTER IV.

GEOLOGICAL AGENCY OF THE SEA—CORAL INSECTS—DIMINUTION OF THE OCEAN—ICEBERGS.

The geological agency of the sea is to be seen in every country; in some places extending the line of coast, and in others encroaching upon the land. In the reign of Henry I., of England, the sea converted the estates of Earl Goodwin, in Kent, into that celebrated sand-bank which still bears his

name; and large tracts of land have recently been reclaimed in England, which had formerly been overflowed by the sea.

The detritus brought down by the river Maranon, is carried forward by the great force of that stream until checked and turned by the ocean current, which carries it to the coast of South America, and renders the water in its vicinity so shallow, that it is dangerous for vessels to approach; the only harbors on the coast are the mouths of rivers. The river Mississippi, falling into an almost tideless sea, has, during floods, carried to the ocean an immense number of logs, trunks of trees, etc., where, it is said, they are bound together by a species of cane, filled with mud, forming a belt of uninhabitable country, from fifty to one hundred miles in width. The coast of Holland was subject to a great inundation in 1421, when twenty-two villages were overflowed, the sea forming a large sheet of water, called Bias Bosch. No vestige even of the ruins of these places could ever afterwards be discovered, but a small por-

tion of the new bay thus formed, sometime after was thrown up and became an island. Up to the year 1240, Northstrand was, with the islands Sylt and Förhr, connected with the main-land, and formed a peninsula, measuring eleven geographical miles from north to south, and from six to eight from east to west: in the above-mentioned year a flood-tide passed over it and tore it from the continent. Of this peninsula only three small isles remain at present, and these are continually wasting away. In the time of Tacitus, the present site of the Zuyder Zee was covered with a number of small lakes, situated between Friesland and Holland, but successive floods have swept all the land away and reduced it to the gulf called Zuyder Zee. At Cape May, on the north side of Delaware Bay, in the United States, the encroachments of the sea were shown by observations made consecutively for sixteen years, to average about nine feet a year; and at Sullivan's Island, at the entrance of the harbor of Charleston, in South Carolina, the sea carried away a quarter of a mile of land in three years, ending in

1786. A great part of some of the islands of Massachusetts Bay have been washed away within the last fifty years. At Frenchman's Cove, in Fortune Bay, on the southwest coast of the island of Newfoundland, I have seen sea-beaches, a half a mile from the sea-shore, the intervening space being covered with fir-trees. Some suppose the great banks of Newfoundland were once an island, reduced to their present state by the agency of an earthquake or volcano: others attribute their origin to the great river St. Lawrence.

Facts can be produced to show that the sea-coast has frequently altered, projecting itself into the sea, and that rocks have appeared above the water which were known in former days to have been considerably immersed. These changes have been attributed by some to volcanic action, and by others to the gradual rising of the land by interior heat expanding beneath and forcing the mass above to rise. Topographers and surveyors have discovered that the ocean line of the present day does not correspond with the sea line of ancient times, and that

these changes have been produced by a constant diminution of the waters of the ocean, caused by that slow process at all times going on, by which the substances held in solution in the ocean waters are converted into solids, by means of the coral insect.

Amongst the wonders of the mighty deep, few things have excited greater astonishment than the formation of coral reefs and islands. Geologists at one time supposed that whole islands in the Southern Seas were reared from the bottom of the ocean by the labors of the coral insects. It is now, however, believed that the mass of these islands was upheaved by submarine volcanoes, and that when it approached the surface, it formed a base on which the coral insects commenced the construction of their edifices, some of which are said to be from twenty to thirty feet in thickness. When the coral reaches the edge of the water, pieces of shells, sea-weed, and wood, accumulate upon it, which gradually form a soil. The manner by which these islands acquire earth, vegetable productions, and animal life,

is thus described by James Montgomery, in his beautiful poem, "The Pelican Island:"—

"Nine times the age of man, that coral reef
Had bleach'd beneath the torrid noon, and borne
The thunder of a thousand hurricanes,
Raised by the jealous ocean, to repel
That strange encroachment on his old domain.
His rage was impotent; his wrath fulfill'd
The counsels of eternal Providence,
And 'stablish'd what he strove to overturn:
For every tempest threw fresh wrecks upon it;
Sands from the shoals, exuvia from the deep,
Fragments of shells, dead sloughs, sea-monsters' bones,
Whales stranded in the shallows, hideous weeds
Hurl'd out of darkness by th' uprooting surges;
These, with unutterable relics more,
Heap'd the rough surface, till the various mass,
By Nature's chemistry combined and purged,
Had buried the bare rock in crumbling mold,
Not unproductive, but from time to time
Impregnated with seeds of plants, and rife
With embryo animals, or torpid forms
Of reptiles, shrouded in the clefts of trees,
From distant lands, with branches, foliage, fruit,
Pluck'd up and wafted hither by the flood.
Death's spoils, and life's hid treasures, thus enrich'd
And colonized the soil; no particle
Of meanest substance but in course was turn'd
To solid use or noble ornament.
All seasons were propitious; every wind
From the hot siroc to the wet monsoon,
Temper'd the crude materials: while heaven's dew

Fell on the sterile wilderness as sweetly
As though it were a garden of the Lord,—
Nor fell in vain; each drop had its commission,
And did its duty, known to Him who sent it."

It had long been imagined that coral branches were vegetable substances, but it is now an established fact, that coral is produced by very minute insects, classified by naturalists in the order *vermes zoophyta*. The little busy scientific workmen employed in this species of architecture are so very minute, that it requires a powerful microscope to show even the semblance of some of them, while others can be detected by the naked eye. The sea is composed partly of solid substances, held in solution. Some of these are salt, soda, and lime. From these, it is said, the coral insect selects his materials, separates them, mixes them in proportions, and forms them into solids, in the same medium from which the materials were taken, whence the cause, according to some, of the gradual diminution of the waters of the ocean. The Florida reefs, Antilles, coasts of Mexico, and nearly all Polynesia, are taken from the solid sub-

stances held in solution by the sea. "Let us illustrate," says Mr. Porter, "the formation of shells, coral, etc., and show the diminution of the ocean by this process. Let us box up a certain space in the ocean, say about one thousand pounds of water. Within this space all the varieties of coral insects can perform their work; and all the numerous shell-fish take their place and abstract from the waters the materials for their domicils: when all have finished, let us weigh the water, and we will find it has lost in weight the amount of material required to fabricate each and every style of building, and the waters would not occupy as much space. If transferred to another box, the waters would be found to have been diminished. This, then, is the process by which the waters of the ocean are slowly but certainly diminishing on the earth. *The waters are becoming solids.* But other causes are aiding in this great work, such as the ocean plants, such as kelp, and particularly the Sargasso plant, or gulf weed.*

* This weed is found in immense quantities floating on the surface of the waters in the Gulf of Mexico.

These materials grow either on the surface of the ocean, deriving all their substance from it, or adhere to the coral formations and assist in forming islands. This process of island-forming appears to be uniting in one great mass all the Antilles, the great mass of islands in the Pacific, China with Japan, and finally will unite the whole of the Pacific isles with the continent of Asia, diminishing the ocean by this accumulation of solid, and, in fact, diminishing the waters of the earth by many millions of square miles."

At the recent meeting of the American Association of Naturalists, held in Cincinnati, an interesting communication was made by Professor Agassiz, concerning the reefs and keys of Florida. These, he said, were entirely of coral formation, yet differing from the peculiar coral formations of

Humboldt is of opinion that this weed is produced in large beds, at the bottom of the ocean, and that from these beds it is detached in a ripened state, and collects in large masses on that part of the Atlantic called the Sargasso, or Weedy Sea. Other writers are of opinion that it grows along the sea-coast, and is carried to sea by means of winds and currents.

the Pacific. Parallel with the coast of the mainland, around the southern part of Florida, is a barrier of rock rising in many places above the water, covered with soil and rank vegetation. This is the coral reef, and the islands are called keys. The whole coast of Florida appears to have been formed by a succession of coral reefs.

Mrs. Sigourney describes the coral insect in the following beautiful lines:—

"Toil on! toil on! ye ephemeral train,
Who build in the tossing and treacherous main;
Toil on! for the wisdom of man ye mock,
With your sand-base structures and domes of rock;
Your columns the fathomless fountains lave,
And your arches spring up to the crested wave;
Ye're a puny race, thus to boldly rear
A fabric so vast in a realm so drear.

"Ye bind the deep with your secret zone,
The ocean is seal'd, and the surge a stone;
Fresh wreaths from the coral pavements spring,
Like the terraced pride of Assyria's king;
The turf looks green where the breakers roll'd,
O'er the whirlpool ripens the rind of gold;
The sea-snatch'd isle is the home of men,
And mountains exult where the wave hath been.

"But why do ye plant, 'neath the billows dark,
The wrecking reef for the gallant bark?

There are snares enough on the tented field,
'Mid the blossom'd sweets that the valleys yield;
There are serpents to coil, ere the flowers are up;
There 's a poison drop in man's purest cup;
There are foes that watch for his cradle breath,
And why need ye sow the floods with death?

"With moldering bones the deeps are white,
From the ice-clad pole to the tropics bright;—
The mermaid hath twisted her fingers cold
With the mesh of the sea-boys' curls of gold;
And the gods of ocean have frown'd to see
The mariner's bed in their halls of glee:
Hath earth no graves, that ye thus must spread
The boundless sea for the thronging dead?

"Ye build,—ye build,—but ye enter not in,
Like the tribes whom the desert devour'd in their sin;
From the land of promise ye fade and die,
Ere its verdure gleams forth on your weary eye;
As the kings of the cloud-crown'd pyramid
Their noteless bones in oblivion hid;
Ye slumber unmark'd 'mid the desolate main,
While the wonder and pride of your works remain."

Among the varied phenomena which the mighty deep presents are the islands of ice, or icebergs, appearing like crystal castles, with their high and glittering pinnacles, towering in solitary grandeur, and from which the most beautiful colors are sometimes reflected by the rays of the sun fall-

ing on them.* Some of these icebergs are several hundred feet in altitude above the level of the sea, though this is only one-eighth of their height, as it is calculated that seven-eighths are below the surface. I saw one of these immense masses of ice explode some years ago on the northern coast of Newfoundland. It made a tremendous noise, like the rumbling of heavy thunder. Several large streams of water were flowing over it for some time before it burst. One side of it was covered with a quantity of earth and small stones. I have been informed by several persons that they have seen large trees embedded in them, which appeared as if torn from the earth by some violent force. It is said many of them contain rocks and earth frequently exceeding fifty thousand tons. They are, no doubt, agents in the production of many shoals, as wherever they ground and are dissolved, the earth and stones must sink to the bottom, thereby diminishing the depth of the water. These islands of ice are supposed to be masses detached by the action of the waves from

* See Frontispiece.

the vast glaciers descending into valleys terminating in the sea, such as are known to abound in Greenland, Spitzbergen, and other high northern latitudes. During Captain Ross's Arctic expedition, he discovered land from 9,000 to 20,000 feet in height, perfectly covered with eternal snow, and the glaciers descending from the mountain summit projected many miles into the ocean, and presented a perpendicular face of lofty cliffs. These icy breakwaters are no doubt undermined and excavated by the waves, and in proportion as the excavations are enlarged, and the snow and ice accumulate above and become heavier, immense masses fall into the sea, whence probably come the icebergs which appear in the spring along the coast of Labrador, and the eastern and northern shores of Newfoundland, where some have been seen miles in length. They are looked upon as dreadful engines of destruction by all mariners. Many vessels come in contact with them, when sometimes vessels and crews perish together.

CHAPTER V.

INHABITANTS OF THE MIGHTY DEEP—WHALE AND SHARK—CURIOUS ACCOUNT OF A SHARK—PORTUGUESE MEN-OF-WAR—STORMY PETREL—A COPPER-MINE UNDER THE SEA.

THE wide expanse of ocean teems with life; a population made up of beings of various habits and of various forms, range its gloomy deeps. Here we behold the whale, (*balæna,*) the monarch of the deep, plowing the waves, and lashing, as it were, the ocean into storm. Here, too, the shark (*squalus*) revels in his ocean home. I saw a large shark, (*squalus maximus,*) which was captured in the summer of 1843, in a salmon-net, on the northern coast of Newfoundland. This monster of the deep measured twenty-seven feet in length, and twenty feet in circumference; the tail-fin was seven feet broad. On opening the stomach, nothing was found but the remains of *fuci*, or *algæ:* their food is said to consist chiefly of sea-plants. The quantity of liver taken from this animal, filled eleven pork-barrels, the

product of which was one hundred and twenty-two gallons of oil.

In the United Service Museum, in London, there are many interesting things to be seen; all of which, together with the funds to sustain it, are furnished by the officers of the army and navy.

Among rare things there collected, are a shark's jaws, with six rows of teeth, and attached to them is an account of how, where, when, and under what circumstances, the fish was caught; the substance of which is as follows:—

"In the war of 1812, numerous British cruisers were on the look-out for American vessels all over the world. One day an English corvette sailed into Port-Royal harbor, Jamaica, with a prize she had taken on suspicion of being a Yankee; but as there were no papers on board, and no flag but the English, she could not be convicted. She was therefore left in the harbor with a prize-crew on board, and the cruiser sailed out. Two days after leaving Jamaica, she fell in with another British cruiser on the same station, and came near enough for the

captain of the corvette to board the other. He was met on the quarter-deck by the other captain, and they compared notes. The captain of the corvette said he had taken a prize, but was afraid he could not convict her, as there were no papers on board. 'What is her name?' asked the other. 'The Nancy.' 'O, I know her. The Nancy, Captain Brush; supercargo, John Williams.' 'Why, where did you see her? —that is the captain's name, and also the supercargo's.' 'Well, walk aft; I will show you a shark we caught this morning, and we are drying a part of the contents of his stomach on the poop.'

"They walked aft, and the captain handed his visitor the ship's papers, which Captain Brush had thrown overboard on being chased, and the shark had picked them up for his breakfast. The two cruisers, on making this discovery, made sail for Port-Royal together, where they arrived. The Nancy was convicted, by the papers found in the fish, and the two British cruisers shared equally in the prize."

The sea-shore exhibits to our view the

sea-urchin, (*echinidea,*) the muscle, (*anadonta,*) the crab, (*cancer,*) the lobster, (*articus marinus,*) and thousands of other animals. Few persons ever cross the mighty deep without beholding fleets of creatures sporting and frisking on its bosom. I remember seeing, some years ago, an immense mass of small creatures sailing along on the surface of the water: the vessel was nearly a whole day passing through them: the sailors caught several, which they called the Portuguese men-of-war, (*physalia.*) I was warned not to touch them, as they possessed the singular property of stinging. I have since consulted its natural history, and find that such is the case. Troops of larger animals are also seen gamboling on the crested waves.

"Now to the north from burning Afric's shore,
A troop of porpoises their course explore;
In curling wreaths they gambol on the tide—
Now bound aloft, now down the billow glide;
Their tracks awhile the hoary waves retain,
That burn in sparkling trails along the main:
These fleetest coursers of the finny race,
When threat'ning clouds th' ethereal vault deface,
Their route to leeward still sagacious form,
To shun the fury of the approaching storm."

Far away from land we see the stormy petrel, (*procellariæ pelagica.*) I have for hours, in the midst of the Atlantic Ocean, watched the evolutions of the stormy petrel, skimming along, sometimes on the tops of, and sometimes between, the mountain waves. It seemed to revel in the storm, and never appeared so fresh and lively as when braving the billows and the tempest. The appearance of the petrel awakens the superstition of the sailor,—most sailors believing the appearance of Mother Carey's chicken to be the harbinger of a storm. Nobody, says the sailor, can tell anything about them, where they come from, or how they breed; they are night and day in the middle of the ocean. It is a well-known fact, however, that the petrels breed on rocky shores, making their nests in the holes and cavities of the rocks, and in the banks along the sea-shore. It is said they return to feed their young only during the night, with an oily food, disgorged from their stomachs. Great numbers of these birds breed on the northern coast of Newfoundland. I saw fourteen young ones, which a

person brought from a small island; but they communicated such a rank, disagreeable smell, that he was obliged to set them free. Barry Cornwall describes the petrel in the following lines:—

"Up and down! up and down!
From the base of the wave to the billow's crown,
And amidst the flashing and feathery foam
The stormy petrel finds a home—
A home, if such a place may be,
For her who lives on the wide, wide sea,
On the craggy ice, in the frozen air;
And only seeketh her rocky lair
To warm her young, and to teach them spring
At once o'er the waves on their stormy wing!

"O'er the deep! o'er the deep!
Where the whale, and the shark, and the sword-fish sleep,
Outflying the blast and the driving rain,
The petrel telleth her tale—in vain;
For the mariner curseth the warning bird
Who bringeth him news of the storms unheard.
Ah! thus does the prophet, of good or ill,
Meet hate from the creatures he serveth still;
Yet *he* never falters:—So, petrel, spring
Once more o'er the waves on thy stormy wing."

Captain Flinders says, that when on a voyage he saw a flock of stormy petrels, which was from fifty to eighty yards deep,

and three hundred yards or more broad: they continued to pass, without intermission, for a full hour and a half. It has been calculated that this flock of petrels contained no less than one hundred and fifty-one millions and a half.

The following description of a visit to Bottallack copper-mine, in England, is from a work recently published, entitled, "Rambles beyond Railroads." In complete mining equipment, with candles stuck by lumps of clay to their felt hats, the travelers have painfully descended by perpendicular ladders, and along dripping-wet rock passages, fathoms down, into pitchy darkness. The miner who guides them, calls a *halt;* and their exact position, with reference to the surface of the "terraqueous globe," is thus described:—

"We are now four hundred yards out, *under the bottom of the sea,* and twenty fathoms, or a hundred and twenty feet, below the sea level. Coast-trade vessels are sailing over our heads. Two hundred and forty feet beneath us men are at work, and there are galleries deeper yet even below

that. The extraordinary position down the face of the cliff, of the engines and other works on the surface at Bottallack, is now explained. The mine is not excavated like other mines, under the land, but under the sea. Having communicated these particulars, the miner next tells us to keep strict silence and listen. We obey him, sitting speechless and motionless. If the reader could only have beheld us now, dressed in our copper-colored garments, huddled close together in a mere cleft of subterranean rock, with a flame burning on our heads, and darkness enveloping our limbs, he must certainly have imagined, without any violent stretch of fancy, that he was looking down upon a conclave of gnomes.

"After listening for a few moments, a distant unearthly noise becomes faintly audible—a long, low, mysterious moaning, that never changes, that is *felt* on the ear as well as *heard* by it—a sound that might proceed from some incalculable distance, from some far, invisible height—a sound unlike anything that is heard on the upper ground, in the free air of heaven—a sound so sublime-

ly mournful, and still so ghostly and impressive, when listened to in the subterranean recesses of the earth, that we continue instinctively to hold our peace, as if enchanted by it, and think not of communicating to each other the strange feeling and astonishment which it has inspired in us from the first.

"At last the miner speaks again, and tells us that what we hear is the sound of the surf lashing the rocks a hundred and twenty feet above us, and of the waves that are breaking on the beach beyond. The tide is now at the flow, and the sea is in no extraordinary state of agitation; so the sound is low and distant just at this period. But when storms are at their height; when the ocean hurls mountain after mountain of water on the cliffs, then the noise is terrific; the roaring heard down here in the mine is so inexpressibly fierce and awful, that the boldest men at work are afraid to continue their labor. All ascend to the surface to breathe the upper air and stand on the firm earth—dreading, though no catastrophe has ever happened yet, that the sea will break

in on them if they remain in the cavern below.

"Hearing this, we get up to look at the rock above us. We are able to stand upright in the position we now occupy; and, flaring our candles hither and thither in the darkness, can see the bright, pure copper, streaking the gallery in every direction. Lumps of ore of the most lustrous green color, traversed by a natural network of thin red veins of iron, appear here and there in large irregular patches, over which water is dripping slowly and incessantly in certain places. This is the salt water percolating through invisible crannies in the rock. On stormy days it spurts out furiously in thin continuous streams. Just over our heads we observe a wooden plug of the thickness of a man's leg; there is a hole here, and the plug is all that we have to keep out the sea.

"Immense wealth of metal is contained in the roof of this gallery, throughout its whole length; but it remains, and will always remain, untouched; the miners dare not take it, for it is part, and a great part,

of the rock which forms their only protection against the sea, and which has been so far worked away here that its thickness is limited to an average of three feet only between the water and the gallery in which we now stand. No one knows what might be the consequence of another day's labor with the pickax on any part of it."

CHAPTER VI.

SHOALS OF THE OCEAN—SAILOR-BOY'S GRAVE—NUMBER OF DEATHS BY DROWNING—NUMBER OF SHIPS LOST—MARINE POPULATION OF THE WORLD, AND REMARKS ON IT—THE DEEP THE LARGEST OF CEMETERIES—OYSTER FISHERY—SHIP BUILDING—STEAMERS—BRITISH AND AMERICAN TONNAGE.

The ocean is beset with innumerable rocks and shoals, some of which, no doubt, are yet undiscovered. Ship-masters have frequently reported having seen rocks in the ocean about midway between America and Europe: these statements, however, have been somewhat discredited. If some of the undiscovered shoals could become animated

and vocal, they would sing in mournful strains—

"Of the ship that sank in the reefy surge
And left her fate to the sea-bird's dirge—
Of the lover that sail'd to meet his bride,
And his story left to the secret tide—
Of the father that went on the trustless main,
And never was met by his child again—
And the hidden things which the waves conceal,
And the sea-bird's song alone can reveal."

Poetry has decked the grave of the sailor-boy with pearls, and shaded it with coral branches, whilst spirit-forms have been created to hover around it with soft airs, and to sing, and sail, and sleep, in the "breast of the billow."

But there is something more than poetry in dying at sea—amidst the raging of a tempest to be washed overboard, in the appalling darkness of the night, to grapple with death on the foaming billow, to listen to the ocean's roar, and tempest's moan, singing our funeral dirge. May we never know the agony of dying under such circumstances, far away from home and friends!

"When death draws near, then mariners, aghast,
Look back with terror on their actions past;

Their courage sickens into deep dismay,
Their hearts through fear and anguish melt away;
Nor tears, nor prayers, the tempest can appease;
Now they devote their treasures to the seas;
Unload their shatter'd bark, though richly fraught,
And think the hopes of life are cheaply bought
With gems and gold; but O, the storm so high!
Nor gems, nor gold, the hopes of life can buy."

It is calculated that eleven out of every sixteen deaths among seamen occur by wrecks and drowning, and that to the sin of drunkenness are to be charged six-tenths of the wrecks. If, therefore, *one thousand* ships are lost, *six hundred* are lost in consequence of the intoxication of the masters or men. The number of British seamen is estimated at 300,000, of whom it is computed that 2,500 are annually lost. The marine population of the whole world is 3,500,000; calculating, therefore, the same proportion of loss, the aggregate loss of sailors for the whole world annually, is supposed to be 291,666. In most of the principal cities of the United States, there are Mariners' Churches, Sailors' Homes, Sailors' Orphan Asylums, etc. But in both America and Britain, there are provincial ports in which