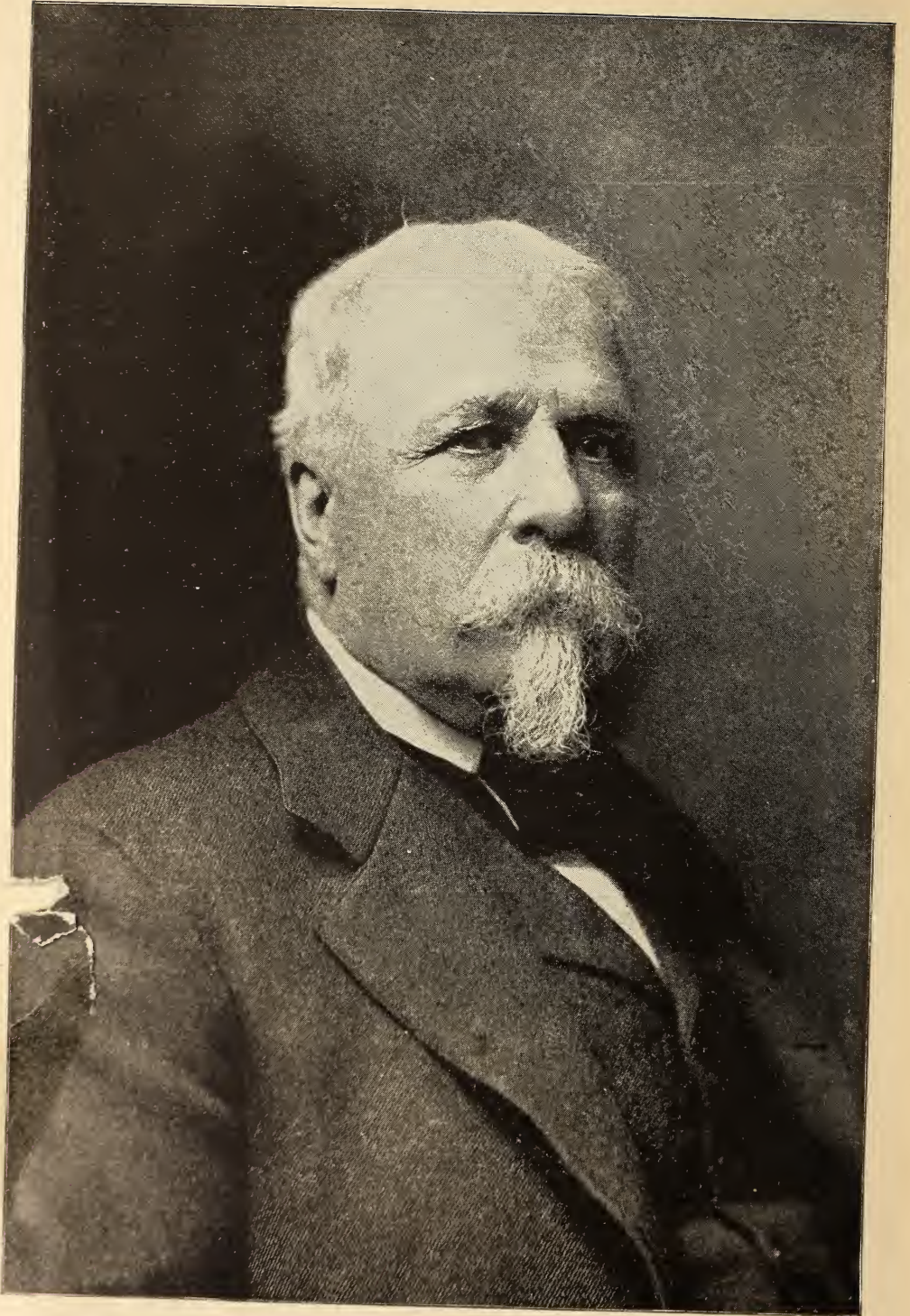






JOSEPHINE, EMPRESS OF FRANCE.



MURAT HALSTEAD, THE AUTHOR.

THE WORLD ON FIRE

INCLUDING

Splendors and Horrors of the Volcanic Eruptions of the Lesser Antilles, together with a Biographical Sketch of Josephine, Empress of the French, the Fair Daughter of Martinique, and Alexander Hamilton, Stalwart Son of Island of Nevis, and Father of the American Constitution.

By MURAT HALSTEAD

Author of "The Story of the Philippines," "Pictorial History of America's New Possessions," "Official History of the War with Spain," "Life and Achievements of Admiral Dewey," "Life and Reign of Queen Victoria," "Galveston: Horrors of a Stricken City," "Life of Wm. McKinley," "Story of Cuba," "Our Country in War," etc., etc.

THE DESTROYING VOLCANOES OF OLD AND THE
NEW CLASSED.

A STRANGE AND AWFUL HISTORY.

SPLENDIDLY ILLUSTRATED WITH MANY VIEWS
IN HALF TONES.

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PROLOGUE

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The experience of our race teaches that we live in a wonderful, beautiful, beneficent and terrible world. It is a rolling splendor, and so far as our kind are competent to comprehend it, an eternal mystery. Ages on ages have unfolded the books of nature and the glories of God, but riding upon our stately home through the universe, and measuring our flight by far off-brilliant, that we find for our purposes "fixed stars" and confidently call them so, we perceive they are steadfast only in their relations to us, for the processions of which we behold the pageantry pursue sightless paths beyond the spheres of the marvels that are masterful, in our guidance. When we study the systems for which thousands of years are as a vapor, that goes as light comes, and are convinced that our majestic planet is an atom, stupendous as it has been revealed to us; and the all-conquering and compelling sun a moon following the wheeling of other vaster suns; and these having infinitely greater suns to lead them.

This earth of ours has been called "the great globe we inherit." We have been assured eye-witnesses that we dwell upon an orb that is as a bubble on a flood that streams through the unknown, giving and receiving light, and subject to magnetic influences, all-abounding and controlling. The profoundest students are persuaded, as they strive for knowledge, that their lives illustrate the fabulous truth that the philosopher announced when he said at the end of his labors of discovery, he had only picked up a few pebbles on the shore of an illimitable sea of knowledge.

Our portion of the revelation of the spectacular dwelling places of our people tells at first that we may not boast independence, for the sov-

ereign sun is clearly our master, the fountain of living light, of the heat that is creative force, and that we may well believe is subordinate to greater powers. Our tremendous earth, of which we are so profoundly conscious, with its wealth of continents and oceans, is of a group of glorious worlds, and these greater and smaller than our inheritance, while the steady blazing suns have their families of planets, and the planets satellites, some with many moons, while we, spinning in the midst, bear with us a lifeless and lonesome moon, as we know life and comprehend companionship. As we are able to group the issues of life and death, the moon is a dead child of the luminous system, a thing of beauty, not a joy forever, but pale and cold, contrasted with the prodigious flaming furnaces of the suns, attracting exhaustless streams of fuel from the regions the comets visit and convey to the consuming stars resources of vitality. Between the sun and moon, we seem to partake of the nature of both. We are not quick as the sun, or dead as the moon. We are of the stars that are glowing factors and differ in glory. The sun is fire for the day. The moon is a lamp to make the shadows of night fainter, and soften dazzling fires. The grandeur of the earth is manifest. It is our house and home made with infinite hands. Our race has but touched the surface of its store of energy, and had visions of its bounty. It has an atmosphere of storms, and a bosom of flame; but the land and the waters abound with our food. The inner fires of the sun are radiated, and we follow the splendid leader, as the fair phantom moon follows us. Near as our pallid attendant is to us, we are not sure whether she is quite calm, but we believe she is cold, and hardly know why she haunts us, but sure we could not spare her gentle rule of the night, misty with stars. The sun is a flame. His fires are visible, for they are the light, and we feel them, for they are of the principle of life. Our earth partakes of the character of sun and moon. Perhaps we once had a work of preparation to accomplish before we could take our spin with the other worlds, and that it was fitted up for man by evolutions, for which in the eternity of the past there was ample time for

soil to accumulate, and food grains and fruit trees to grow, bloom in the spring and ripen in the summer.

The mountains that burn and the storms that rend are signs of the life of our planet. The procession of the seasons turn the tides, according to the constellations that are the universal clocks. The earthquake is a process of progress, science says, and it is written over the face of the earth that there has been shifting of seas and changes of climates, that continents and oceans have shifted places, and the shaking of the ground and the bursting of fires from the deeper deeps, preparing resources for the generations that are to gather the harvests of the Hereafter, richer than golden. The volcanic conditions are not confined to certain lands, but common to all engaged in the wonders yet to be wrought. As the ages go, the fashioning of instruments of investigation of the hitherto unsearchable secrets of the earth permit deeper explorations, and now the earth is to be proved as the air is to be navigated, and the secrets of the fires that boil the waters under the earth added to our education.

The Atlantic Ocean in the tropics is separated from the greater islands of the American Mediterranean—the Caribbean Sea and the Gulf of Mexico—by a chain of smaller groups, of almost incomparable beauty, belonging to Denmark, France and England. They are lofty in their loveliness, like Hayti, and among their attractions have been rugged peaks blackened with ancient fires, whose reputation has been less formidable in the stirring latter years than formerly. Like Vesuvius they have, after long rests, suddenly burst forth with tremendous thunders, and exploded as if infinite stores of dynamite had been ignited. Floods of scalding mud, rivers of lava, rains of ashes darkening land and sea, hail storms of fiery rocks instead of pellets of ice, clouds of swooping flame, cyclones of deadly gases, have annihilated cities and killed of people unnumbered thousands. Here is the most frightful and startling event in the records of the earth.

Two mountains especially have contributed this amazing disaster,

that adds grandeur of sorrow to teachings of wisdom, and it has not a little affected the confidence of the nations in the immortality, under obvious conditions, of the great globe itself.

The marvelous energies of Krakatoa, whose thunders were heard across Indian Ocean, and twenty-five hundred miles away, while the lurid vapor discharged reddened the skies for months, as the mighty waters rolled, have been surpassed in the islands of the Caribs.

Volcanoes are steam holes. The power exerted in eruptions is steam power, unless there is some monstrous magnetism that cannot be measured or named. The tops of live mountains have been blown away with astounding desolation. It does not seem impossible that if the dreadful peaks of Martinique and St. Vincent had been set off at once, their united potentiality might have rent the crust of the earth over the abyss of inconceivable heat, of which both serve as valves of escaping gases from the bottomless pits, and turned the ocean into the inconceivable burning core of the earth, sent our world flying with the other broken worlds, all our beauty at an end, so far as the conditions go that sustain human life, and find hope in other stars. Do we totter upon the verge of possible problems that involve the earth as a habitation of man? Science had just pronounced the muttering mountain, that was the background of the pleasant City of St. Pierre, safe, and the scientists, having at hand means of flight, escaped with their lives, and our war ships sent on errands of charity fled before the lightnings and thunders of Mont Pelee, whose rain of fire and brimstone, glowing rocks and scalding waters, and blazing clouds were made an intolerable assault on land and sea, all swallowed in a whirlpool of scorching and blasting chariots of clouds afire.

MURAT HALSTEAD.

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THE WORLD ON FIRE

CHAPTER I.

INTRODUCTORY.

A GENERAL SURVEY OF THE SUBJECTS TREATED—THE VOLCANOES THAT ARE FAMOUS AND THE ERUPTIONS THAT ARE HISTORICAL—SIDELIGHTS THAT ARE OF INTEREST IN THE GENERAL ILLUMINATION.

In the prehistoric ages there may have been earthquakes and eruptions of volcanoes greater than we have in the records. Geology tells that there were periods when evolutions of the earth as it was were more revolutionary than in the times that are shadowed forth in the traditions. The deeper students of old times tell us that there are beds of lava very far down in the stratification, just as the more recent foundations of the city bear marks of a great fire, of which witnesses still live and are engaged in good works. The portion of the earth that bears the slightest traces in history of internal forces, fires and tremors, is the continent of Africa, but it does not prove that the bursting forth of fiery mountains and the subsoiling of the substance of the earth, when its crust is fractured by fissures formed by internal forces, are unknown in the dark continent.

Perhaps the fundamental fact in earthquakes is that they require a combination of fire and water. The greater quakes have been located on islands and peninsulas. The cities by the seas are those that have suffered most from the paroxysms of the earth. The remarkable case of Lisbon comes first in magnitude of disasters. We have a recent example in our own country, in the city of Charleston. Iceland is en-

tirely volcanic, and the eruption of the Scapta is quoted as that in which there was more matter exploded to the earth's surface than in any other case of volcanic eruption. Mount Hecla has a record carefully kept of the eruptions of a thousand years, during which it has been in tremendous agitation more than a hundred times. Hecla at peace is a beautiful mass of whiteness, formed like a hen's egg, lying on its side, and seen at a distance a few precipices look like pencilmarks on the snow. The eruptions of Hecla have been extremely unfortunate for and fatal to the Icelandic people because they live largely on milk and fish, and the deadly volcano's immense clouds are of dust that blights the grass and poisons cattle, while the fish are destroyed in some of the rivers by streams of lava very alarming, and are frightened from the shaky shores.

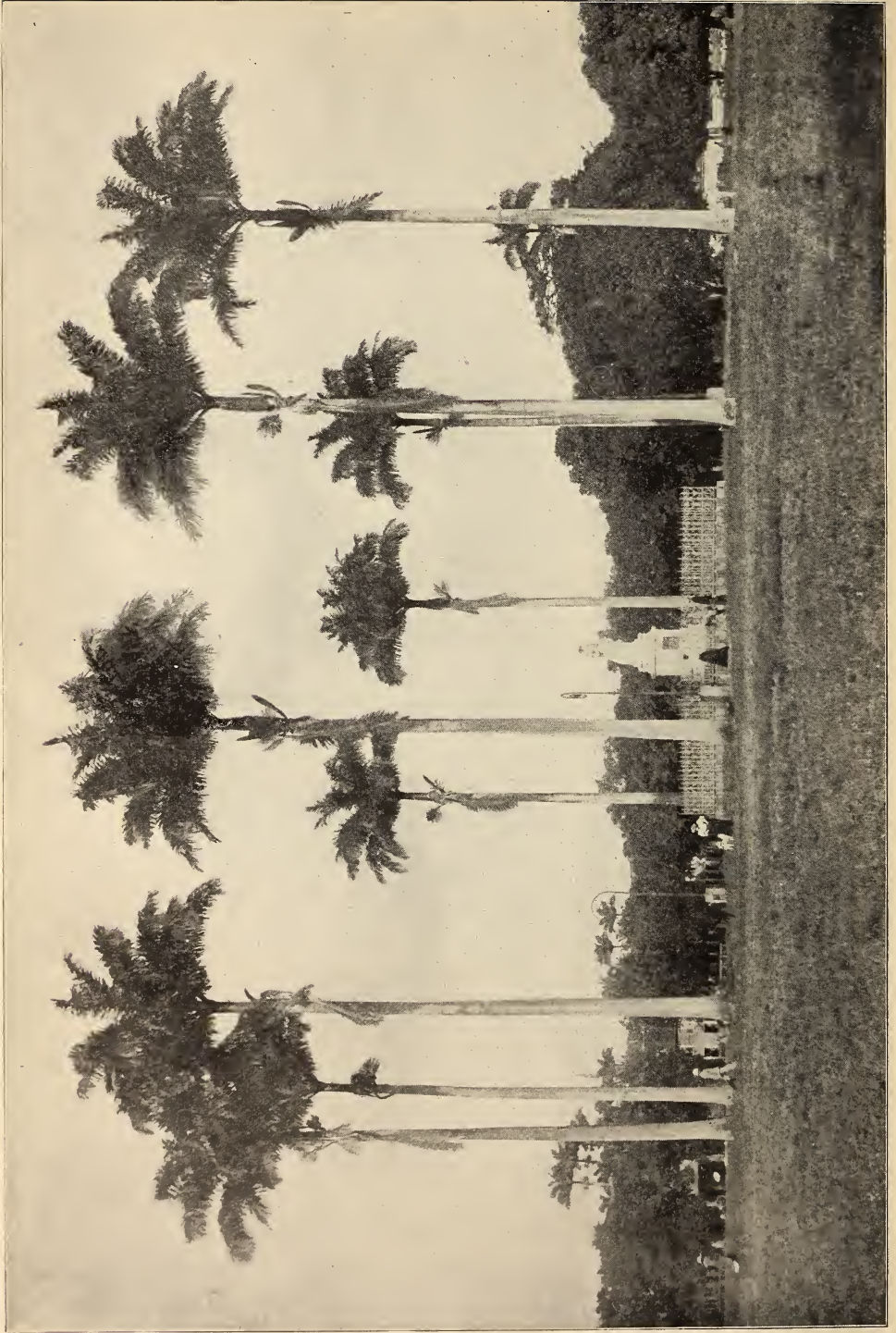
The capital village of Iceland is Reykjavik—the "Smoking Bay." There is a cape that is the "Smoking Nose," and throughout the island there are hot springs, the greater of which are the famous geysers; these, doubtless, the evidence of volcanic action, suppressed for a time, perhaps restrained by the activities of Hecla, whose stupendous beauties are in full view from the geyser grounds across a broad and desolate but grassy valley. There is not in that silent, somber vale, a tree, or house, or sign of life, except in the flight of flocks of ravens. The sands of the seashores are black.

The great volcano of the world that seems to go on from everlasting to everlasting is in the Sandwich Islands, where a lofty and vast crater boils and rages forever, and such floods of lava are discharged from time to time that they force their way through forests that they consume, melting hills by the way, until they are quenched in the sea, wherein they have often tumbled in cataracts of fire, sending clouds of steam to the skies.

It is worthy of remark that the deepest water known, by measurement, in an ocean, is in the Pacific, some leagues east of the Hawaiian group. The greater volcanic eruptions, taking into account the area of



STATUE OF JOSEPHINE, Empress of France. in the Public Square in Fort de France, Martinique
Erected by the People of the Island of Martinique.



STATUE OF JOSEPHINE, Empress of France, in the Public Square in Fort de France, Martinique; Showing also the Majestic Tropical Palms of the Island.

land shaken, are those of the Lisbon earthquake, that of New Madrid, and Krakatoa. The seas are accustomed to be close at hand to furnish the water, to come in contact with the fire and raise the steam power that makes the world tremble. The Mississippi river was, however, equal to the water supply in 1812. The recollection of the New Madrid "quakes," that was handed down from the contemporary generation, related very often to the stoppage of the tall seven day clocks, that were apparently indispensable time-keepers, and the rattling of the rifles in the buckhorn racks, fixed to the wooden walls; also the extreme fright of horses and cattle. The sheep and hogs, the saying was, had not sense enough to be scared at anything they did not see.

The extraordinary energy and destructiveness of the volcanic eruptions in the Caribbean Islands have drawn to them the attention of the world in a degree never before experienced, and there is a historical surprise in the revelation of the number of personages of world-wide reputation and uncommon importance, and of events originating in that quarter that have had influence of fame in all parts of the world, and shaped events with the magic of tropical tempers, combined with the tenacity of the blood of the zone that is the north temperate, and outlasts in effective strength the people of torrid lands.

First we find Christopher Columbus, fascinated by the beauty of the islands, profoundly interested in their people, at a loss for language to express his admiration; and in one of the names that became familiar during his voyages, he was robbed of the honor so hardly won of giving his own name to his own discoveries, striking out Columbus and inserting American. The early European navigators and adventurers thought they found a paradise in each of the islands, and dreamed of marvelous wealth to be gathered, likened the Lesser Antilles to a string of pearls, and discovered on the Atlantic frontier, as it were, of the West Indies, the warlike Caribs, fierce fighters, and of a manlier and more strenuous type than the people of the Greater Antilles, who were a softer race, readily enslaved, and in their weakness speedily perished under the hard-

ships imposed upon them. The Caribs were man-eaters, and made a very stout and ferocious fight. They were wonderfully expert watermen, going about over seas exceptionally stormy, in canoes, and exceedingly skilled as voyagers.

It is one of the stated incidents of the recent desolation of the island of St. Vincent that the last of the Caribs perished in the lava streams, so that there is an end of all the races that Columbus found in the splendid archipelago that he dreamed were the Indies, of whom the Spaniards and Italians had heard in the Asiatic waters where the East and West were lost. With the exception of the Caribs, the original inhabitants of the West Indies were like a race of children, gentle and kindly, living upon the fruits that grew in the forests, and the fish that glittered in the rivers and along the seashores. Their houses were of the leaves of the palm. There were orange and cocoanut trees, so that refreshments were forever abundant, and the soil was rich. There was opulence of food in half a dozen varieties of sweet potatoes. The people were attractive, but were swept away utterly, and the demand for the labor that they could not supply was the African slave trade.

In presenting the surroundings of the volcanoes that recently have wrought such frightful destruction, we find in the Lesser Antilles the birthplace of the Empress Josephine of France, the wife of Napoleon, and the history of her youth in her native island of Martinique was a romance, before she saw her future Empire. There is no more interesting story in fiction than the history of Josephine, and the splendor of her elevation as the wife of Napoleon, crowned with his own hand as Empress of France, has caused neglect, almost forgetfulness, of her attractive childhood in the island now so awfully stricken and desolate.

Horatio, Lord Nelson, the greatest of the British Admirals, was married on the Isle of Nevis, which has also the distinction of being the birthplace of Alexander Hamilton, one of the men of genius in the American revolution, one whose influential public life will be memorable through all time, and who before leaving his native island had indi-

cated the astonishing precocity of his genius by writing a story of a hurricane that devastated his birthplace, while Nelson's glory outshines all the other heroes of the wars on the seas.

It was in the midst of these islands that the great naval battle was fought between the English Admiral Rodney and the French Admiral Grasse, a combat that decided the question of the mastery of the seas by the British as against the French. The forces of the combatants were nearly equal, and the run of luck was with the British.

Lord Nelson was in love several times in the West Indies, before he met the fascinating widow who was one of his fates. He and Rodney, who stands next as the great Admiral most potent for England, were in a constant contention while in the Indies, with their home governments and distinguished subordinate officers. They were of high warlike spirit, but Nelson had the happy fortune of being personally companionable.

The story of Nelson's marriage has seldom been fully related, as given in the history of the Lesser Antilles, and the light on his future career, as a genius for sea fights and undisciplined in domestic affairs, is clear and convincing. He respected his wife, but he loved Lady Hamilton, and made eagerly boundless sacrifices for her sake. The only relationship between Alexander Hamilton and Lord Nelson was that the former was born and the latter married on the little isle Nevis, one of the lesser pearls of the Lesser Antilles.

The story of Josephine in Martinique is a true fairy tale. In the light of burning mountains of the Caribbees, the figures that loom in the history of "the Pearls" are a group in which the world is vividly interested.

CHAPTER II.

THE TRAGEDY OF ST. PIERRE.

DETAIL OF THE SUDDEN STROKE OF THE BLACK CLOUD CHARGED WITH DEADLY GAS AND DEVOURING FIRE—THE SUDDEN DEATH OF A GREAT MULTITUDE—THE WOEFUL TALES OF THE SUFFERING, NEAR UNTO DEATH, OF SURVIVORS—THE GOOD SERVICE OF SOLDIERS.

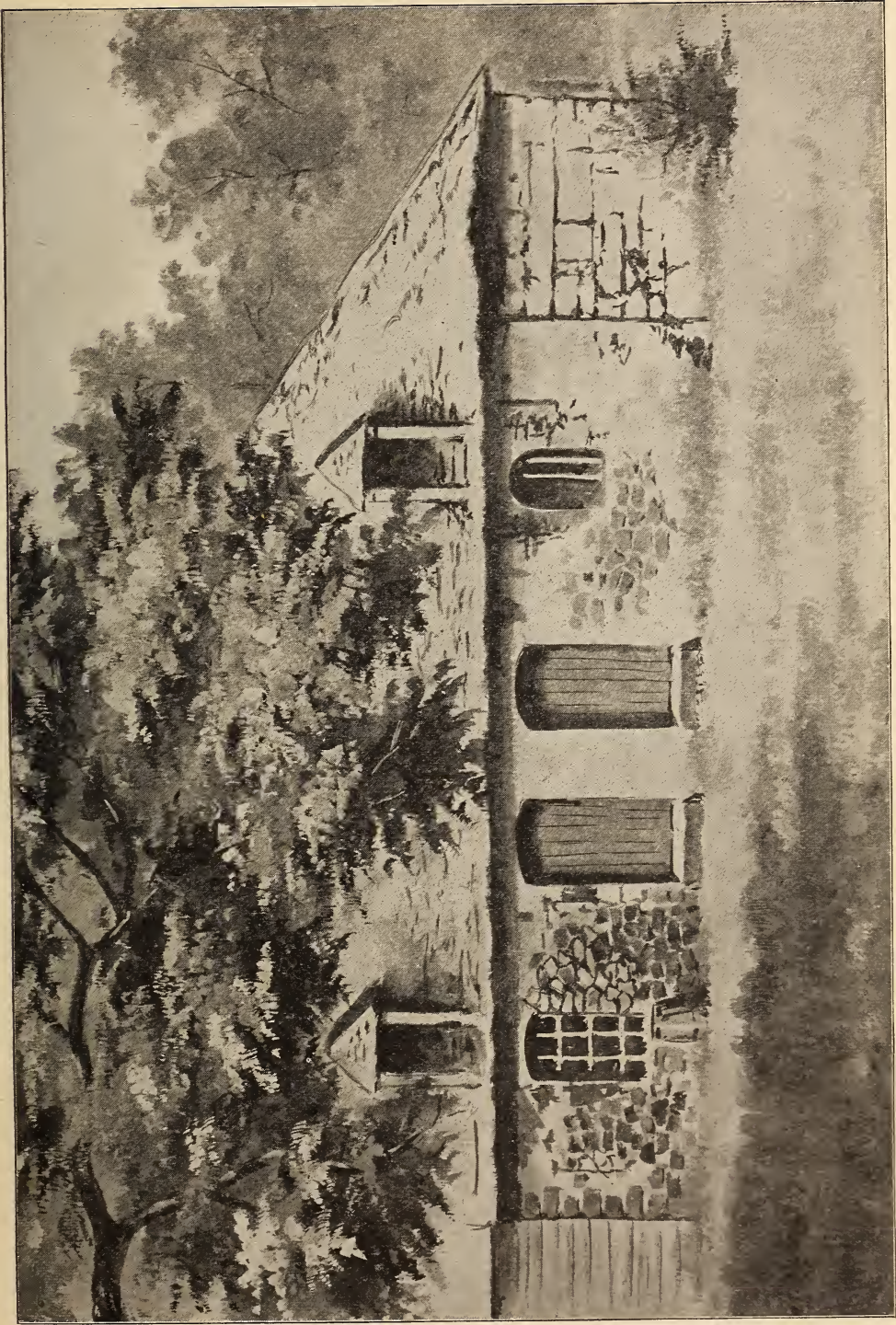
The inhabitants of St. Pierre had been accustomed to count among the chances of their lives, witnessing an actual volcanic eruption. Such a calamity was dreaded, but there was felt to be something in the nature of compensation, if there must be a stupendous show, in making the most of the spectacular effects of the occasion. Clara King was the nurse of the Stokes children on the fated British steamer, the Roraima, and was in her stateroom, the vessel at rest in the harbor, when the steward called to her, "Look at Mont Pelee." She hastened to the deck, and saw a vast black cloud coming down from the volcano. The steward ordered her to return to the saloon, saying, "It is coming."

Miss King then ran to the saloon. She says she experienced a feeling of suffocation, which was followed by intense heat.

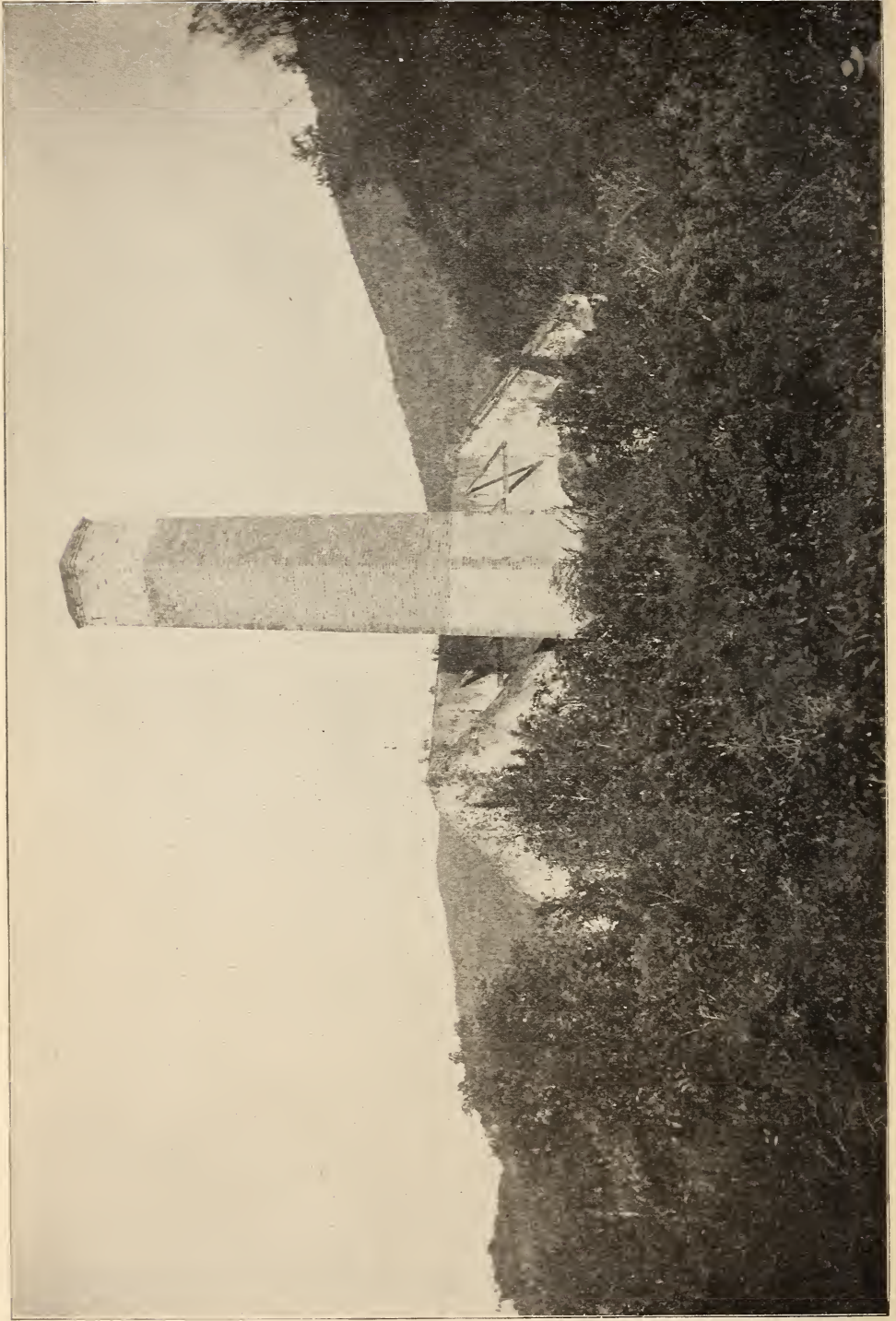
The after part of the Roraima broke out in flames. "Ben" Benson, the carpenter of the Roraima, who is now in hospital here severely burned, assisted Miss King and Margaret Stokes to escape.

With the help of Mr. Scott, the first mate of the Roraima, he constructed a raft with life-preservers. Upon this Miss King and little Margaret were placed.

While the raft was being constructed Margaret's little brother died. Mate Scott took water to the child at great personal danger, but it was unavailing. Shortly after the death of the little boy Mrs. Stokes succumbed.



BIRTHPLACE IN MARTINIQUE OF EMPRESS JOSEPHINE, WHERE SHE LIVED UNTIL THREE YEARS OLD.



SUGAR HOUSE IN MARTINIQUE in which the Empress Josephine lived from Her Third Year until Her First Marriage at Sixteen.

Margaret and Miss King eventually got away on the raft and were picked up by the steamer Korona. Mate Scott also escaped.

Miss King did not sustain serious injuries. She covered the face of Margaret with her dress, but still the child was probably fatally burned.

All who saw the black cloud and lived, speak of it with awe and wonder, and of the deathly airs that came from the volcano and were charged with horrible gases from the inner world, for which there is no name that approaches descriptiveness. In a moment the living were dead. One of the expressions made at the moment of the destruction was that "it fell from the sky so suddenly," it was convincing that "the end of the world had come." It was death to breathe, the darkness could be felt, and it was rent by rivers of lightning, and flowers of many colors. The plain story of the shock of the impending calamity at St. Pierre, May 8th, as appeared at Barbados, in the words, "It suddenly became intensely dark."

Among the accounts following by a week the bursting of Pelee and the death clouds, is this: All the district for miles about St. Pierre is a desolate waste. Even the whole appearance of the country has been transformed. Where there were hills there are now deep crevasses, and where there were cultivated valleys there are hills.

It is not believed that there are any persons left alive in the northern part of the island. Those who have not perished have fled either to this place or elsewhere along the south coast. How many were lost in endeavors to escape in small boats to other islands will never be known.

All that is certain is that many did take to the water in this way and of these but very few have been heard from. There has been a heavy sea running.

Over St. Pierre and all the country for miles around there is still, even in the middle of the day, a darkness from the great black canopy of smoke that continues to rise from Mont Pelee and spread out over the sky to the horizon.

At considerable distances from where the big Soufrière of the volcano was new craters have broken out.

To add to the devastation the rivers which took their rise from the vicinity of Pelee have overflowed their banks on the north side of the island and wide areas of country are under water.

By way of London, we have, from the British Administrator of Dominica, this:

“The Martinique catastrophe is even more terrible than at first reported. Refugees who arrived this morning from the north end of the island state that new craters are opening in many directions.

“The rivers are overflowing their banks, and large areas on the north side of the island are submerged.

“Other districts are crowded with survivors. Almost total darkness continues.

“I do not believe that Guadeloupe will be able adequately to relieve the stupendous distress.”

A scene on the deck of the Roraima is described by one of the crew, who at first took refuge in the hold, and when it became unbearably hot went on deck:

“All about were lying the dead and the dying. All were covered with hot mud and with ashes.

“The dying were suffering terrible torture. Little children were moaning for water. I did what I could for them, but it was very little. I obtained water, but when it was held to their swollen lips they were unable to swallow, because of the ashes which clogged their throats. One little chap took water into his mouth and rinsed out the ashes, but even then could not swallow, so badly was his throat burned. He sank back unconscious and a few minutes later was dead.

“All aft the ship was afire, and from the land came draughts of terrible heat. At last, when I could stand it no longer, I sprang overboard, thinking that I might swim to the mouth of the harbor and thus escape.

The water was almost hot enough to parboil me, but a wave soon swept in from the ocean, bringing with it cool water that made life possible.

"I was caught in the receding wave, which was of tidal velocity, and was carried out to sea. Then, on the second return of the wave, I was washed against an upturned sloop, to which I clung."

The panics at Fort de France were almost incessant for two weeks. The eruption of Pelee on the 20th, twelve days after the first supreme demonstration, was extremely violent, and at the port colossal columns of volcanic matter were ejected from the volcano, which rained huge red-hot boulders, many feet in diameter, on the ruins of St. Pierre and the country near it from an enormous elevation and with fearful velocity. The volcanic clouds advanced until they reached Fort de France.

The spectacle was appalling and beyond description. The whole population of Fort de France was thrown into a frenzy of panic during which soldiers, police, men and women, all terrified, frantic, weeping and praying, rushed through the streets, while overhead the glowing, fiery clouds rolled relentlessly and rained down stones, still hot, amid the ashes.

Still the people had the presence of mind to be very respectful during the funeral services of Mr. Prentis, the American Consul at St. Pierre. The friends of Mr. Prentis, knowing his extensive information and self-possession, counted upon him as one who would save himself and family. They did not, however, contemplate the cloud of suffocation rolling swiftly over and beyond the swift-spreading lava, the most frightful form of death that ever smote a great multitude. The intelligence of the finding of the remains of Mr. Prentis was disbelieved, such was the faith in his faculty; and when there was no room for doubt of his death, and his remains were in a casket to convey to the Cincinnati, a renewal of the Pelee phenomena was so amazing that rapid retreat was necessary.

A Fort de France dispatch, dated May 21, said: "Funeral services over the remains of Thomas T. Prentis, the late United States Consul at St. Pierre, were held to-day. Commander Thomas C. McLean of the

United States cruiser *Cincinnati* officiated, and the officers of the war vessels in port, the marines and sailors, Acting Consul Ayme and many citizens were present. The funeral cortege passed between rows of people, who bared their heads to the flag covering the coffin. The remains of the Consul are buried under an acacia tree in the cemetery here."

Surely the panic at Fort de France is accountable when four days after the temple of fire abolished the city the authenticated facts were given in these terms :

St. Pierre was destroyed, not by lava streams and not by showers of red-hot rocks, but by one all-consuming blast of suffocating, poisonous, burning gases.

Death came to the inhabitants instantly. It was not a matter of hours or minutes; it was a matter of seconds. They did not burn to death. They died by breathing flame and their bodies were burned afterward.

It is not merely true that no person inside the limits of the town escaped, but it is probably a literal fact that no person lived long enough to take two steps toward escape.

These facts, which will go on record as the most astounding in the history of human catastrophes, have been practically established by the investigations of to-day and yesterday at the site of the city, helped out in slight degree by the scanty testimony of the few tortured sufferers on boats in the harbor who alone survived.

Where St. Pierre once stood there is not even a lava bed now. The city is gone from the earth.

The half-dead victims who escaped on the *Roddam* or were brought here by the *Suchet* talked of a "hurricane of flame" that had come upon them. It now appears that that phrase was no figure of speech, but a literal statement of what happened.

There are bodies lying in the streets of the city—or rather on the ground where streets once were, for in many places it is impossible to trace the line between streets and building sites—to which death came so

suddenly that the smiles on the faces did not have time to change to the lines of agony.

That does not mean death by burning, though the bodies have been charred and half consumed, nor does it mean suffocation, for suffocation is slow. It can mean only the bath of burning fumes into which the city was plunged affected the victims like a terribly virulent poison when the first whiff of the gases entered their lungs.

There are many of the victims who died with their hands to their mouths. That one motion of the arm was probably the only one that they made before they became unconscious. Others fell to their faces and died with their lips pressed into the earth.

There was no time to run, perhaps no time even to cry out, no time to breathe a prayer. It was as if St. Pierre had been just dipped into an immense white-hot furnace and then set out to cool. Mont Pelee went sputtering on, but that made no longer any difference. In the city all life was destroyed.

Every combustible thing was burned. Animal bodies, full of moisture, glowed awhile and then remained charred wrecks. Wood and other easily combustible things burned to ashes.

On the ground lay the bodies, amidst heaps of hot mud, heaps of gleaming ashes and piles of volcanic stones. That was all.

The destroying feature in the quick annihilation of St. Pierre was the cloud that will be famous as the pine tree that towered prodigiously over Vesuvius when the ashes buried Pompeii. Engineer Davis, one of the few survivors of a lost ship, said: "I never can forget the horrid, fiery, choking whirlwind which enveloped me."

Jean Louis Prudent was saved by being on a ship not wholly destroyed, and he says first there was an awful noise of explosion, and then, right away, a cyclone of smoke and fire, but such was the awful, poisonous, choking nature of the smoke that it burned worse than the fire. When it struck people they fell dead. The cyclone of gas tore the masts

out of ships, blew others up and sunk some of them. Soon afterward came a wave of fire bigger than the smoke cloud.

"The cloud," continued Prudent, "was bigger, it seemed, than the mountain.

"The fire burned the city everywhere at once. Near me I saw only dead men, but on shore I saw men and women rushing back and forth amid the flames for an hour. They would not run long. Then came the choking smoke, and they would drop like dead flies. The explosion, smoke and fire all came and went in three minutes; but the city burned for three hours."

An evidence of the swiftness of the onslaught of fire is found in the fact that none of the victims were blinded, although the eyelids of most of them were nearly burned through.

One who approached the demolished city three days after the destruction, writes:

"The sea for miles was covered with the wreckage of the vessels sunk off St. Pierre at the time of the disaster, and ashore only a few trees, all bent seaward by the force of the volcanic shower, were left standing. The heat from the smoking, lava-covered ruins at St. Pierre was suffocating, and the stench from the corpse-strewn streets was awful.

On all sides were found portions of corpses, which were gathered up by the soldiers and gendarmes and burned in one of the public squares.

Not a drop of water was procurable ashore. The darkness caused by the clouds of volcanic dust shrouded the town and continuous subterranean rumblings added to the horror of the scene.

At the landing place some burned and ruined walls indicated the spot where the custom house formerly stood, and traces of the larger shops could be seen. In that neighborhood hundreds of corpses were found lying in all kinds of attitudes, showing that the victims had met death as if by a lightning stroke. Every vestige of clothing was burned away from the charred bodies, and in many cases the abdomens had

been burst open by the intense heat. Curiously enough, the features of the dead were generally calm and reposeful, although in some cases terrible fright and agony were depicted. Grim piles of bodies were stacked everywhere, showing that death had stricken them while the crowds were vainly seeking escape from the fiery deluge. On one spot a group of nine children were found locked in one another's arms.

Great credit is given the few soldiers that have worked bravely and hard in the rescue work at St. Pierre. There were fifteen hundred troops, at most, available, and at the end of the first week they were exhausted, but still able to shoot the plunderers of the dead. Five prisoners made for the United States tug *Potomac* in a small boat near St. Pierre. They were laden with watches, rings, and other articles costly in proportion to bulk. The French soldiers devotedly gave their time and strength to burning bodies that were fully exposed and to recovering specie and securities in the vaults of the banks. Most of the money, jewelry and valuables have been secured and placed in vaults in Fort de France.

Comparatively few bodies have been found, the total number to date being about two thousand. The most thickly populated parts of St. Pierre were buried under several feet of ashes and lava, and thousands of bodies were cremated until little remains. This lessened the danger of an epidemic. In spite of the efforts of the soldiers to dispose of such bodies as were exposed, the stench was terrible, and many of the rescuing parties were sickened and forced to hasten away from the dreadful sights and odors. Excessive heat, aggravated by blasts from the mountain fires, seriously increased the difficulties of the situation.

The appearance of ghouls on the scene of a great disaster by flood or fire anywhere, or the outburst of a volcano, or the presence of plague or any form of pestilence, has become a feature of the calamity. There is to be counted upon a considerable class of disorderlies who hold as the primary principle of wretched life that civilization is a failure and chaos must come again. There were robbers in the midst of the

smoking ruins of Chicago, when the great conflagration made room for the greater city. Thieves and assassins rushed to the ruins of Galveston, and it was as necessary to shoot them as to burn the dead caught in the wreckage. It was necessary while the thunders of Pelee were still shaking the island, and ashes fell like an infernal snow, with millions of stones from the waning crater, crashing upon the ruins of the lost city, that martial law should be declared and the prowling fiends shot down like wild raving beasts.

"A chaos of silent horrors," a writer at Fort de France said was to be seen at St. Pierre when the outlines of streets were pelted with lava, where billows of viscid mud and sulphurous lava silently hove in enormous bubbles, which, as they broke, brought to the surface the charred bodies of the human beings the hideous brew had swallowed and disgorged. Above wheeled huge carrion birds, not daring to descend into so terrible a scene of nature's malignity, while at sea the overfed sharks reveled in acres of floating and dismembered corpses. Over all hung a nerve-torturing silence, forcing the unwilling throat to scream aloud lest brain should reel and sanity be lost in the agony of terror.

To stand still was impossible, to go on with the knowledge that every step would bring to view some scene more haunting than all that had gone before scarcely less so, and St. Pierre in its appalling desolation portrayed above all else the repulsiveness of a noisome death and fear, the fear which makes the heart palpitate and the flowing of the blood through the veins become the keenest of torture.

It was not only that charred and contorted bodies were at every step, it was not that here was seen a family stricken at they fled from the home, it was not only the child and the grandparent side by side in a hideous death, it was the unimagined suffering of that death, the staring eyeball, with the eyelid almost invariably burned through, the expanded nostril and the torture expressed in the rigid poise of death which showed that 30,000 people within one short half hour suffered to a degree that



NAPOLÉON CROWNING JOSEPHINE, Daughter of Martinique, Empress of France, in Paris, France.



MOUNT PELEE, NEAR ST. PIERRE, Martinique, in Eruption.

none know and endured physical and mental torments which none can paint.

From under a large stone protruded the arm of a white woman, while just on the other side of the stone lay a native woman, her hands entirely burned away and her arms charred far beyond the wrists in a vain attempt to raise the red-hot mass from the body of her beloved mistress. What devotion that could endure such fearful suffering at so panic-stricken a moment! But a yard or two farther on lay twenty or thirty negroes, trusting that if they could but keep together some must escape, and on white woman, faithful servant and abject negro alike the poisonous fumes and the fiery rain brought unendurable suffering, leading to a painful death.

Through the middle of Place Bertin, where the night before lovers had strolled and children played, ran a hissing, boiling stream of mingled mud and water, all that remained of the River Gayave, but a short time before a rivulet of beauty. This boiling water, here and there convulsed and thrown up in a jet of steam, laved with venomous touch the bodies of those who so short a time before had floated upon its limpid waters. Great trees with roots upward and scorched by fire showed the course of the famous Rue des Arbres, and huge stones still hot and blocks of volcanic debris gave a Titanic fearsomeness to the scene.

It is very hard to comprehend that such a reign of terror has taken place as that of which news came from the Caribbean Islands in May, 1902. No one knows, or will ever know, how many thousands of persons were destroyed in St. Pierre, but a conservative estimate is 30,000, some say 40,000, and the time in which the multitude died is placed at three minutes.

There was a cloud of fire streaming from a new crater of the old mountain, and the people perished in the sulphurous fumes and flames, a consuming fire and suffocating gas. They had a good telephone system in Martinique, and when the question was asked whether medical help was wanted, there was no answer. The people of St. Pierre were

dead and the wires were broken. Business men in many cities anxiously awaited advices from their correspondents in St. Pierre and got no letters. The agents were dead.

There are so few living witnesses of the catastrophe that it is of interest to hear what was seen and heard forty miles away. Here is a passage:

“A report from Barbadoes says that the sky was heavily overcast, the heat was excessive and there was a distant sound of thunder. Later, early in the afternoon, dense darkness set in and a great quantity of vivid dust fell and continued falling until a late hour.”

The Soufrière had been in a state of violence for nine mornings, and all this seemed to be merely preparatory, and then came at daybreak heavy thunder and great streams of lightning, and presently there was a continuous, tremendous roar. Vast columns of smoke rose over the mountain, becoming denser and denser, and the scoria-like hail, changing later to fine dust, fell upon all the adjacent estates, destroying a vast amount of property. At Chateau Belair the ashes were two feet deep in the streets. In Kingston they were fully an inch deep, and many large stones fell in the parish of Georgetown. The earth shook violently, and at 4 o'clock in the afternoon a midnight darkness spread over the country. Thirty people are known to be killed and the damage to property in the windward district was very heavy.

It is not denied that the one man in St. Pierre who lived in the city through the hours of the horrid eruption was a black criminal in a jail, who, because he was violent, had been placed in the dungeon below the level of the sidewalk. He heard the rumbling of Pelee and felt the tremor of the earth, and realized that something extraordinary was going on. He was panic-stricken with fear and beat with his hands against the walls, but only succeeded in getting open a door leading into a cell a little larger than his, over which there was an iron grating looking up through the sidewalk. He stumbled into this apartment to find it half filled with a sifting mass of hot ashes and dust. It burned him

severely and he was not slow to retreat to the inner cell, from which he had just escaped.

Then came the awful silence that seemed to paralyze him with fear more than the first roar. He has since said that he lay on the floor of his dark cell for hours, scarcely daring to breathe, oppressed by the terrifying silence. He does not know how many hours he lay there. Finally he summoned up courage enough to open the cell door and look into the other apartments. He was met by a wave of dust that choked his mouth and nostrils and half blinded him. It had cooled, and he ventured to wade through the soft, flake-like mass toward the iron gratings, through which descended a constant shower of soft and almost invisible dust. He hallooed aloud again and again, and at every echo his voice seemed to increase the shower through the grating.

Hunger and thirst overcame him and he crept back into his dungeon to sleep, but he could not. He says he did not close his eyes from the moment he heard the terrifying roar of the volcano ball until on Monday morning, four days later, when his shrieks were heard by the first party of searchers to invade the stricken city. His cries were feeble by this time and he had almost despaired of liberation. A marine from the French cruiser Suchet heard Sartout's wail, and, tracing it, rescued the one living creature in the city. The bars of the grating had to be pried open and Sartout was dragged out, more dead than alive. He was found to be not only on the verge of death from starvation and thirst, but suffering from terrible burns about his legs and the lower part of his body.

The charming daughter of the consul of Italy to Barbadoes was visiting with friends. The Italian consul had been among the first to come to St. Pierre in search of the body of his child. Strangely enough, it was his fortune to identify his daughter's remains beyond peradventure of doubt. The explosive blast which had reduced wrought iron machinery to pulp and heavy masonry to powder, by some strange freak

had left intact a bit of needlework and a garment of French make, which told the consul that he had found his own dear one.

The dead bodies of a team of horses and the wreck of a volante which had stood directly in front of the house where his daughter was a guest told plainly enough the story that they had been about to start for a drive when the storm of death swept through the streets and blasted them with its fire.

A business man visited St. Pierre some time before the city was smothered, and is very interesting in describing the people whose fate it was to perish. He wrote:

"The natives were optimistic regarding storms, all appearing to think the last hurricane had visited them. I was in St. Pierre two days. Subsequently I toured the island. The natives are very interesting. Their artistic natures are highly developed. Negroes formed the great majority of the population of St. Pierre and of all other towns on the island.

"Even now the fear of negro uprisings is never entirely allayed on account of the antipathy existing between the whites and the blacks, although the last insurrection was as far back as 1841.

"Most of the city is modern, although the buildings are of two stories only, on account of the recurring earthquakes. There are two parts of the town, the old and new St. Pierre, the old being given up principally to the cabins of the negroes. Most of the people of the island live in the small towns. The industries are the cultivation of sugar-cane, coffee and fruits, and an important article of export is the Martinique rum.

"The volcano, which has three craters, is northwest of the city. Usually at least one of the craters is moderately active. The center of the island is entirely volcanic, the chain of islands being of volcanic origin. I believe confidently that some day the entire chain will be submerged."

And the baptism of fire came.



ST. PIERRE, MARTINIQUE, Overwhelmed by the Flow of Lava from Mount Pelee.



ST. PIERRE, MARTINIQUE. Mount Pelee in Eruption.

With a mighty roar, that seemed to shake loose the foundations of the universe and stun earth and sky with its deafening reverberations, a pillar of smoke and fire shot out of the crater of the trembling mountain high into the air.

The crashing thunder followed up peal with peal, and was multiplied a hundred fold by the echoes from earth to clouds and from clouds to sea.

A moment of silence succeeded this and then came an answering roar, an appalling sound, composed of the shrieks and cries and moans of 30,000 human beings who saw their doom upon them. There was something strangely lacking in this composite moan of terror. In all that thrilling death cry there was no bellowing of kine or barking of dogs or any other sounds from the lower animals. Birds and snakes had left their haunts and fled for safety long before. Cattle and horses had stampeded wherever they could. Only a few of the house dogs remained, and these in this awful moment only whined at the feet of their masters. Man alone had stayed to reap the penalty of his temerity.

A mighty suction seemed for a brief space to draw every living thing toward the mountain and to draw the souls of men from their bodies. The grass and the trees bent their heads, with scarcely a rustle, low toward the monster of Mont Pelee, and in that silent rush of air the shriek of the multitude died away in a low moan. A green phosphorescence filled all the atmosphere and threw a ghastly glare upon the faces of the stricken people. The shroud of death. The silence became intense. Nature's heart for one terrible moment seemed to cease its beating.

A huge rolling cloud that had for a brief instant hovered at the mouth of the crater now began to unroll like a black curtain down the mountain side.

One of the most startling descriptions given in few words of Pelee's outbreak was in saying it was "a crown of fire." The further statements were made that great waves of fire seemed to hedge about the

mountain top. Such thunder as has seldom been heard by man cracked and rolled. Ashes and rock, as well as lava, were carried skyward in this column to deluge the island and the ocean for miles around. Gradually the column mushroomed at the top, spreading out into dense clouds that descended to bring night at noontime.

Those who saw the eruption from the sea say that masses of fire fell from the sky. The red hot cinders that followed the lava kept falling till 1 o'clock in the afternoon.

Mont Pelee, which is cultivated in spots up to a height of 2,500 feet, is usually covered to a large extent with dense forests containing a wonderful variety of woods, oaks, cedars, mahogany, silk-cotton, ironwood, and palms. The view from the peak is thus described by an enthusiast: "Valleys and hills, peaks and ravines, succeeding each other swiftly, as surge succeeds surge in a storm—a weirdly tossed world, but as beautiful as weird; all green the foreground, shadowing off to billowy distances of purest blue."

CHAPTER III.

DESTRUCTION BY PELEE'S RAIN OF FIRE.

COMPARATIVE FIGURES OF OTHER GREAT DISASTERS—SUPPOSITION OF A SCIENTIST—THE FACTS ABOUT THE DISASTER IN MARTINIQUE AS GLEANED FROM LATER AND CORROBORATED REPORTS.

The following figures are of the destruction of human lives by floods :

Dort, Holland, April 17, 1421, 100,000 victims.

Canton, China, October, 1833, 10,000 victims.

Toulouse, France, June, 1875, 1,000 victims.

Murcia, Spain, October 16, 1879, 1,000 victims.

Johnstown, Penn., May 31, 1889, 5,000 victims.

Galveston, Texas, September 8, 1900, 6,000 victims.

Professor Russell, of the Ann Arbor University of Michigan, and a member of the Board of Managers of the National Geographical Society, held for some days that the first Martinique reports were gross exaggerations, and "simply a small eruption of one of the volcanoes," gives these reasons :

"Nothing was heard of the sound of the explosion on the neighboring islands. If the destruction had been as great as the reports would indicate, the sound would have been heard in Porto Rico and even at Florida. There would have been violent fluctuations of the barometer. None has been noticed. There would have been big water waves if earthquakes had increased the destruction, and none has been reported. No, I cannot believe the printed reports, and I have just sent a telegram to the Board of Managers of the National Geographical Society moving that we send a geographer to investigate."

The frightful facts were not soon given because the energy of the earthquakes and the outpouring of lava, scalding mud, stones and gases

were so destructive, the truth was slow getting beyond the area of utter destruction. There was danger at sea for considerable distances from the burning mountains, scattering death and annihilating all before it, as this dispatch displays:

“Willemstad, Island of Curacao, May 10.—The Italian steamer *Pedemonte*, which arrived this morning at La Guaira, reports that while passing near the Island of St. Vincent Thursday night her deck was covered by a depth of two inches with ashes and her passengers were nearly suffocated with the smell of sulphur. During Thursday all along the coast, especially in the Gulf of Paria, subterranean noises were heard. The Indians were terrorized.”

The first mate of the *Roraima* stated that suddenly during the eruption of Mount Pelee there came a sort of whirlwind of steam, boiling mud and fire, which suddenly swept the city and the roadstead. There were some eighteen vessels anchored in the harbor, including the *Roraima*, the French sailing ship *Tamaya*, four larger sailing ships and others. All vessels immediately canted over and began to burn. The *Tamaya* was a bark from Nantes, Captain Maurice, and was on her way to Pointe a Pitre. All the boats except the *Roraima* sank instantly and at the same moment.

Every house ashore was utterly destroyed and apparently buried under the ashes and burning lava. An officer who was sent ashore penetrated but a short distance into the city. He found only a few walls standing and the streets literally paved with corpses. The Governor of the island, who had arrived only a few hours before the catastrophe, was killed. Both the English and American Consuls, with their families, were reported to have perished.

There was not at first news, because those in the city were suffocated and buried in ruins and the discharges of the fearful mountain. The beginning of the great Pelee eruption is thus described by an eye-witness:

“The *Roraima* arrived at Martinique at 6 o'clock Thursday morning. At 7:55 o'clock there was a sudden and terrific report, and Mont Pelee

gave vent to an ugly mass of dark matter, which, spreading over the entire city and environs for about seven miles, suddenly broke into a solid flame of fire. This flame, traveling with hurricane force, spread over the bay, enveloping all shipping in a perfect maelstrom. A tidal wave twenty-five feet high passed over the burning ships, snapping spars and funnels as if they were pipe stems.

"Fire, mud, ashes and hot stones rained upon the Roraima's decks. I took refuge in my cabin, burying myself in the bedclothes. At one time I was up to my neck in hot water. Captain Muggah was fearfully burned and died in six hours.

"The men who were saved fought the fire on the ship for hours. Finally they took to a raft and were rescued by the French war ship Suchet."

The steamer Korona, from Barbadoes, arrived at Martinique Friday morning and went to Fort de France, taking on Scott, mate of the Roraima, and Thompson, and leaving others in the hospital.

The governor of Martinique and his family had arrived in St. Pierre to attend mass at 8 o'clock on the morning of the fatal day. Special thanksgiving services were being held, the people believing all danger had passed, and the cathedral and city churches were filled with worshippers at the moment of the catastrophe.

Fort de France is said to be quite safe and no danger is apprehended there.

As the direful news came out there was given such particulars as these:

Dr. Verne, who is attending the patients here, lost forty-two of his relatives. The injured were brought here from Precheur, Carbet, St. Denis, Petit Anse and other places.

M. Clarac, the wealthiest merchant in Fort de France, lost 110 relatives.

The Italian consul at Barbadoes, Signor Paravicino, whose daughter

was visiting at St. Pierre, recognized her body among the killed by the clothing which she wore. The body was found in the suburb of Carbet.

No fewer than 30,000 persons lost their lives in St. Pierre and its vicinity. The reports as to the number of dead there are very meager, and it is believed that many of the inhabitants escaped in small boats.

There were, however, very few escapes by small boats. One who reached St. Pierre some days after the outbreak writes:

The destruction there is appalling. The streets are two feet deep in ashes and cinders, which cover thousands of dead bodies, scorched black and shiny as if they had been plunged into boiling pitch. Many of the dead were never touched by the volcanic fire, and some of the houses and woodwork destroyed show no signs of burning.

At Moudlage, in the southwestern portion of St. Pierre, the town hall is still standing as high as the first story, while at the fort, in the northwestern part of St. Pierre, the most massive stonework is calcined. The church tower, built by the Jesuits two centuries ago of Cyclopean mason work, is now like a huge heap of old metal.

London, May 14.—Sir Frederick M. Hodgson, the governor of Barbadoes, forwarded to the colonial office to-day the report of the colonial secretary, who has just returned from a visit to St. Pierre, Martinique. It confirms the worst accounts of the disaster.

The secretary compares the ignited matter, which destroyed everything within an area of ten miles by six wide, to burning sealing wax. He adds significantly that the services of doctors are not required, as there are no wounded persons.

Governor Hodgson estimates that 2,000,000 tons of volcanic dust fell on the Island of Barbadoes.

London, May 15.—The correspondent of the Daily Mail at Barbadoes, B. W. I., who visited St. Pierre on board the royal mail steamer Solent, has learned from Dr. Artier, who miraculously escaped the disaster, that when the governor of Martinique, M. L. Mouttet, and the insular officials had declared that all danger from an eruption of Mont Pelee was

past, a cordon of armed soldiers and policemen was placed around the town to prevent the people from leaving.

Dr. Artier, however, went to the suburb of Morne Rouge. He was riding back to St. Pierre when the explosion occurred. He turned and fled precipitately across the mountains to Fort de France.

In St. Pierre, a negro murderer was locked in a cell so far underground that the gases as well as the flames failed to reach him. There he remained for four days before his cries were heard.

When the cell door was thrown open he dashed away toward the distant woods. He is believed to have been crazed by the awful experience through which he passed. Armed soldiers are now watching the workers to prevent the robbing of the dead bodies of the ruins. Vandals continue to profit, but orders that have been given to shoot down any person who is seen robbing a body will probably put a stop to the crime.

Some of the walls of the houses that still stand crumble and fall at touch. Some idea of the terrible heat that poured down from Mont Pelee may be had when it is known that the iron rollers of the Prinelle sugar mills were melted as though they had been passed through a furnace.

The part that the scientists played at the time of the overwhelming explosion would be ludicrous if it were not for the stupendous terror of the errors. The story is that a scientific commission arrived at St. Pierre with all the pomp and circumstance of official prestige, on Wednesday, May 7th, and esteemed it their duty to comfort the people with the assurance of authority that there was no danger. The scientists were there to vouch for Mount Pelee as not a destroyer, but a safety valve, and they "studied phenomena on the spot."

It was agreed by the members of this commission that the relative positions of the craters and the valleys debouching on the sea were such that the scientists could affirm that the security of St. Pierre was complete, and this announcement was made to allay the fears of the frightened citizens.

The sun rose clear over St. Pierre at 6 o'clock on the morning of May

8. Mont Pelee was smoking at the mouth and the wind was blowing westward. A few minutes before 7 o'clock a great white column of what seemed to be steam and gas belched forth from Mont Pelee, which seemed to be about 200 yards from the original crater, and which appeared to open up a deep rent from the top to the bottom of the mountain.

This outbreak caused the utmost consternation and panic among the inhabitants of St. Pierre, who fled toward the seashore, uttering frightful screams, in anticipation, evidently, of what was to follow.

Those on the Gabrielle observed a small steam yacht leaving St. Pierre at ten minutes after 7 o'clock with the governor and members of the scientific commission on board. The yacht steamed toward Le Precheur.

All the survivors of the St. Pierre disaster continue to be greatly broken by the terrible experience through which they passed, says a dispatch to the Herald from St. Kitts, B. W. I. First Officer Scott, Assistant Purser Thomas and Cooper Taylor are still in a pitiable condition. Scott, who lost a son about to enter college, cannot take his mind from the scenes of last Thursday.

All three men speak in the highest terms of Captain Pierre Lebris of the French cruiser Suchet, whose kindness to the survivors endeared him to them.

MONT PELEE AS A SAFETY VALVE.

New York, May 14.—Sir Henry T. Wrenfordsley, who has been chief justice for at least six of England's colonies, among them the Leeward Islands, is in this city. Regarding the volcanic outburst in the West Indies, he said:

"I don't believe there will be any great destruction elsewhere. There is no doubt in my mind that there is a subterranean connection between all that string of islands, but that fact will save the rest, perhaps. I look to see Mount Pelee take its place as an active volcano, at least during our life-time, acting as a sort of safety valve for the other islands."

The distinguished English justice had not at this time heard the news from the British island of St. Vincent.

There was no news for a time for the same reason the doctors were not wanted. The spectators close to the scenes were like those immersed in the poisonous gas and boiling mud—they were dead. Six days after the bursting of Mont Pelee a dispatch from Fort de France announced the baptism of fire of St. Vincent. The island of St. Lucia lies between Martinique and St. Vincent, and the chain of islands is known as the Windward Islands, the Lesser Antilles and the Caribbees. The greater destruction of life on St. Vincent was that of the Carib Indians, and that means the almost total extinction of the race Columbus found. The feeble remnant of the race was located in St. Vincent and Dominica. There are a few in St. Lucia. Now that Cuba is independent there is not a known survivor of the race Columbus found on that island. It has long been a prophecy called a superstition that the Caribs would be sacrificed to the fire god they worshiped, and the promise now seems to be substantially fulfilled. Down the sides of Morne Soufriere flowed and spread out a network of streams of lava, and many were imprisoned and perished. There were crushing showers of stones falling where the torrents of lava flowed. A Herald correspondent wrote:

“By the explosion of 1812 a river that had existed ever since the discovery of the island was dried up. Down its channel there flows a swift stream of molten lava, which glistens like liquid silver, and which flows into the sea within 100 yards of Georgetown. As the water and the lava meet a great cloud of steam arises, and the hissing can be heard for miles.”

The most violent eruption took place Saturday, May 10th, three days later than the bursting of Pelee. The electrical display from Soufriere was surpassingly brilliant, “forking out from the column that reaches so far up into the sky that the eye cannot reach its crest.” The mountain had been giving signs of trouble for two weeks. Soufriere raises its head 4,048 feet above the sea level. It lies at the northern end of St. Vincent and can be seen fully fifty miles at sea on a clear day.

That entire district was a smoking, incinerated ruin. Ashes were

everywhere, no place being less than two feet deep, and in some places lava had rolled over deep banks of ashes. Every Indian had disappeared. All vegetation disappeared. Not a sprig of green was to be seen on the island. Live stock died. Houses vanished. Rivers were dry, and in their beds ran lava.

Everywhere north of Chateau Belaire were dead bodies, some half-buried, others showing that they had been stricken down by the lightning. A few seemed to have been dipped into lava, which took form from them. Decomposition seemed to be almost immediate.

The agony of the two mountains reached its greatest violence about the same time. In an account from a source independent of that quoted above, we find this confirmation:

At noon three craters appeared to open and began to vomit lava. Six streams at once ran down the sides of the mountains, making an awful scene.

The mountain labored heavily for half an hour after the appearance of the lava. Fire flashed around the edges of the craters, and there were tremendous detonations in succession, rapidly merging into a continuous roar. This lasted throughout Wednesday night and until Friday morning. The thunderings of the volcano were heard throughout the Caribbean Sea.

The eruption began Wednesday. A huge cloud in a dark and dense column, charged with volcanic matter, rose to a height of eight miles from the mountain top. Darkness like midnight descended and the sulphurous air was laden with fine dust. A brief rain followed, a rain of favilla scoriae, rocks and stones.

There were bright flashes, numerous and marvelously rapid. These, with thundering, the mountain shocks, the earthquake roar, the lava and falling stones made a scene terrible beyond description.

The Royal Mail steamer Wear is transporting food and water to the Leeward coasts, sailing vessels proceed to the Windward coast on the same ocean. Doctors and nurses have gone to the scene of distress. The

majority of the corpses being found are covered with ashes, decomposed and hardly approachable. The dead are being buried in trenches, thirty in each.

All the earlier stories of the disaster worked by Mont Pelee have been verified. The destruction of the city is complete. Not a building remains standing.

Piles of dead in the vicinity of the site of the cathedral tell a story of the attempt to find the sanctuary and refuge in the great structure of worship. Men and women, panic-stricken at the cataclysm, turned in the moment of their despair to the cathedral and were apparently overcome before they could reach its doors.

It was noted from the French island of Guadalupe that pumice-stone in great quantities was floating on the sea there and at the British island of Dominica, and that much stone has been cast upon the beaches of these islands.

It had a rather better reputation for extinction as a volcano than Pelee, but May 5th the beautiful lake in the old crater boiled, and steam ascended in clouds, and the mountain groaned and trembled. The last serious eruptions before this were in 1812. The bubbling of the boiling lake during the afternoon of the 5th was varied by the quivering under the dreadful strain of the whole island.

That night sulphuric flames played about the summit of the volcano, giving it a weird and a terrible appearance. Steam continued to rise in clouds, and the thunders of the skies were joined with those that came from the bowels of Soufriere.

All during Wednesday, the 6th, the splendid phenomena continued, giving those who lived in the near vicinity of the volcano ample time to make their escape. All seemed to have been hypnotized, and of the thousands who were there only a few hundred went away.

It was noon on Wednesday when Morne Soufriere suddenly opened, sending six separate streams of lava pouring and boiling down its sides. Death was everywhere and in its most terrible forms. Lightning came

from the sky, killing many who had escaped the molten streams that were pouring into the valleys.

For this great tragedy the settings were wonderful. Soufriere literally rocked in its agony. From its summit a majestic column of smoke, inky black, reached skyward. The craters were vomiting incandescent matter that gave forth prismatic lights as it rolled away toward the sea.

Great waves of fire seemed to hedge about the mountain top. Such thunder as has seldom been heard by man cracked and rolled through the heavens. From the earth came tremendous detonations. These joined with the thunder, all merging in an incessant roar that added to the panic of the fleeing inhabitants.

This lasted through the night and the day and the night following. On Thursday morning a huge column, so black that it had the appearance of ebony, arose to an estimated height of eight miles from the top of the volcano.

Ashes and rock, as well as lava, were carried skyward in this column to deluge the island and the ocean for miles around. Gradually the column mushroomed at the top, spreading out into dense clouds that descended to bring night at noontime.

The atmosphere was so laden with sulphurous gas that life was made almost impossible. Many of those nearest to Soufrière were suffocated by this gas before they were touched by floods of flaming mud or the burning stones of the amazing bombardment.

There has been some confusion about the location of the Soufrière volcano, which this dispatch clears:

Castries, Island of St. Lucia, May 13.—The Soufrière volcano, on the Island of St. Vincent, is still in destructive eruption. A terrific cannonade can be heard 100 miles away. The reports are followed by columns of smoke rising miles in the air. Immense balls of colored fire also issue from the crater. Lightning is playing fiercely in the upper sky, and the whole northern part of the island is one mass of traveling flame. It is impossible to reach the burning district by land or sea.

In the dispatch following there is one of the most startling lessons in geology that has been given by earthquake convulsions.

Fort de France, Martinique, May 14.—Eruptions of Mont Pelee continue, covering the island with ashes, which are in many places many feet deep. Rumbblings of the volcano are heard continuously.

St. Pierre can now be approached. Troops and a man-of-war have been sent there to search ruins and burn the dead. The stench in the city is awful.

The stream of fire that destroyed St. Pierre came from the side of the mountain, which opened and closed, leaving large and very deep crevices near Macuba and Grand Riviere. The sea near the catastrophe withdrew several hundred feet, coming back steaming with fury.

The officers in charge of a boat making soundings off the island report a depth of 4,000 feet where formerly it was only 600 to the bottom. Pumice stone and ashes covered the sea for many hundred miles.

The cable repair steamer saved 500 persons who were surrounded by burning lava near La Precheur. Many wounded were found at Morne Rouge, a summer resort on the mountain that escaped the floods from the summit that made broader sweeps further below.

It was in 1850 L. Hearne wrote of Pelee:

“Pelee is not very remarkable in point of altitude, being between 4,400 and 4,500 feet. But in bulk Pelee is grandiose.

“Nearly thirty rivers have their birth in its flanks—besides many thermal springs, variously mineralized. As the culminant point of the island, Pelee is also the ruler of its meteorologic life—cloud-herder, lighting-forger and rainmaker. During clear weather you can see it drawing to itself all the white vapors of the land—robbing lesser eminences of their shoulder wraps and head coverings.

“Is the great volcano dead? Nobody knows. Less than forty years ago it rained ashes over all the roofs at St. Pierre, within twenty years it has uttered mutterings, for the moment it appears to sleep, and the clouds have dripped into the cup of its highest crater till it has become

a lake several hundred yards in circumference. The crater occupied by this lake, called 'The Pool,' has never been active within human memory. There are others, difficult and dangerous to visit because opening on the side of a tremendous gorge, and it was one of these no doubt which has always been called La Soufriere that rained ashes over the city in 1851.

"The explosion was almost concomitant with the last of a series of earthquake shocks which began in the middle of May and ended in the first week of August—all much more severe in Guadeloupe than in Martinique.

"In the village of Au Precheur, lying at the foot of the western slope of Pelee, the people had been for some time complaining of an oppressive stench of sulphur—or, as chemists declared it, sulphuretted hydrogen—when on the 4th of August much trepidation was caused by a long and appalling noise from the mountain—a noise compared by planters on the neighboring slopes to the hollow roaring made by a packet blowing off steam, but infinitely louder.

"These sounds continued through intervals until the following night, sometimes deepening into a rumble like thunder. The mountain guides declared: 'C'est la soufriere qui bout!' (the soufriere is boiling), and a panic seized the negroes."

There was a renewal, May 20, of the gigantic disturbance with all its more violent features, of the original outbreak on the 8th. At 5:30 o'clock of the 20th, a heavy cloud rose from the crater, lit up by flashes of lightning and the rising sun. The telegraphing of this scene and that which followed was from Fort de France, and the people of that place became panic-stricken at the awful spectacle, and ran, crazy with excitement, through the streets. Many hurriedly embarked upon the vessels in the harbor, and with great difficulty they were eventually reassured. The detonations were loud enough to be heard in all the neighboring islands, and the eruption was finally pronounced worse than that of May 8th. The ruins of the houses of St. Pierre were further wrecked, nearly all completely cast down, and great bowlders, it is stated, were scattered

about everywhere. Deep clefts in the mountains disappeared, and in the highlands and the lowlands the aspect of the country changed. Persons were hurt at Fort de France by stones crashing through the roofs of their houses. Villagers were reported killed or drowned. Mr. Richard, of Manchester, England, left all his possessions at the hotel and dashed into the sea. Being a good swimmer he managed to get onto the ship. On the morning of the 20th advices from Dominica were to the effect that a "curious, fiery cloud, floating in the southeastern skies, was seen from that island. It was surmounted by a fleecy white cap, that resembled highly polished silver."

Following this marvelous appearance were vivid flashes of lightning, and the people were exceedingly alarmed. A dispatch from Guadeloupe stated, "the sounds of the eruption were similar to those on the day before the eruption of Mont Pelee on the 8th." Detonations of a startling character were heard at Antigua. Later advices state that the eruption of the 20th was most serious and came near involving the destruction of the United States cruiser *Cincinnati*, and the British cruiser *Indefatigable*. Those vessels were indebted for their safety to the fact that they were in motion when the formidableness of the eruption was developed, and, therefore, able to put to sea at full speed.

On the northeast coast of the island there was an inundation at Bassa-pointe, at 2 o'clock in the morning of the 20th, and twenty houses and fifty other buildings were swept away by flowing mud, which passed over the valley of the river.

On this day of renewed horrors access to the ruins of St. Pierre was declared impossible. There was sufficient food for the refugees at Fort de France, but linen, clothing, bedding and disinfectants were needed, and money to support the refugees who saved nothing but their lives and could find no work to do.

The expedition, which resulted in the flight of the *Cincinnati*, which was fortunately well managed into safety, was for the purpose of recovering the remains of Mr. Prentis, the American Consul, and his family,

and the British Consul and his family. The volcano broke out with renewed fury after a party from the American navy tug *Potomac* had landed to obtain the bodies of the Prentis family, which were found in the ruins of the consulate a few days ago.

Ensign Miller of the American cruiser *Cincinnati* and Lieutenant McCormick, commanding the *Potomac*, were among those who landed. The latter remarked upon the threatening appearance of the volcano, and between 11:30 and 12 o'clock it began to throw off steam, smoke, and ashes, while lightning played in the murky clouds above it.

The laborers in the party rushed down the hill, leaving behind the body of Mr. Prentis, which had been placed in a casket, but the American sailors bravely lifted the remains and carried them to the beach.

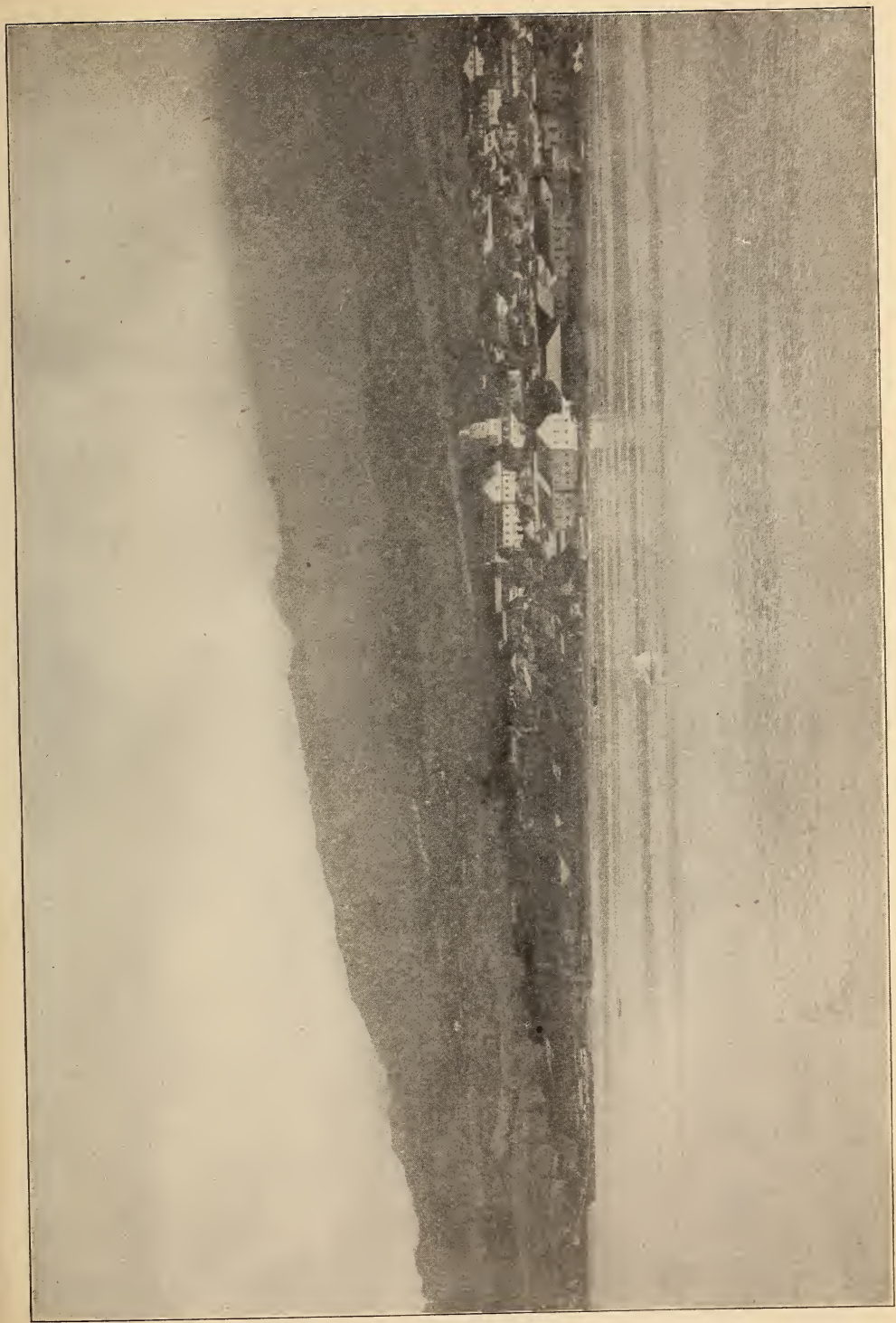
Meanwhile the British cruiser *Indefatigable*, which had come from Fort de France, had run out five miles to sea. The *Potomac* kept blowing its whistle as a danger signal to hurry the landing party to the beach. The situation was momentarily becoming more dangerous, and orders were given to leave the casket on the beach while the party hurriedly took to their boats and made for the *Potomac*.

The American cruiser *Cincinnati* was in the roadstead, and its commander ordered the *Potomac* to cruise along the shore and look out for refugees, which was done.

Dense masses of black smoke were towering for several miles above the volcano, while streams of lava were pouring into the sea, causing steam to rise in great volumes until the atmosphere looked as though a heavy fog was prevailing. The outbreak lasted for some time, but gradually abated in violence.

Then the *Potomac* returned and secured the remains of Mr. Prentis, which were transferred to the *Cincinnati*, which brought them to Fort de France. It is not known yet whether the *Indefatigable* returned to St. Pierre to secure the remains of the British Consul.

The list of great earthquakes below, with estimates of property ruined and lives lost, should be named with caution, except with respect



ST. PIERRE, MARTINIQUE, as Seen from the Harbor, Showing Volcanic Mountains in the Distance.



THE SIGNAL TOWER on the Wharf in St. Pierre, Martinique.

to the dates. The value of lands and houses damaged and the number of persons reported killed are habitually and almost proverbially excessive:

- 345 B. C.—Twelve cities in the Campana buried and Duras in Greece destroyed with immense loss of life.
- 283 B. C.—Lysimachi and its inhabitants buried.
- 79 A. D.—Pompeii and Herculaneum destroyed.
- 106 A. D.—Four cities in Asia, two in Greece, two in Galatia destroyed.
- 157 A. D.—One hundred and fifty cities in Asia, Pontus and Macedonia buried.
- 557 A. D.—Constantinople partly destroyed—thousands perished.
- 742 A. D.—Five hundred cities in Asia, Syria and Palestine overturned—immense loss of life.
- 936 A. D.—Constantinople again destroyed. All Greece shaken.
- 1089 A. D.—England thoroughly shaken.
- 1137 A. D.—Cantania, Sicily, destroyed; 15,000 lives lost.
- 1158 A. D.—In Syria, 20,000 lives lost.
- 1268 A. D.—In Silesia 60,000 perished.
- 1318 A. D.—In England—greatest known there.
- 1456, Dec. 5—Forty thousand perish at Naples.
- 1531, Feb. 26—Lisbon, 1,500 houses destroyed and 30,000 persons killed; several neighboring towns swallowed up in sea.
- 1580, April 6—St. Paul's, London, partly destroyed.
- 1596—Japan cities destroyed and thousands perished.
- 1626, July 30—At Naples, thirty towns destroyed; 70,000 lives lost.
- 1667, April 6—At Schamaki, 80,000 die.
- 1692, June 7—At Jamaica, 3,000 killed.
- 1693, September—In Sicily, 100,000 lives lost.
- 1703—Jedod, Japan, 200,000 dead.
- 1706—Abruzzi, Italy, 15,000 perished.
- 1716, May—Algiers, more than 20,000 lost.
- 1731, Nov. 30—One hundred thousand people buried at Peking.

- 1732—Naples, 1,940 lives lost.
- 1746, Oct. 28—Lima, Peru, and Callao destroyed; 18,000 persons buried.
- 1751, Nov. 21—San Domingo overwhelmed. Immense loss of life.
- 1754, September—Cairo, loss of 40,000 lives.
- 1745, June 7—Kaschan, Persia, overturned, 40,000 people killed.
- 1755, Nov. 1—Great Lisbon shock; 50,000 people killed at Lisbon, 12,000 Arabs in Morocco buried, 2,000 houses in the Grecian archipelago overturned.
- 1759, Oct. 30—Baalbec, Syria, destroyed; 20,000 persons killed.
- 1773, June 7—Santiago, Guatemala, and its inhabitants swallowed up.
- 1783, Feb. 4—Towns in Italy and Sicily destroyed, thousands perish.
- 1784, July 23—Ezinghian, near Erzeroum, destroyed, 5,000 killed.
- 1788, Oct. 12—St. Lucia, near Martinique, 900 killed.
- 1797, Feb. 4—Panama, 40,000 people buried suddenly.
- 1800-1842—Great shocks with awful loss of life in Constantinople, Holland, Naples, the Azores, the Mississippi Valley, Caracas, India, Genoa, Aleppo, Chile, Spain, China, Martinique and Guadeloupe.
- 1868, Aug. 13—Cities in Ecuador destroyed; 25,000 killed and property loss \$300,000,000.
- 1883, Aug. 3—Island of Ischia almost destroyed; 2,000 lives lost.
- 1883, Oct. 20—Karakatoa eruption in Java and Sumatra; 100,000 lives lost.
- 1884, April 22—Earthquake general throughout England.
- 1886, Aug. 31—Charleston, S. C., 41 lives lost; \$5,000,000 property destroyed.

There is a tone of terror and exaggeration in such statements as this, which has been largely accepted as reliable.

In seventy-five years—that is, from 1783 to 1857—the Kingdom of Naples lost 111,000 inhabitants by earthquakes. This is at the rate of more than 1,500 per year out of a population of 6,000,000. The most disastrous earthquake of recent history was the great Lisbon shock, on

November 1, 1755. In less than eight minutes almost all the houses of Lisbon were overturned, 50,000 of the inhabitants were killed and whole streets were buried. The cities of Coimbra, Oporto, Braga and St. Ubes were destroyed. Malaga in Spain was largely reduced to ruins. One-half of Fez in Morocco was destroyed and 12,000 Arabs killed. The Island of Madeira was laid waste, and the ruin extended to Mitylene in the archipelago, where half the town was laid low. The shock was felt 5,000 miles away, and even Scotland was given a slight upheaval.

CHAPTER IV.

AN AWFUL OUTBREAK OF PELEE.

THE TOP OF THE MOUNTAIN BLOWN OFF—A RAIN OF SCALDING MUD
—FLOOD OF LAVA AND CYCLONE OF FIRE—ON HORROR'S HEAD
HONORS ACCUMULATE.

A dispatch from Guadeloupe, dated May 10th, said: On the morning of May 5 Guadeloupe learned that the Mont Pelee volcano, in Martinique, had been in a state of eruption since Saturday, May 3, throwing out ashes. The same day violent thunderstorms began here. A very heavy storm occurred and loud detonations were heard. At noon came a rumor that lava was flowing from Mont Pelee and that 300 lives had been lost at St. Pierre.

All that day were heard here loud noises like the discharge of heavy artillery far off. It is now known that these noises were from the Martinique volcano. In the afternoon the cable connections with Martinique all disappeared. A very heavy thunderstorm then broke over Guadeloupe and lasted for a considerable time and rumors were current that the Soufrière volcano in Guadeloupe was more active.

The word Soufriere, so frequently used, means a sulphur crater, and applies to more than one mountain. A dispatch of May 10th, dated at Fort de France, said many believed an explosion even more serious than that of ten days ago will mark the culmination of the activity of Pelee.

Ashes were spouted in great clouds from the crater all day yesterday. The explosion began in the early morning, when a black cloud arose above Mont Pelee, accompanied by internal rumblings and a tremor of the earth that sent the sea back from the land in powerful waves.

This column was first caught by a current of air that carried it northward. Then an upper air current swept it back in the opposite



THE RIVER AT ST. PIERRE, Martinique, Before the Eruption of Mount Pelee in 1902.



AN OLD STAIRWAY IN BOUILLE STREET in St. Pierre, Martinique, Before the Town Was Destroyed by the Volcanic Eruptions in 1902. Native Girls with Head Dress for Carrying Burdens.

direction. Thus it made an immense and well-formed letter T, the base of which rested in a cup of flame in the crest of the volcano from which it sprang.

Then the wind veered and a mantle of darkness was swept westward across the island, enveloping Fort de France, upon which volcanic dust fell to a depth of more than an inch and a half.

So heavy was the dust that filled the air that respiration became a labor, and a fear of suffocation came upon the inhabitants. Great alarm continued for more than four hours, and it was not until the cloud of ashes blew out to sea in the early evening that confidence was restored.

All last night the summit of Mont Pelee had the appearance of a gigantic blast furnace at which great forces were working. Flames shot skyward in sheets that at times lighted up the entire island. For a few minutes the fires would drop back into the mouth of the crater, only to reissue with redoubled force.

Still there was no adequate understanding of the terrible desolation wrought. As the people fled from their houses there were thieves who robbed and burned the deserted homes.

The first news sent to Europe of the St. Pierre disaster was in these terms:

“St. Thomas, May 9.—St. Pierre and its inhabitants, with all the shipping, have been totally destroyed by a volcano.”

May 10, the day following the receipt in London of the foregoing telegram, the London Times contained the following editorial, which for its timely and condensed information is worthy of preservation:

“The intelligence of an appalling disaster to the French West Indian island of Martinique conveyed in the brief but unambiguous telegram from our correspondent in St. Thomas, which we published yesterday, has been but too amply confirmed by the official information since received at the Ministry of Marine in Paris. The despatch sent from Fort de France by Captain Le Bris, the commander of the French cruiser Suchet, to M. de Lanessan leaves no room for doubt that the flourishing

town of St. Pierre has been wholly swept away by an eruption from Mont Pelee, the great volcanic peak at the northern end of Martinique which terminates the mountain formation of the island. A later telegram received at the French Colonial Office from the Secretary-General of Martinique confirms the tidings, stating that St. Pierre, its environs, and the ships in its harbor have been destroyed in a rain of fire. In this terrible catastrophe, the sudden and annihilating force of which almost transcends imagination, practically the entire population of the town, numbering, if the dwellers in its suburbs be included, some 36,000 souls, is said to have perished. Only thirty survivors could be brought off on the Suchet by Captain Le Bris, who states that St. Pierre was enveloped in flames and completely destroyed early on Thursday morning. When the French commander left the remains of the ill-fated town the eruption was still continuing, and we are not likely to hear further definite news of what is taking place in the neighborhood of Mont Pelee until Captain Le Bris, who has gone to Guadeloupe to obtain provisions, returns to Martinique. The first signs of the approach of this catastrophe, which, as our Paris correspondent says, has stunned the French public, were observed at the end of last week, but the eruption was not then thought likely to have serious consequences. On Monday, however, the Guerin factories, two miles from St. Pierre, were destroyed, and 150 persons were reported missing. On Tuesday, M. Mouttet, the Governor of Martinique, who, it is feared, must have perished in the ruined town, announced that streams of boiling mud were pouring continuously from the crater; and after this the situation of St. Pierre must have grown more and more crucial until, at 8 o'clock in the morning on Thursday, the town was consumed in a general conflagration. A single ship, the British steamer Roddam, has succeeded in making her escape from the port, but not without severe loss among her crew. With the exception of this vessel and of the few survivors rescued by the Suchet all those who were in or near St. Pierre at the time when the eruption reached its

most devastating state must, it is feared with only too good reason, have lost their lives in the final terrible disaster.

“The island whose busiest and most important settlement has been destroyed by this melancholy catastrophe is practically the center of that long chain of the Lesser Antilles which, sweeping in a great arc southwards, forms the eastern boundary of the Caribbean Sea. Our largest West Indian colony, Jamaica, lies among the Greater Antilles far to the north-westward; but Dominica and St. Lucia, Martinique’s immediate neighbors to north and south, are British, and Martinique itself has been more than once temporarily in our possession. Around it, as around its fellow-islands, raged more or less continuously the stormy warfare of that long duel between France and England which filled the greater part of the eighteenth century and closed only with the termination of the Napoleonic age. In the minds of Englishmen it is associated inseparably with some of the brightest pages in the annals of our naval prowess, and, above all, with the glorious name of Rodney. Three times has it passed into British hands, and three times has it passed back into those of France. For nearly a hundred years it has now preserved unbroken that French connection into which it entered as early as the seventeenth century. The French Government has during this period watched carefully over its development, and Martinique has rewarded the attention lavished on it by passing through the days of West Indian depression far from unprosperously. It presents many of the most salient features characteristic of our own islands in the West Indies. It has the volcanic scenery of Dominica and St. Vincent, and, like Trinidad and Barbados, it has a staple industry of sugar. In the thriving town of St. Pierre its commercial life was centered. There, too, were the Courts of Justice, and a handsome cathedral, for St. Pierre was an episcopal see. Though not the official capital of Martinique, that place of primacy being occupied by Fort de France, it held the virtual headship of the island as being the focus of its active life. The terrible fate which has suddenly annihilated it may be said to have fallen upon it

almost entirely unawares; for, although Martinique was frequently visited by earthquakes during the eighteenth century and is said to have suffered as many as 200 shocks in 1843, the great volcano of Mont Pelee, nearly 5,000 feet high, the very name of which bears ominous witness to the devastating influence of its crater, had been silent and untroubled ever since 1851.

“Modern parallels to this catastrophe, which has something of the same destructive completeness as the fate which overtook Pompeii more than eighteen centuries ago, are few and far between. Japan and Java have both within recent years experienced considerable seismic shocks, but probably the instance of an eruption of great desolating power which will recur most readily to the mind is the extraordinary explosion which occurred in the volcanic island of Krakatoa, lying between the coasts of Sumatra and Java, in the summer of 1883. By a titanic upheaval, which was audible in the Andaman Islands and in India, Krakatoa hurled the greater part of itself into the ocean, called two fresh islands into being out of the enormous blocks of matter which it threw off, and produced a vast reflex movement in the sea which swept down with awful force on the low-lying shores of Java and Sumatra. The loss of life occasioned by this astonishing convulsion seems to have been curiously similar to that which has just been caused in the island of Martinique, for some 30,000 persons are said to have fallen victims to Krakatoa. But the effects of the disaster of 1883, though not less terrific than those which are described to-day, were diffused comparatively widely, whereas the full force of the eruption of Mont Pelee appears to have concentrated itself on a single devoted town. The circumstantial accounts which we have now received of the destruction of St. Pierre forbid us to hope that any further tidings which may be yet to come can impair in any very material degree the accuracy of the sad news which is before us. We can only trust that the volcanic upheaval has now spent itself, and that the signs of activity observed during the past week in the craters of Dominica and St. Vincent will not be the prelude to fresh seismic dis-

turbances. There is no reason to anticipate another calamity similar in magnitude to that in Martinique. But no considerations of what may take place in the future can efface the mournful impression which will be everywhere created by the terrible catastrophe that has just annihilated St. Pierre. So sad a misfortune touches the simplest and deepest feelings of our common humanity. In this country the regret and sympathy for France in her loss will be especially keen. We draw from our own colonies so much of the vitalizing energy of our national life, and our hopes and aspirations are so inseparably bound up with theirs, that we can realize in the fullest degree the poignant sorrow which France must feel at this sudden destruction of one of her centers of colonial enterprise.

“The attention of Englishmen, at first engrossed by the calamity which descended with such terrible suddenness upon Martinique, has now for the time being shifted from the ruins of St. Pierre to our own suffering colony of St. Vincent. How serious St. Vincent’s losses had been was hardly realized until yesterday’s announcement that some 1,600 persons had perished made clear for the first time the sad extent of the disaster. The official report on the situation dispatched by the Governor of the Windward Islands to the Secretary of State for the Colonies, so far from minimizing the grave character of the catastrophe, amplifies our conception of its scope, and the people of this country will therefore welcome with the warmest approval and satisfaction the initiative taken by Mr. Chamberlain in invoking the assistance of the Mansion-house on behalf of our distressed colonists. At the request of the Colonial Secretary the Lord Mayor has opened a fund for their relief, and has invited the Lord Mayors and Mayors of the metropolis and the country generally to co-operate with him in endeavoring to secure a prompt and liberal response to his appeal. Now that this most effective of all channels of organized charity has been thus thrown open, it will doubtless be generally recognized as advisable to divert into it such benefactions as may have flowed in to funds started by private individuals.

Mr. Chamberlain, in his letter to the Lord Mayor, puts briefly and forcibly before us the strong claims which St. Vincent has upon the generosity of Englishmen. He recalls the devastation of the island by the hurricane of 1898, and the way in which the powerful influence of the Mansion-house was then successfully set at work. He observes with truth and cogency that no part of the King's dominions deserves more truly than St. Vincent the practical sympathy of the people of this country. 'In normal times it has been among the most distressed islands in the sorely tried group of West Indian colonies, and, in addition, it has now within the space of four years been visited by two calamities which it would be difficult, probably impossible, to parallel in the history of a British colony.' To fill out in detail this comprehensive statement of St. Vincent's claims we have only to turn to the report in which Sir R. B. Llewellyn, himself an eyewitness of the island's destitution, sums up the impressions made upon him by the consequences of this desolating eruption. He pronounces the condition of affairs to be much worse than any reports previously forwarded to him had led him to suppose. The country on the eastern coast of the island between Georgetown and Robin Rock, where all life appears to have been annihilated, has been blasted like St. Pierre, and the scenes in this devastated area are, says the Governor, 'too harrowing to describe.' In the Carib country, which lies below the Soufriere at the northern and north-eastern extremity of the island, all the best sugar estates have been wrecked and the cattle destroyed."

R. T. Brown, secretary and manager of the West India and Panama Telegraph Company in London, issued a statement May 15th on telegraphic communication with the West Indies, giving the following information:

"Owing to the interruption of four of this company's cables, caused by volcanic disturbance, there is a delay of about 24 hours in telegraphing to and from this country and Barbados, St. Vincent, Grenada, Trinidad, and Demerara, as telegrams have to be conveyed by our specially

chartered vessels, and by steamers, either to and from St. Lucia, or any other place which may better ensure despatch.

"I may add that the usual cable communication with St. Lucia and all our stations to the north of it remains in full working order."

May 8th a cablegram to London from St. Vincent brought the information that Soufriere was smoking, and the next thing the St. Lucia cables were interrupted. The following cablegrams are pertinent records in the history of the disaster :

"St. Thomas, May 11.—St. Pierre was destroyed in the twinkling of an eye. A whirlwind of steam, boiling mud, and fire swept the city and the roadstead. Eighteen vessels anchored there instantly canted and began to burn and sink."

"Port Castries, St. Lucia, May 10.—On the 5th inst. a stream of burning lava rushed down the side of Mont Pelee from a height of 4,400 feet, following the dry bed of a torrent and reaching the sea, five miles from the mountain, in three minutes. As the lava rushed down, the sea receded 300 feet on the west coast, returning with greater strength in a big wave, which covered the whole of the front, but did little damage. On the afternoon of the 8th the steamer Roddam crawled slowly into Castries Harbor. She was quite unrecognizable, being grey with ashes, while her rigging was dismantled and her sails and awnings were hanging torn and charred. The captain reported that he had just anchored off St. Pierre at 8 o'clock in the morning in fine weather following upon an awful thunderstorm in the night, and was talking to the ship's agent, Mr. Joseph Plissono, who was in a boat alongside, when he saw a tremendous cloud of smoke glowing with live cinders rushing with terrific rapidity over the town and port. The former in an instant was completely enveloped in a sheet of flame, which rained fire on board the steamer. The agent had just time to climb on board when his boat disappeared. Several men of the Roddam's crew were quickly scorched to death. By almost superhuman efforts the cable was slipped, and steam being still up the vessel backed out

from the shore and arrived here nine hours later. Ten of the Roddam's men were lying dead, having been burned out of all human semblance, among the black cinders which covered the deck to a depth of six inches. Two more have since died. The burning cinders continued to fall upon the ship for six miles after she was under way."

A press correspondent cabled as follows:

"Kingstown (St. Vincent), May 15.—I have just returned here from a 50-mile ride on horseback in the devastated districts of St. Vincent. I penetrated to within five miles of the Soufriere crater. The entire northern part of the island is covered with ashes averaging 18 inches in depth, and varying from a thin layer at Kingstown to 24 inches or more at Georgetown. The streets of Georgetown are encumbered with heaps of ashes like snow-drifts, and several roofs have fallen in from the weight of the deposits upon them. The hospital here is filled with the dying. Fifty sufferers are lying on the floor for want of beds, but cots are being rapidly constructed of boards. Two or three days elapsed before the dead could be buried, as the negroes refused to dig the trenches, though offered thrice the usual wages. The nurses available are incompetent, but willing to learn, and are working hard. The negroes are indifferent. They expect to receive Government rations, and there are instances in which they have refused to bury their own relatives. The commander of the United States tug Potomac visited Sir R. B. Llewellyn, Governor of the Windward Islands, to express the sympathy of the United States and to offer to render any assistance in his power. The commander of the Potomac also landed all the provisions he could spare. The Governor expressed his thanks. Rain would be welcome, as the clouds of dust which fill the air are intensely irritating to the eyes and throat. Many people in the dread of further eruptions are flocking into the city. The Carib survivors, leaving the cover they had found, are pillaging the abandoned dwellings and shops."



STREET SCENE IN ST. PIERRE, Martinique, Showing Types of Natives in the Streets.

SOMBRERO
 AUGUILLITA
 ANGUILLA
 S. MARTIN
 S. BARTHOLOMEW
 SABA
 ST. EUSTATIUS
 BARBUDA
 ST CHRISTOPHERS
 NEVIS
 REDONDA
 PLYMOUTH
 MONTserrat
 G. DE TERRE
 GUADALOUPE
 BASSE TERRE
 THE SAINTS
 FOUITE A PITRE
 MARIE GALANTE
 DOMINICA
 ROSEAU
 FORT ROYAL
 S. PIERRE
 MARTINIQUE
 DIAMOND ROCK
 PT. CASTRIES
 S. LUCIA
 KINGSTOWN
 S. VINCENT
 G. BEQUIN
 BRIDGETOWN
 BARBADOES
 GRENADINES
 CARRIACOUS
 GRENADA
 ST. GEORGE

CARIBBEE

OR

WINDWARD

ISLANDS



GUIANA

MAP OF THE WINDWARD ISLANDS.

The following is from the Kingston correspondent of the London Times:

“Kingston, Jamaica, May 16.—The Atrato arrived here this morning. She had passed St. Pierre and reports the whole countryside a mass of lava and ashes. Not a living soul was to be seen. The ocean bed in the vicinity seems to have risen, and the whole chain of the West Indies is enveloped in a dense cloud of volcanic dust. The Atrato brings details of the eruptions. In the last days of April smoke was noticed on Mont Pelee and rumbling sounds were heard. On May 3 the mountain threw out dense masses of smoke, and at midnight belched forth flames. Next morning the sky was dark with clouds and ashes. The inhabitants of the villages of Precheur and St. Philomene at the foot of the volcano grew alarmed and left the district. Ashes fell on St. Pierre, which by evening was covered a quarter of an inch thick. The mountain was invisible. The alarm was so general that business was suspended. On Sunday a sea-breeze swept the ashy fog from the town, but at evening dust and scoria fell again. The night passed without incident.

“At noon on Monday a stream of burning lava 20 feet high suddenly rushed down the southwestern slope, and following the dry bed of the river Blanche, swept away buildings, plantations, and people in a tremendous rush to the sea, five miles distant. It was all over in three minutes. The Guerin factory on the beach near the mouth of the river was embedded in lava; only the chimney could be seen. The sea then receded along the western coast a distance of 100 yards, and returning invaded St. Pierre. A great panic ensued, and the people made for the hills. Loud detonations were heard at short intervals, and from the mountain broke forth dense masses of smoke and lurid flashes of flame. When darkness fell the sight was so terrible that people ran to and fro wailing and screaming. Earthquakes were frequent, and as assistance was being implored from other islands the cable snapped. On Tuesday the same conditions prevailed, and a number of people left for St. Lucia. On Wednesday an appalling thunder storm burst over the island; but Thurs-

day broke fine. It was Ascension Day, and all the stores were closed. In the morning the Roddam, from St. Lucia, arrived and was ordered to the quarantine ground.

“Shortly afterward a black cloud of smoke appeared on the top of the mountain. A loud explosion occurred, and vast sheets of flame and glowing cinders descended on the town and the sea. An awful scream from thousands of throats was stifled by the rain of fire, and in a moment the town was destroyed. The Roddam had steam still up. The rolling of the sea broke her anchor and she backed slowly out, the men falling asphyxiated or burned, or leaping into the sea in agony. The captain was frightfully burned, but, looking around, saw the captain of the Roraima waving a goodbye as his vessel sank. The Roddam succeeded in reaching Castries, only 12 returning out of 40 who went. Those dead on the deck were charred and twisted beyond recognition.

“The town and its inhabitants were destroyed by sulphurous fumes, flames and hot ashes. The scene afterward was frightful. It was dark as pitch; flames were leaping from the mountain and the air was charged with brimstone; a deep silence reigned in the dead town, which was a mass of flames; the ships riding at anchor were blowing up at intervals.

“For some weeks earthquake shocks had been felt in the northern districts of St. Vincent, chiefly between the Soufrière and the sea, called the Carib country. On May 3 19 shocks were felt within half an hour. On Monday they increased in severity and many people fled. On Tuesday smoke was seen issuing from the volcano. The people, having no boats, began to trek across country. One man said the earth was too hot to walk on, and he saw boiling water in the crater. At 3 p. m. jets of flame sprang up from the older of the two craters, and at 5 there was an explosion, which caused uneasiness in Kingstown, 16 miles away. The Administrator sent the Chief of Police, a colonial surgeon, and a district warden to investigate. They arrived at midnight and found the crater blazing in indescribable splendor.

“Next morning the whole range of mountains was affected. Jets of

steam and fire were issuing from crevices, and terrific detonations were occurring. At 1 p. m. both craters erupted and threw out gigantic volumes of lava, steam, stones, mud, and ashes, accompanied by lightning flashes. Great streams of lava poured over the brim and from the many different fissures and rushed down to the sea, reducing the whole face of the Carib district to cinders.

“The people of Wallibu, Morne Ronde, and Richmond, at the foot of the Soufrière, escaped, but large numbers of others were killed by lightning and stones, some of these being 18 inches in circumference.

“Extensive physical changes have taken place. The sea has risen in the Wallibu district; the Richmond estate is engulfed, the top of the chimney alone being visible; the countryside is covered over 2 feet with ashes. During the eruption Kingstown was enveloped in darkness, and scorious pebbles fell in a hail. The dust there was 1 inch deep.”

CHAPTER V.

FRIGHTFUL PRANKS OF MONT PELEE.

INHABITANTS OF ST. PIERRE WARNED BY MINOR ERUPTIONS SEVERAL DAYS BEFORE THE DESTRUCTION OF THE TOWN—EVIDENCE IN LETTERS WRITTEN BEFORE THE ERUPTION—A SERIES OF ERUPTIONS FOLLOWED THE GREAT UPHEAVAL.

The dark and rugged mountain that loomed over the doomed City of St. Pierre had, before the terrors of the May days of 1902, a record for activity at intervals, and was in its lofty steeps exceedingly desolate and threatening. Notwithstanding the people dwelt in that queer state of confidence peculiar to the inhabitants of the fertile slopes of the volcanoes, below the immediate presence of the craters, and where the ancient lava beds have become soil that is tempting.

The news came from Paris nearly a fortnight after the destruction of St. Pierre that letters from writers who perished in the waves of lava and clouds of fire record strong expressions of alarm five days before the hideous disaster. The letters are full of hope and fear, for the volcano was becoming furious, yet none fled from the threatened disaster. Instead, the letters relate that the suburban population flocked into the city, expecting to find protection beneath its secure roofs.

One of the letters published in Paris was written by a young woman May 30. After describing the aspect of St. Pierre before dawn, the town being lit up with flames from the volcano, everything covered with ashes, and the people greatly excited, yet not panic-stricken, she wrote:

“My calmness astonished me. I am awaiting the event tranquilly. My only suffering is from the dust which penetrates everywhere, even through closed windows and doors. We are all calm. Mamma is not a bit anxious.

“Edith alone is frightened. If death awaits us there will be numer-



ST. PIERRE, MARTINIQUE, showing Structure of Buildings, Tropical Foliage and Mountain Ranges in the Rear.



ST. PIERRE, MARTINIQUE, from the Roadstead, Showing Mount Pelée in the Distance.

ous company to leave the world. Will it be by fire or asphyxia? It will be what God wills. You will have our last thoughts. Tell Brother Robert that we are still alive. This will, perhaps, be no longer true when this letter reaches you." The Edith mentioned was a woman visitor among the rescued. This and other letters inclosed samples of the ashes which fell over the doomed town. The ashes are a bluish-gray impalpable powder, resembling newly ground flour and slightly smelling of sulphur.

Another letter, written the afternoon of May 3, says: "The population of the neighborhood of the mountain is flocking to the city. Business is suspended, the inhabitants are panic-stricken and the firemen are sprinkling the streets and roofs to settle the ashes which are filling the air."

Still another letter says: "St. Pierre presents an aspect unknown to the natives. It is a city sprinkled with gray snow, a winter scene without cold. The inhabitants of the neighborhood are abandoning their houses, villas and cottages and are flocking to the city. It is a curious pell-mell of women, children and barefooted peasants, big, black fellows loaded with household goods. The air is oppressive; your nose burns. Are we going to die asphyxiated? What has to-morrow in store for us? A flow of lava, rain of stones or a cataclysm from the sea? Who can tell? Will give you my last thought if I must die."

A St. Pierre paper of May 3, received by mail, announces that an excursion arranged for the next day to Mont Pelee had been postponed, as the crater was inaccessible.

The eruption of Pelee that began with the destruction of the City of St. Pierre continued with uncommon pertinacity, and as has often happened, the agitation of the fiery forces deep in the earth has been answered with sympathetic vibrations in far distant lands. It is memorable that the Lisbon earthquake that proved so destructive to life by the sinking of a marble quay, that seemed the place least liable to danger, was felt distinctly over one-third of the earth's surface. The Krakatoa erup-

tion was recorded by scientific instruments around the world, and the sound of the explosion was distinct thousands of miles. The furious revival of the Pelee phenomena, twelve days after the top of the mountain was blown off, as if all the dynamite in the world had been exploded, was accompanied by a formidable shake in California. A Port de France cable gives a thrilling account of the second grand commotion of the prodigy of fire alarms:

Fort de France, May 20.—Four ships had a narrow escape from destruction in the harbor of St. Pierre yesterday. The British cruiser *Indefatigable*, the United States tug *Potomac*, the steamer *Estafette* and the dredger *Converino* were caught in a heavy shower of lava, caused by the renewal of the tremendous eruptions from Mont Pelee. The vessels barely got away before catching fire in the dense gloom caused by smoke and ashes thrown from the volcano.

At 6 o'clock yesterday morning the steamer *Estafette* proceeded hence for St. Pierre. Mont Pelee was very active and smoke and ashes thrown from the volcano were visible for the entire distance from Fort de France to the ruined city. When the *Estafette* reached Carbet, a suburb of St. Pierre, the gendarmes there stopped the steamer, declaring that it was unsafe for her to venture nearer to the volcano. After a short stop the *Estafette* proceeded, followed by the dredger *Converino*, which had a party of laborers on board who were to be employed in destroying the bodies of victims.

As these laborers landed there was a tremendous eruption, and they returned with all possible speed to the dredger, which steamed away for Fort de France. Immediately afterward those on the *Estafette* saw about fifty fugitives on the beach. The eruption subsiding for a time the *Estafette* steamed close in shore with the object of taking the fugitives on board.

About this time the American naval tug *Potomac* arrived for the purpose of recovering the bodies of the American and British Consuls. A party from the ship went ashore, and shortly afterward the British

cruiser *Indefatigable* arrived. Before the cruiser could be anchored there were several tremendous eruptions. The sight was a terrible one. The *Indefatigable* immediately proceeded out to sea, with the *Estafette* following her. The *Potomac* cast loose and steamed slowly southward, blowing her whistle continuously.

All the ships came near catching fire. Immense quantities of lava were falling into the sea, and the clouds of smoke and ashes were miles in extent.

Fort de France, Martinique, May 19.—Mont Pelee's activity still continues to be a source of the greatest apprehension to the residents of this city and other sections of the island. The volcano continues to throw out immense quantities of cinders, which, owing to a change in the direction of the wind, are now covering the southern sections of the island. Violent explosions have been heard at Le Carbet.

The American and English officers who have been searching the ruins of St. Pierre for the bodies of the United States and British Consuls and their families have found the remains of Mr. Prentis, the American representative, and the members of his family. They will be brought to Fort de France, where Mr. Prentis will be buried with military honors.

The American collier *Sterling* has started for St. Vincent, where she will land provisions and medical supplies.

The captain of the French cruiser *Suchet* and other officers are discussing the question of bombarding the ruins of St. Pierre when the French squadron arrives.

Paris, May 19.—M. Decrais, the Minister for the Colonies, has received the following dispatch from Acting Governor L'Huerre of Martinique, dated Fort de France, Sunday:

"Instructions have been given to forward to you duplicate reports of the distribution of relief supplies. I have informed the inhabitants that provisions are expected on the United States naval vessel *Dixie* and the steamships *Fontabelle* and *Madlana*. I shall exempt the cargoes from

duties, as I have done in the case of former consignments. Captain Hugh J. Gallagher, an American army officer, is expected to arrive aboard the Dixie to supervise the distribution of supplies. It has hitherto been unnecessary to make money grants to the victims, but food has been distributed with incomparable devotion by the Mayor and Relief Committee. I am occupied in giving work to the refugees.

"I returned on the cruiser Suchet on Saturday. The territory between St. Pierre and Precheur is completely ravaged. Grand Riviere is buried in cinders. The large properties at Macouba and Basse Pointe are in good condition. The small properties in Lorraine have been damaged. The people are quiet and brave. Distribution of food has been made to the victims at Grand Riviere, Macouba, Basse Pointe, and Lorraine. I have appointed a commission to examine the demands made by the survivors of families who have disappeared at St. Pierre. A search is being made under the inspection of the police for valuables, which, if recovered, will be placed in the care of the police and handed to the proper owners."

CHAPTER VI.

THE NAME OF THE TERRIBLE MOUNTAIN.

DETAIL OF THE HORRORS OF THE RUINED CITY—FATAL CONSERVATISM OF THE GOVERNOR OF MARTINIQUE—REPORT OF THE ADVENTUROUS SCIENTIFIC EXPLORATION OF MONT PELEE, AND THE DARING JOURNEY TO THE CRATER OF GEORGE KENNAN, THE HISTORIAN AND CORRESPONDENT.

The name of the terrible mountain in Martinique, which has so suddenly acquired so vast a distinction, is not everywhere interpreted to mean the same thing. They have in Hawaii, where the most constant and enormous active volcanoes in the world are located, a superstition about a goddess Pelee, and it is alleged to have been one of the customs of the natives to sacrifice to the fire goddess, that she may be propitiated, white pigs; but there is no stated formality of offering the animals beyond casting occasionally a suckling into the boiling crater. The word Pelee there has become identified especially with the lava which streams down the mountains in a style alleged at times to resemble a flood of hair. The lava, therefore, is Pelee's hair! In the French definition of the word, the coarser and more familiar description of it is that the mountain that furnishes the fireworks is "bald-headed," and instead of having reverence for the display, it is held to be that the mountain is personified as a ragamuffin. There seems to be a certain contradiction between the Hawaiians and the French. However, whatever hair there may be of the texture of lava, the head of the mountain, down whose sides it flows, in shapes that bear a rude resemblance to cold molasses, and remotely suggest masses of disordered auburn hair, it is no misnomer to call the mountain bald at the top.

According to the opinion of the people at large at the time the news

of the outburst of Mont Pelee in Martinique, on the 8th of May, was extremely exaggerated, and there was a general expression of surprise that the first reports rapidly received confirmation; that the disasters inflicted were magnified as the details came in. There was something of that as more careful and competent observers reported the result of their investigation. Three days after the outbreak of Pelee, there was this dispatch from Fort de France: "The disaster is complete; the city of St. Pierre wiped out. Consul Prentis and his family are dead. The Governor says thirty thousand have perished; fifty thousand are homeless and hungry." All this has been verified. It was received with great incredulity.

Lafcadio Hearn, in 1888, wrote of his arrival at St. Pierre: "Morning: A gold sunrise. The wind has fallen. It is a great, warm caress. The sea is deep indigo, the sky a cloudless and tender blue. Martinique looms before us. At first it appears all gray, a vapory gray; then it becomes bluish gray; then all green.

"It is another of the beautiful volcanic family; it owns the same hill shapes with which we have already become familiar; its uppermost height is hooded with the familiar cloud; we see the same gold yellow plains, the same wonderful varieties of verdancy, the same long green spurs reaching out into the sea—doubtless formed by old lava torrents."

He added in his style of sunset colors: "The semicircular sweep of the harbor, dominated by the eternally veiled summit of the huge Mont Pelee (misnamed, since it is green to the very clouds) from which the land slopes down on either hand to the sea by gigantic undulations, is one of the fairest sights that human sight can gaze upon.

"The city of St. Pierre, on the edge of the land, looks as if it had slid down the height of the hill behind it, so strangely do the streets come tumbling down the steep in cascades of masonry, with a red billowing of tiled roofs over all and enormous palms poking up through it, higher even than the white twin towers of its antiquated cathedral. We

anchor in limpid blue waters; the cannon shot is answered by prolonged thunderclapping of mountain echoes.

“We are anchored in St. Pierre, the quaintest, the queerest and the prettiest withal among the West India cities; all stone built and stone flagged, with very narrow streets, wooden awnings, iron balconies and peeked roofs of red tiles pierced by gabled dormers. Most of the buildings are painted in a clear pale yellow tone.”

It was the fashion in Martinique to indulge the pleasant theory that the sinister mountain, overlooking the greater city of the island, had an added interest because it was a “thunder mountain” and had been engaged in mischief; that there was a certain charm in living so near a mass of matter that might convert the smiling landscape suddenly into a horrible chaos. There was something fascinating in the vague but substantial opinion that there was an ever present danger giving a peculiar zest to life. The people, well accustomed to the trembling of the earth and the rumbling of the mountain, wanted very positive evidence of peril to move them to think of hastening away from their homes. They lived in an old town and it had never been destroyed, though often disturbed, and it was quite politic, therefore, for the Governor of the island to declare, after going to the mountain, which was giving out warning, that there was nothing very important likely to happen. He had directed Professor Landes, of the University of St. Pierre, to make an investigation of Mont Pelee, and the Professor went to the crater of the volcano, found the forces at work that would cause an eruption, telegraphed the Governor in cipher, and that gentleman was so accurate as to think and say, officially, that the destruction of the city would “not happen later than the 8th of May,” the very day when St. Pierre was wiped out by floods of mud and clouds of fire. American correspondents on the ground state that the dispatch of Professor Landes predicting the end of the city is held a secret by the government. The popular thing with the business men of St. Pierre was to oppose the theory that there was danger from Mont Pelee. On the last day but one of St. Pierre there was heard by

the swarm of people in the market place a growl from the fiery giant, "a deep-toned jarred growl." The top of the mountain at the time was hidden in a white mist, and that seemed to comfort the people. But they were slightly alarmed when ashes, very fine and white, began to fall from the clouds on the brow of the mountain. The rumbling was not continued. A band of music had played on the night of May 1st, on the plaza of St. Pierre, and the young people talked lightly of Old Pelee. There was a lawn party on that evening. The mist about the top of Pelee seemed to cling there, and there was a thunder storm over the mountains, the people noticing that the flashes of lightning were not from the crater close at hand. But there was a gradual growth of apprehension, and when a black column of smoke arose, something of fright—and such eyes as two thousand years ago saw the towering pine tree with branches of fire ascending and quivering from the crater of Vesuvius, are said on this occasion to have beheld a swelling figure of smoke, black as a pall; and that piercing through the white shroud, it reared "billows of crape into the form of a great up-ended coffin." There was another growl from Pelee, grander and more savage than the first. This was Sunday morning, and "a small river of hot black mud, touched here and there with red, was seen to come snaking down from out the mists screening Pelee's summit, to cascade over a hundred foot precipice." The hideous stream destroyed a factory and many lives, and so commenced the dreadful desolation.

The hand of the government appeared at this point. Fort de France is the seat of local authority, as it was the station of the French navy when France disputed with England supremacy on the seas. The governor got warning and went so far as to say that if Pelee destroyed St. Pierre, it should destroy him. He didn't want to have the grand and noisy old mountain officially branded as dangerous. That would be unpopular, and, therefore, he restrained himself from giving his august countenance up to a panic, but he got out of town.

The correspondent of the *Record-Herald*, on the spot, gives this inci-

dent of the utility under such circumstances of common sense as coolly measures the most sensational experiences :

“Out in the bay was anchored an Italian vessel, a craft which had come in a few days before and which was to have awaited there instructions from her Genoese owners. After the train of pebbles and sand and the stream of mud the captain went to his consul and notified him of his intention of immediately putting to sea.

“‘I know nothing of Pelee,’ the master said to the consul, ‘but I have lived in Naples and I know Vesuvius.’

“‘That man,’ reflected the consul after the mariner had made a hurried exit from the consulate, ‘apparently knows about volcanoes.’ And within the hour the consul and his family were hastening to a place of safety.”

Letters written from Martinique twenty days subsequent to the disaster, say that “forty thousand lives of St. Pierre were blotted out quietly as one snuffs a candle.”

The morning of the last day of the city there was an unwonted silence. There was a profound public consciousness of danger. Pelee continued to smoke and emit clouds of ashes, but the wind sent the smoke and ashes away from the city, and while the clouds were seen from a great distance, and ashes fell on ships a hundred miles away, the people of St. Pierre, as the wind did not blow the news verified by ashes to them, were not aware of the portentous emission from the mountain. They had heard that the geologists had been on hand and surveyed Pelee, and there was a story that soldiers were being sent to take care of the people, and there was a misplaced confidence in the military power. The governor arrived, and gave assurances, and returned that night, May the 7th, on the little steamer Topaz, and he did not succeed in perishing with his people.

The French cruiser Suchet was to have arrived at St. Pierre on Thursday morning, the last before the day of doom. Her machinery was damaged to some slight extent, and she waited. When the steamer ar-

rived the people were dead. The pity of it was the village of Carbet, with seven hundred people, with merely a high ridge between itself and St. Pierre, was a perfectly safe place, but no one sought safety in that quarter. The top of the ridge was the dividing line between the total destruction by the flood of fire and the preservation of the grasses and palms in all their greenness. The rolling sea of fire had not passed over the ridge to involve Carbet.

The United States consul was sitting on the veranda of his home, and a friend driving by in a buggy called to the consul and told him, "I am getting out, and you'd better get out of this." The consul said, "There is no need of anyone going away," and the man in the buggy reports himself to have retorted, as he whipped up his team, "It is better to be safe than sorry." There was a telephone between Fort de France and St. Pierre, and one in the Fort at 7:55, May the 8th, heard a shriek over the 'phone, and heard no more. That was the hour and the minute when the city was smitten by fire that consumed the lives of its inhabitants.

It seems that through forces not altogether accountable a prodigious burst of flaming gas arose from the crater of Pelee and was carried directly upon the city itself, and in the twinkling of an eye the city was a ruin in the solitude—St. Pierre as dead as Pompeii. People died in their wrecked homes, "sealed forever under tons of boiling mud, avalanches of scoria, and a hurricane of volcano dust."

The correspondent of the *Record-Herald* gives a most touching story of the fate of United States Consul Prentis and his wife and two daughters. Mr. Prentis and Ayme, stationed at Guadeloupe, had talked of exchanging their places, as each thought better of that which the other had. It became the sad duty of Mr. Ayme to penetrate to the house occupied by the dead consul, and "in the ruins of the structure between what was formerly Mr. Prentis' consular office and the apartment used as his family dining-room, were uncovered what are believed to be the remains of the consul and his wife. Mr. Ayme carefully noted the loca-

tion and then consulted with the captain of the U. S. S. Cincinnati. Two metallic caskets were brought by the cruiser to receive the bodies."

While the identification could not be absolute, there is reason to believe there is authenticity.

Mr. Sherman Morse, correspondent of the *Herald* of New York and Chicago, explains that the unparalleled disaster to St. Pierre—according to the judgment of the officers of the cruiser Cincinnati, who made an investigation of the ruins, that a crater was opened in the side of the volcano nearest the city, and from this vent issued the gas that the breeze carried straight over St. Pierre; and in support of this it is said:

"The lines of demarcation of the gaseous river are as plain as though they had been drawn by a ruler laid down the slope, narrowing at the mountain's top to open fan-shaped as it neared the ocean, and including every section of the doomed city within its deadly radius. Heavier than the air, it seemed to have rolled down the long sweep of mountain side to bank itself many hundreds of feet deep over spires and roofs.

"The very few eye-witnesses who are left agree that the flame flashed from mountain to city, from which fact it is argued that the gas was ignited near its vent by a flash of the lightning that is almost continuously playing around Pelee's crest.

"This theory, if correct, explains much that would otherwise be hard to comprehend. It would explain why the ruined walls of the city are tumbled in every conceivable direction, some falling toward the mountain, some toward the sea. Some reeled toward the north side of the basin, some staggered toward the south. It looked as though there had been a thousand simultaneous but separate explosions."

The intensity of the heat of the deadly volume of gas may be estimated from the fact that it requires 2,800 degrees of heat to fuse wrought iron, and that irons in the center of a green park were fused and twisted out of shape. The specification is, that the wrought iron pipes of cast-iron gargoyles, four hundred feet distant from any build-

ing, in the center of the park, were few. The people were killed by suffocation in their houses or fields where they were at work, or on the road, some sitting upright in chairs, in attitudes showing that death must have been instantaneous.

The gas capable of such a sweep of fire and a heat so frightful as to consume everything before it, with a fatality as indiscriminate and universal as that in the depths of the coal mines, when there is an explosion, seems never before to have been identified in the history of volcanoes. It is not surprising that such a gas should exist to be developed under such circumstances, with consequences appalling as are recorded here. And the problem of the solution of this mystery is one well worthy investigation by scientific processes, else there is a new terror entered into the experiences of mankind. The mountain seems to have entertained a sight seer, one who was engaged in investigation when the explosion took place, and by extreme exertion he lived to give this account of himself:

“I heard a violent noise within the mountain, and at a spot about a quarter of a mile off the place where I stood the mountain split; and with much noise from this new mouth a fountain of liquid fire shot up many feet high, and then, like a torrent, rolled on directly toward us. The earth shook at the same time that a volley of pumice stones fell thick upon us. In an instant clouds of black smoke and ashes caused almost total darkness; the explosions from the top of the mountain were much louder than any thunder I ever heard, and the smell of the sulphur was offensive. My guide, alarmed, took to his heels, and I must confess that I was not at my ease; I followed close, and we ran nearly three miles without stopping. As the earth continued to shake under our feet I was apprehensive of the opening of a fresh mouth, which might cut off our retreat. I also feared that the violent explosions might detach some of the rocks off the mountain of Somma, under which we were obliged to pass; besides the pumice stones, falling upon us like hail, were of such a size as to cause disagreeable sensations.”

Professor Robert T. Hill, United States Government Geologist, and head of the expedition sent by the National Geographical Society, arrived at Fort de France May the 26th, from a courageous and extremely intelligent investigation of the volcanic activity in Martinique. He chartered a steamer and examined the coast to the extreme northern end of the island, making many landings.

After landing at Le Precheur, five miles north of St. Pierre, he walked through an area of active vulcanism to the latter place and made a minute examination of the various phenomena disclosed.

Professor Hill is the first and only man who has set foot in the area of craters, fissures, and fumaroles, and, because of his high position as a scientist, his story is valuable.

In addition to his work of investigation the professor rescued in his steamer many poor people of Le Precheur, who had ventured back after deserting their homes and found themselves in awful danger. He reports as follows:

“The zone of the catastrophe in Martinique forms an elongated oval, containing on land about eight square miles of destruction. This oval is partly over the sea. The land part is bounded by lines running from Le Precheur to the peak of Mont Pelee, thence curving around to Carbet.

“There were three well-marked zones. First, a center of annihilation, in which all life, vegetable and animal, was utterly destroyed, the greater northern part of St. Pierre was in this zone; second, a zone of singeing, blistering flame, which also was fatal to all life, killing all men and animals, burning the leaves on the trees, and scorching, but not utterly destroying, the trees themselves; third, a large outer, non-destructive zone of ashes, wherein some vegetation was injured.

“The focus of annihilation was the new crater midway between the sea and the peak of Mont Pelee, where now exists a new area of active vulcanism, with hundreds of fumaroles or miniature volcanoes. The

new crater is now vomiting black, hot mud, which is falling into the sea. Both craters, the old and the new, are active.

"Mushroom-shaped steam explosions constantly ascend from the old crater, while heavy ash-laden clouds float horizontally from the new crater. The old ejects steam, smoke, mud, pumice, and lapilli, but no molten lava.

"The salient topography of the region is unaltered. The destruction of St. Pierre was due to the new crater. The explosion had great superficial force, acting in radial directions, as is evidenced by the dismounting and carrying for yards the guns in the battery, on the hill south of St. Pierre, and the statue of the Virgin in the same locality, and also by the condition of the ruined houses in St. Pierre.

"According to the testimony of some persons there was an accompanying flame. Others think the incandescent cinders and the force of their ejection were sufficient to cause the destruction. This must be investigated. I am now following the nature of this."

As the *Herald* boat ran from San Juan, Puerto Rico, on the 23d of May, the sail was for fifty miles through a heavy cloud of ashes. She did not put in at St. Pierre because the danger would have been great and the utility very slight if not imperceptible. When the boat arrived at Fort de France, her decks were deeply coated with ashes.

Lieutenant McCormick arrived at Castries, St. Lucia, on the night of May 22d, and on the Potomac were the scientists who went to Martinique on the *Dixie* dispatched by the national authorities.

The second series of eruptions of Mont Pelee changed the entire aspect of the ruins of St. Pierre. Lava, effacing all landmarks, had entombed the entire city, and the appearance of it was that it might have been buried for hundreds of years. The situation greatly interfered with the rapidity of critical investigation. A huge rent could be seen from the deck of the Potomac on the south slope of Mont Pelee, and the lava flowed incessantly over the hills to the west and into the sea. Some time after Pelee resumed eruptions, after a few days omitting to do great

violence, the mountain was the center of an electric storm. Discharges of terrific electric force were almost continuous, the indication of the sound being that there were astounding energies stored. Two steamers sailed with refugees from Fort de France, Martinique, May 22d, for West Indian and South American ports, and were crowded to the limit of safety, at least; and the departure of these vessels was attended by demonstrations of the frantic earnestness of the people to abandon the island. There were crowds on the wharves weeping because they had been unable to get away. The fears of another eruption prevailed with great intensity among the people, and the "poorer classes," which means especially the colored people who could not sail away, were making for the southern part of the island that they might be as remote as practicable from the volcano.

Soufrière, the sulphur pit, the volcano of St. Vincent, was reported from Kingston, by way of London, May 23d, as extremely active:

"Lava is streaming into the sea, while clouds of sulphurous smoke, extending for miles, obscured the land and compelled us to steam seaward, at full speed. We saw another crater, between La Soufrière and Chateau Belair, emitting stones, and also smaller vents elsewhere.

"The food of the peasantry is ruined and everywhere the island is blighted for fruit and vegetables. Cattle are being shipped to other islands for pasturage. The laborers in the sugar districts have killed their horses for food, and are now dying from diseases of the intestines caused by the lava dust."

A cable from Fort de France, May 28th, announced the return of Professor Hill, United States Government Geologist, who returned late the evening of that day from his extended and dangerous trip to the volcano. He stated that in several instances the activity of Mont Pelee was proceeding along lines unprecedented in the annals of science. He averred that extreme danger still hovered over Martinique and that in view of the extraordinary conditions prevailing it was impossible to

prophesy what the volcano might do next or when the subterranean forces might take new and devastating forms.

While a rescuing party was being organized to proceed by land to discover the whereabouts of George Kennan, the American author who was reported killed, Ferdinand Clerc, a wealthy land proprietor of Martinique, arrived and announced that Mr. Kennan and his party were safe on a plantation at the north end of the island.

Professor Hill gave a detailed story of his examination of the district through which he passed. He left Fort de France at 1 o'clock Monday afternoon. He was accompanied by Mr. Cavanaugh, an army officer from the British island of Trinidad, and a boy named Joe, who was to act as interpreter. The party set out on horseback and took the direct north road for Morne Rouge.

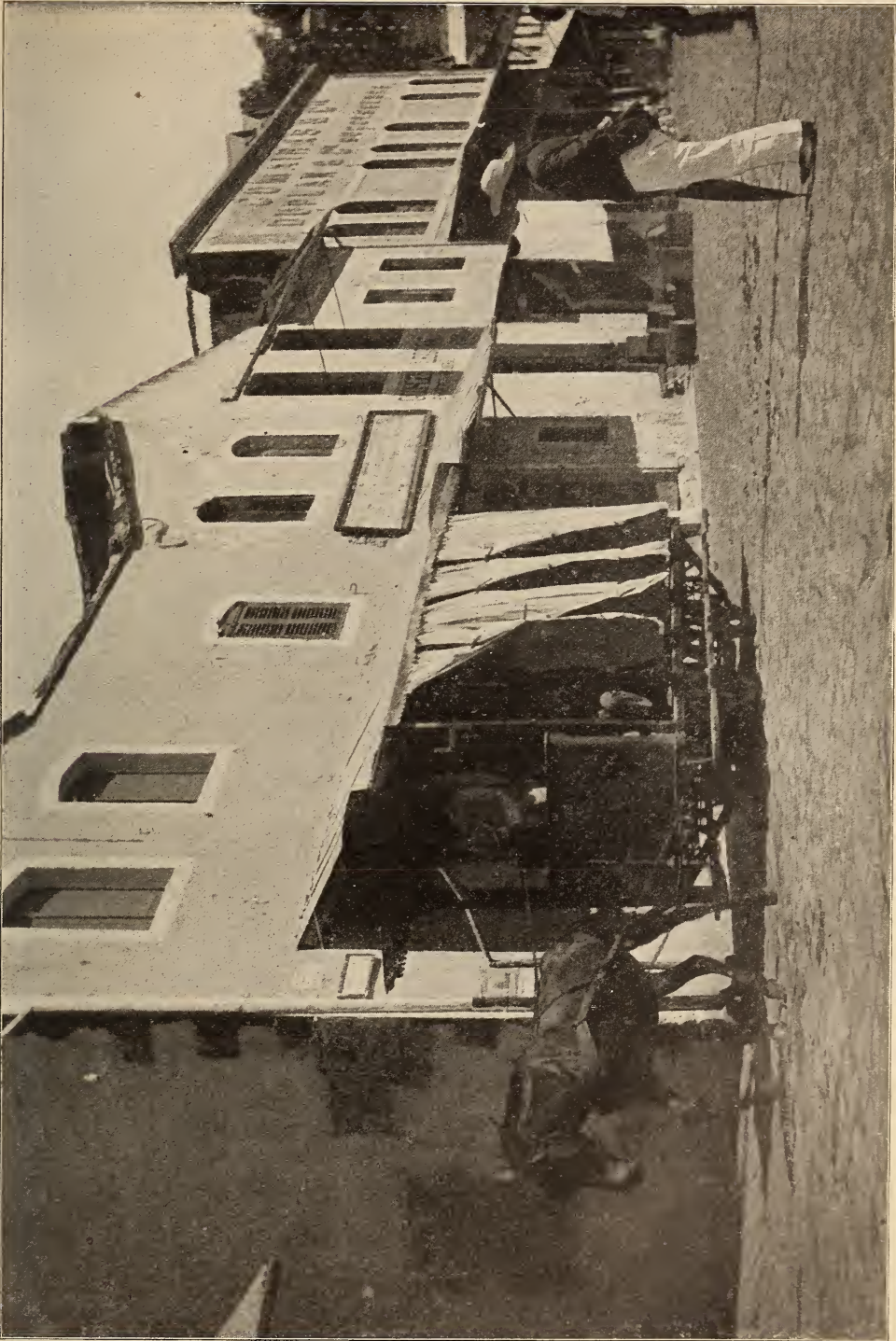
Between the hamlets of Deux Choux and Fonds St. Denis the party entered upon the outer edge of the zone of ashes. Except for occasional patches all the country to this point was green. Upon reaching the Raibaud plantation, one mile southwest of St. Pierre, the explorers met the clear line of demarcation of the zone of flame and destruction, although not of annihilation.

Monday night was spent in a deserted house at Fonds St. Denis, from which Professor Hill witnessed and studied the volcanic eruption of that night. At this point the horses of the party became exhausted.

Early the next morning Professor Hill pushed on to Mont Parnasse, where several people were killed in the eruption of May 8. He encountered no human beings, but he did meet a number of abandoned cattle, which tried to follow him.

From Mont Parnasse the explorer proceeded to Morne Rouge, where he succeeded in getting a number of important photographs. He found that a close approach to Mont Pelee was impossible, and as his actual position was dangerous he started back in a southerly direction.

At Champs Flore Professor Hill's horse gave out completely and he secured the services of native guides, who led him by wild mountain



TRANSPORTATION, OR STREET CAR, in St. Pierre, Martinique.



SCENE IN ST. PIERRE, Martinique. Handling Tobacco in Hogsheads.

paths back to Fonds St. Denis and Deux Choux. Tuesday night was spent at the latter place.

From this point Professor Hill sent a messenger into Fort de France with a request that a carriage be sent for him. Wednesday morning the professor left Deux Choux and walked to within fifteen kilometers of Fort de France, where he borrowed an old horse from a negro and continued his way mounted. The carriage met him five kilometers from Fort de France and brought him back to town, where he arrived at 11 o'clock this morning.

Professor Hill heard the explosion of this morning while on his way into Fort de France, and he says a cloud of black smoke at a great height was drifting slowly to the southeast.

Speaking personally of his expedition to Mont Pelee, Professor Hill said: "My attempt to examine the crater of Mont Pelee has been futile. I succeeded, however, in getting very close to Morne Rouge. At 7 o'clock Monday night I witnessed, from a point near the ruins of St. Pierre, a frightful explosion from Mont Pelee and noted the accompanying phenomena.

"While these eruptions continue no sane man should attempt to ascend the crater of the volcano. Following the salvos of detonations from the mountain gigantic mushroom-shaped columns of smoke and cinders ascended into the clear, starlit sky and then spread in a vast, black sheet to the south and directly over my head.

"Through this sheet, which extended a distance of ten miles from the crater, vivid and awful lightning bolts flashed with alarming frequency. They followed distinct paths of ignition, but were different from lightning in that the bolts were horizontal and not perpendicular.

"This is indisputable evidence of the explosive oxidation of the gases after they left the crater. This is a most important observation and explains in part the awful catastrophe. This phenomenon is entirely new in volcanic history.

"I took many photographs, but do not hesitate to acknowledge that

I was terrified. But I was not the only person so frightened. Two newspaper correspondents who were close to Morne Rouge some hours before me became scared, ran three miles down the mountain and hastened into Fort de France.

"The people on the north end of the island are terrified and are fleeing with their cattle and effects. I spent Tuesday night in a house at Deux Choux with a crowd of 200 frightened refugees.

"Nearly all the phenomena of these volcanic outbreaks are new to science, and many of them have not yet been explained. The volcano is still intensely active and I cannot make any predictions as to what it will do."

The story as related by Ferdinand Clerc is also quite interesting. He says:

"Mr. Kennan and his party have been with me. We got around the mountain and reached the new crater not far from Ajoupa Bouillon. We discovered that it had broken out at the very head of the River Falaise and about 200 yards from the high road. Our party rode directly to the edge of the crater, as it was then quiescent.

"We saw that a great slice of the mountain had fallen, leaving exposed a perpendicular cliff. In this cliff were five huge tunnels which were not smoking. The crater is a great, sloping, oval depression, from which smoke issues as it does from the great crater, with the exception that here and there were a few ashes in the smoke. The River Falaise is boiling hot and so muddy that one quart of water weighed four pounds. Volcanic stones of the nature of pumice float in this water.

"Mr. Kennan witnessed the explosion of Monday night and was much interested in the phenomena. The explosion was accompanied at intervals by a bright light which lasted for half an hour at a time. This light was steady and illuminated the entire mountain top. Professor Hill says he did not see this light. I left Mr. Kennan and his party in good health and in safety. They seemed to be in no hurry to come back to Fort de France."

The explosion of this morning was accompanied by an enormous column of smoke, which rose fully three miles into the air, but which was largely hidden from the view of the people of Fort de France by a heavy cumulus. There was, consequently, no panic here. This column of smoke was seen from the British cruiser Indefatigable while she was at sea.

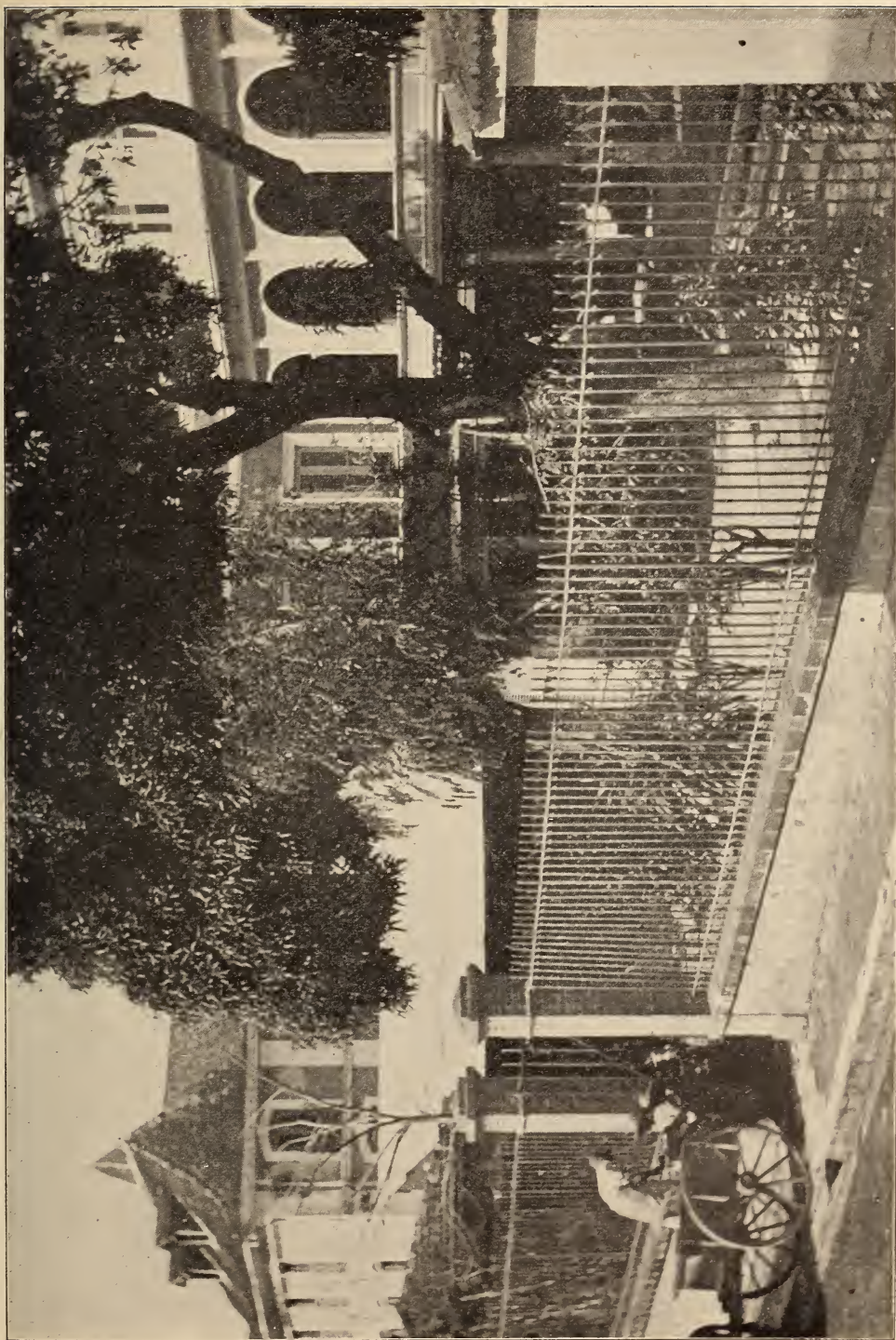
CHAPTER VII.

WORLD-WIDE CHARITIES.

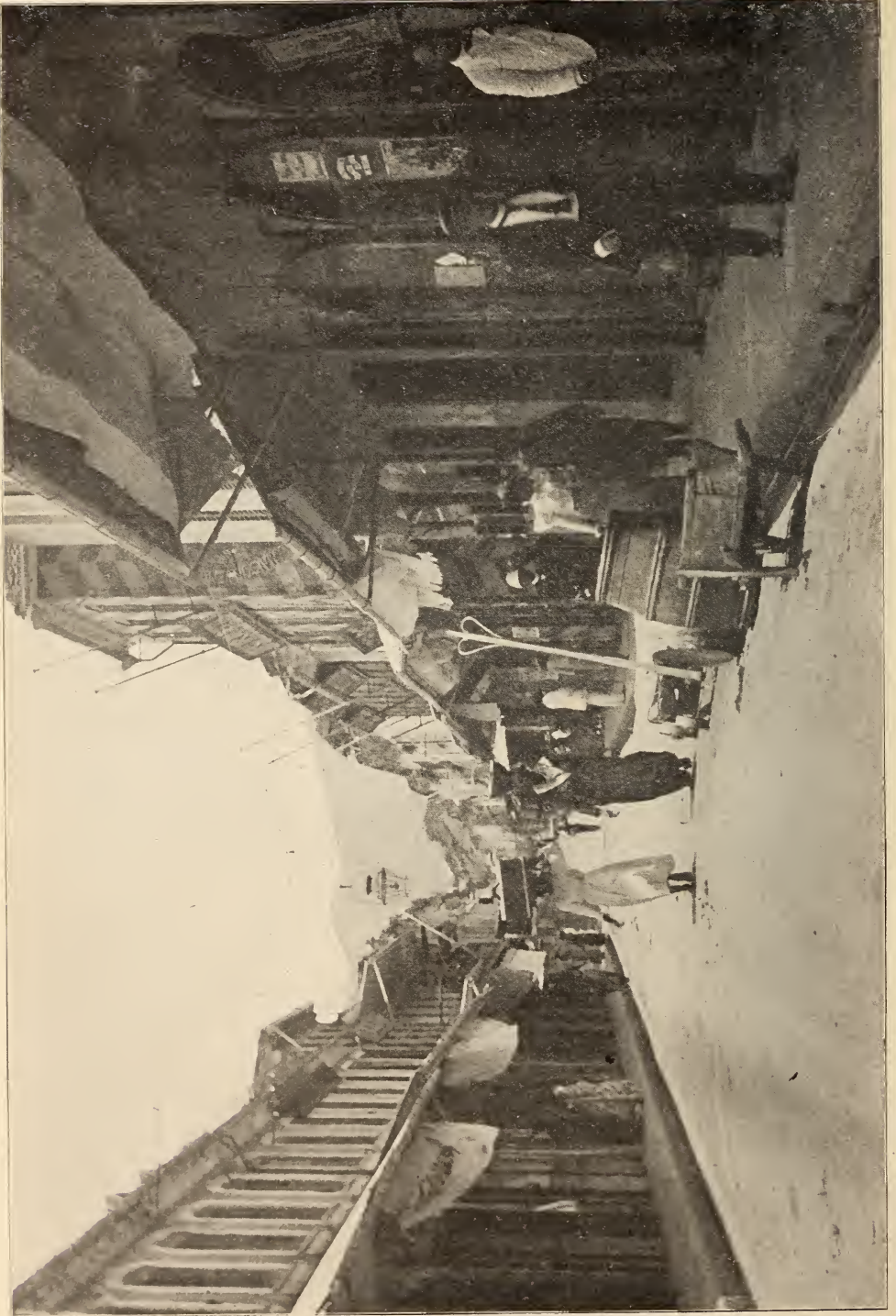
THE UNITED STATES LED THE WAY IN OFFICIAL ACTION—PUBLIC SUBSCRIPTION AND THE DISPATCH OF RELIEF SHIPS—PRESIDENT ROOSEVELT WAS FIRST AND EMPEROR WILLIAM A GOOD SECOND.

President Roosevelt did not wait for Congress to act before beginning preparations for the dispatch of relief, feeling sure that such action would be prompt and favorable. Secretary Hay was called in and a plan of work mapped out, Mr. Hay being charged with the duty of acquainting Secretaries Root and Moody with the President's wishes. The Treasury Department was instructed to co-operate, and it is supposed that this will mean the employment of the revenue cutters and the medical officers of the marine hospital service. The War Department, with its well-organized supply departments, was regarded as in better position than any other institution to take charge of the relief measures except that it had no means of transportation, the Sedgwick, which is out of condition, being the only army transport on the Atlantic coast. Fortunately the navy had a handy ship in the Dixie, which arrived at New York recently from a training cruise. Having been a merchant freighter, she is admirably adapted to the service required of her now.

Secretary Moody immediately telegraphed orders to Captain Berry, her commander, to ship army supplies to be offered him and to sail at the earliest possible moment for Martinique. He was authorized to extend relief to other islands if he found any necessity for so doing. Navigation bureau officers estimated that she can be coaled and provisioned and got under way in a day or two. The scientific department of the government availed itself of the opportunity to send on the Dixie



VIEW IN ST. PIERRE, MARTINIQUE, showing the Rear of the City Hall.



IN VICTOR HUGO STREET, St. Pierre, Martinique, the Shopping Street of the Town.

as passengers or observers two professors from the geological survey. A Harvard volcano specialist was also given passage. The United States steamship Buffalo, also a converted merchant freighter, was prepared as a relief ship if the Dixie should not suffice.

Adjutant-General Corbin, Quartermaster-General Ludington, Commissary-General Weston and Surgeon-General Sternberg were charged by Secretary Root with the arrangement of that part of the relief measures pertaining to the War Department. Official orders were dictated for the guidance of the three supply departments, giving the scheme of distribution as follows:

Three medical officers, with \$5,000 worth of medical stores, etc.; one subsistence officer, with \$70,000 in stores, consisting of rice, dried fish, sugar, coffee, tea, canned soups, condensed cream, salt, pepper and vinegar; one officer of the quartermaster's department, with \$20,000 worth of clothing supplies for men, women and children.

Secretary Root indorsed the scheme as follows:

"The above distribution is approved, and the purchases will be made accordingly, ready for shipment in case the pending bill for relief of Martinique becomes a law."

The orders directed that these officers and stores be sent on the Dixie, to be distributed at such points as may be designated by the navy officer in command of the Dixie, under instructions given by the Secretary of the Navy. The medical officers were to render such medical aid as might be in their power in addition to the distribution of medical supplies.

General Weston, commissary, telegraphed immediately to Colonel Brainerd, the commissary officer at the New York depot, directing him to expend the allotment in the purchase of tea, coffee, sugar and the other foods agreed upon, and to see that these goods were loaded on the Dixie. Captain Gallagher, one of General Weston's most valued assistants, was selected to go to New York and proceed on the Dixie to Martinique. He was to be in complete charge of the distribution of

the stores, and a fund of \$5,000 was allotted to him for emergency expenses.

The character of the President's instructions to the departments concerned in the relief work may be gathered from the text of the following letter, which was delivered to Secretary Moody after the President had seen Consul Ayme's message:

"The President directs me to express to you his wish that your department go to the furthest limits of executive discretion for the rescue and relief of the afflicted islands in the Caribbean.

"JOHN HAY."

Rear Admiral Bradford, chief of the bureau of equipment, submitted to Secretary Moody the following suggestion in regard to the situation at Martinique:

"It has occurred to this bureau that the refugees from the Island of Martinique may suffer from want of good water. Naturally the surface water will be strongly impregnated with sulphur and thus be unsuitable for drinking purposes. There is a good water barge at Key West with a capacity of 175,000 gallons, ready for immediate use. There also is one at Norfolk, capable of 400,000 gallons, ready for immediate use. These may be towed to whatever locality is selected for a camp for the refugees at once. They can be refilled at Kingston, Jamaica, or Cape Haitien, Hayti, where there is an abundance of good water."

Prompt and generous was the response of the United States to the appeal for succor which came from the lava-strewn ruins of Martinique. All the machinery of the government was set in motion to hasten the departure of the relief ship with supplies and medicines.

President Roosevelt took the keenest personal interest in the preparations for extending a helping hand to the sufferers, and at his direction the Dixie was made ready for the voyage and supplies ordered purchased tentatively even before Congress had voted the money to pay for them. The President had no doubt of the prompt and generous

response of Congress, and he did not wish to lose a minute's time in dispatching our relief ship.

When the Senate bill was taken up in the House Mr. Underwood, of Alabama, who had objected to its consideration and had succeeded in delaying action, made a brief speech, in which he explained his opposition to the donation of public funds for such a purpose, insisting that private contributions should be relied upon for relief. General Grosvenor insisted upon a roll call upon final passage of the bill, in order to place the opposition upon record. The bill was passed by a vote of 196 to 9, the following Democrats being recorded in the negative:

"Burgess of Texas, Clayton of Alabama, Gaines of Tennessee, Lanham of Texas, Moon of Tennessee, Snodgrass of Tennessee, Tate of Georgia, Underwood of Alabama, Williams of Mississippi."

The bill was rushed to the Senate, where, on motion of Senator Fairbanks, the House amendment, doubling the amount and making \$200,000 immediately available for distribution by the President in relief measures and directing the use of naval vessels in the work of succor, was agreed to, Senator Cullom making an explanation that the bill was passed without prejudice to the President's recommendations and intimating that if the appropriation prove insufficient it would be increased.

The resolution, as adopted, was:

"To enable the President of the United States to procure and distribute among the suffering and destitute people of the islands of the French West Indies such provisions, clothing, medicines and other necessary articles and to take such other steps as he shall deem advisable for the purpose of rescuing and succoring the people who are in peril and threatened with starvation, the sum of \$200,000 is hereby appropriated.

"In the execution of this act the President is requested to ask and obtain the approval of the French government, and he is hereby author-

ized to employ any vessels of the United States navy, and to charter and employ any other suitable steamships or vessels."

President Roosevelt's message to Congress was as follows:

"One of the greatest calamities in history has fallen upon our neighboring Island of Martinique. The consul of the United States has telegraphed from Fort de France, under date of yesterday, that the disaster is complete; that the City of St. Pierre has ceased to exist, and that the American consul and his family have perished. He is informed that 30,000 people have lost their lives, and that 50,000 are homeless and hungry; that there is urgent need of all kinds of provisions, and that the visit of vessels for the work of supply and rescue is imperatively required.

"The government of France, while expressing their thanks for the marks of sympathy which have reached them from America, inform us that Fort de France and the entire Island of Martinique are still threatened. They therefore request that, for the purpose of rescuing the people who are in such deadly peril and threatened with starvation, the government of the United States may send as soon as possible the means of transporting them from the stricken island.

"The Island of St. Vincent and perhaps others in that region are also seriously menaced by the calamity which has taken so appalling a form in Martinique.

"I have directed the Departments of the Treasury, of War and of the Navy to take such measures for the relief of these stricken people as lies within the executive discretion."

Following is the text of the cablegrams between Presidents Roosevelt and Loubet on the Martinique disaster:

"Washington, May 10, 1902. His Excellency M. Emile Loubet, President of the French Republic, Paris:—I pray your excellency to accept the profound sympathy of the American people in the appalling calamity which has come upon the people of Mantinique.

"THEODORE ROOSEVELT."

“Paris, May 11, 1902. President Roosevelt:—I thank your excellency for the expression of profound sympathy you have sent me in the name of the American people on the occasion of the awful catastrophe in Martinique. The French people will certainly join me in thanks to the American people. EMILE LOUBET.”

Wiesbaden, Province of Hesse-Nassau, Germany, May 12.—Emperor William has telegraphed to President Loubet in French as follows :

“Profoundly moved by the news of the terrible catastrophe which has just overtaken St. Pierre, and which has cost the lives of nearly as many persons as perished at Pompeii, I hasten to offer France my most sincere sympathy. May the Almighty comfort the hearts of those who weep for their irreparable losses. My ambassadors will remit to your excellency the sum of 10,000 marks in my behalf, as a contribution for the relief of the afflicted.”

President Loubet replied :

“Am greatly touched by the mark of sympathy which, in this terrible misfortune that has fallen on France, your majesty has deigned to convey to me. I beg you to accept my warm thanks, and also the gratitude of the victims whom you propose to succor.”

Paris, May 12.—King Edward has sent 25,000 francs as his contribution to the fund being raised for the relief of the sufferers from the Martinique disaster.

The czar has telegraphed to President Loubet expressing the sincere sympathy of himself and the czarina, who share with France the sorrow caused by the terrible West Indian catastrophe.

Rome, May 12.—The pope to-day summoned the French ambassador, M. Nisard, to the Vatican and expressed to him his keen sorrow on hearing of the St. Pierre disaster. The pontiff requested that he be kept informed regarding the details of the volcanic outbreak.

London, May 12.—The colonial office received the following dispatch this afternoon from Administrator Bell, of the Island of Dominica, British West Indies :

"The Martinique catastrophe appears to be even more terrible than at first reported. Refugees arriving here this morning say that new craters are open in many directions; that rivers are overflowing and that large areas in the north of the island are submerged. Other districts are crowded with survivors. Almost total darkness continues. I do not believe Guadeloupe can adequately relieve the stupendous distress."

It is a matter for congratulation that the people of the United States were first, through the President and Congress and the people at large, to make such liberal contributions for the relief of sufferers, that funds were banked in part, and the Secretary to the President sent this message:

"Washington, May 19.—Graeme Stewart, Chicago: On Saturday immediately after receiving Consul Ayme's dispatch the President directed the Secretaries of War and Navy to inquire and report as to the true condition of affairs in Martinique and St. Vincent. These reports will be made public as soon as received. All the supplies and all the money subscribed hitherto have been urgently needed, but until further information is received it is deemed best that the receipt of subscriptions be suspended. GEORGE B. CORTELYOU, Secretary."

Still the amount of the relief fund continued to flow.

Washington, D. C., May 19.—Secretary Hay to-day received the following cablegram from United States Consul S. A. MacAllister at Barbados, West Indies, dated to-day:

"Sixteen hundred deaths at St. Vincent; 4,000 destitute. Immediate wants supplied. Aid needed for six months. This authentic."

The Navy Department received the following dispatch from Commander McLean of the Cincinnati:

"Fort de France, May 19.—Water barge not needed. Ashes and volcanic dust falling thickly here. Now like thick fog; decks covered."

The Potomac is reported to have reached St. Lucia yesterday.

The following statement was given out at the White House to-day:

"On Saturday, immediately on receiving Consul Ayme's dispatch

the President directed the Secretaries of War and Navy to inquire and report as to the true condition of affairs in Martinique and St. Vincent. These reports will be made public as soon as received. All the supplies and all the money subscribed hitherto have been urgently needed, but until further information is received it is deemed best that the receipt of subscriptions be suspended.

And this was the news of the next day:

Kingstown, St. Vincent, May 19.—Evidence of the formation of new craters, taken in connection with the fact that the volcano of La Soufriere continues to vomit up an uninterrupted stream of lava and clouds of steaming vapor, leads to the belief that this vent to the earth's boiling interior will never again become quiescent.

It is conceded that all the region within miles of the mountain's summit is to be rendered uninhabitable.

Jets of steam rise from the earth at various points on surrounding plantations, the ground is cracked and seamed with great fissures in every direction and the soil is so hot that explorers cannot approach the base of the volcano.

One of the new craters has been formed on the windward side of the mountain.

Paris, May 19.—Hot cinders belched out of Mont Pelee are being strewn in great quantities over the southern portion of the Island of Martinique to-day, according to official dispatches to M. Decrais, the French colonial minister, from Governor L'Huerre of Martinique. The wind has shifted since the volcano hurled its first blast of doom on the City of St. Pierre. Already the northern part of the island is a dreary waste, the once luxuriant foliage lying buried under great drifts of lava or a thick carpet of ashes. Now the wind is whirling the devastating product of Mont Pelee's continued eruption over and down upon the City of Fort de France and all the surrounding country.

Within the last two days Mont Pelee's fury has increased and the refugees at Fort de France, as well as the residents and those from

abroad, who are dispensing supplies that are now on hand in sufficient quantity to meet all needs, are experiencing the same conditions that prevailed in the City of St. Pierre five days before the deluge of fire blotted out the lives of the entire population.

Though it is feared that the present showers of ashes and cinders will blight all vegetation in the southern part of the island and make it wholly uninhabitable, the people do not expect any such visitation as overwhelmed St. Pierre. Violent explosions, however, have been heard at Le Carbet and these may presage another death-dealing eruption.

Governor L'Huerre also cables that there is no likelihood of riots in the northern part of the island. Though the remaining inhabitants are without work, they are peaceable, and will not start disorder unless driven to it by the pangs of hunger and the fear of starvation.



ST. PIERRE, MARTINIQUE, Seen from the Harbor, Showing Spires on the Cathedral.



THE MARKET IN ST. PIERRE, Martinique, Showing Types of the Inhabitants.

CHAPTER VIII.

COINCIDENCES AND CONTRASTS

BETWEEN THE CARIBBEAN SEA ISLANDS AND THE MISSISSIPPI VALLEY EARTHQUAKES AND AGITATIONS—THE GREATER OF ALL THE QUAKES OF THE EARTH—THE MARVELS OF THE NEW MADRID.

The recent disaster from the presence of a volcano of Martinique—the birthplace of Josephine—is the third that has been experienced, and much the most severe. Indeed, it will stand out incomparable, not that the forces exerted exceeded all precedents, but the total annihilation of a city and the suffocation of all the people, with the exception of a few stragglers, surpasses precedents in the annihilation of tens of thousands of persons. St. Vincent has had the repute of being more intense than any other of the West Indies. It is the smaller of the volcanic islands, and was distinguished by an eruption in 1812, March 20, that made an impression upon the traditions of the people. This island has a sulphur pit—"Soufriere"—and her volcano is "Morne Garon"; height, five thousand feet. It is famous for a lake in the old crater which is very deep, and the lava breaks through the side of the mountain. In the eruption of 1812 there was a savage shaking of Venezuela, famous for the overthrow of the city of Caracas, with the loss of people exceeding ten thousand. This disaster holds a place, not only in public report, but authentic history. The island of Martinique is purely volcanic, about one-fourth the size of Long Island, area three hundred and eighty-five square miles, with six volcanic peaks. The height of the taller, Pelee, is 4,438 feet, and its situation is in the northwest corner of the island.

The year of the greater agitations of the earth, in the central region of the valley of the Mississippi, was 1811, but they were noted earlier and

later, especially in 1812—the year of the most formidable volcanic eruptions in the islands Martinique and St. Vincent—until the recent frightful energies of the fiery mountains in shaking the earth and discharging mud, stones and vapor, in quantities and with a fury unparalleled. Kaskaskia, in the territory of Illinois, was shocked at 3 a. m., January 8, 1795. The Niagara Falls had a shake at 6 a. m. on Christmas Day, 1795. The “site” of Chicago had a considerable shaking August 24, 1804, at ten minutes past two. The Atlantic Monthly of November, 1869, says of the site of Chicago incident: “It seems to have been quite a strong shock, though we have no accurate description of it. It was felt as far east as Fort Wayne, in Indiana, nearly two hundred miles distant. As with the preceding shocks, the impression left upon the minds of the observers was that it came from the west.”)

On the night of the 16th of November, 1811, the “Atlantic” says of earthquakes of the western United States, there occurred “a great and long-continued earthquake, which shook a larger area than any known shock except the Lisbon convulsion of 1755, and which in intensity was probably not surpassed by the movements which produced that great calamity. The thinly-peopled condition of the region along the banks of the Mississippi, which precluded this great earthquake from producing any great loss of human life, has also made our accounts of the phenomena very imperfect. This latter result is the more to be regretted, inasmuch as there can be no doubt that many of the events of that convulsion were without parallel in the history of earthquake shocks. The valleys of the great rivers of the world, at least the parts immediately adjacent to their banks, are rarely the seats of earthquake shocks of great severity. The Amazons, the Nile, the great rivers of Asia, even the Danube, the Po, and the Rhone, of Europe, have been very slightly affected by earthquake shocks. The course of a great river like the Mississippi must be much affected by a severe earthquake. Without the intervention of external disturbances the stream is constantly wandering over the plain through which its varying channel is cut. A slight acci-

dent, such as the sinking of a wreck or the lodging of a few sticks of floating timber, may so disturb the regular system of curves in which the water flows, that the position of the banks in its course for miles below the point of disturbance will have to be changed before the equilibrium is restored. The sedimentary matter deposited by the overflows of the stream—which in the case of the Mississippi constitutes the great accumulation, from ten to one hundred miles wide and many hundred feet deep, through which the stream cuts its inconstant course—is not a compact mass, but in its structure frequently as loose and incoherent as an artificial filling. The settling which necessarily takes place when this matter is consolidated by sudden and violent agitations of the mass must greatly affect both the surface of the deposit and the course of the river.”

The children born in the early years of the nineteenth century, in the valley of the Mississippi, throughout their lives remembered and referred to, as if the events had some occult association, the “last war with England and the New Madrid earthquakes.” No structure ever built by human hands for the habitation of the human race were better calculated to resist earthquakes than the original log cabins, built as pens, with the logs fitted to each other firmly at the corners by chopping notches and hewing the ends of the logs sharply so that each was securely locked in its place. A log house of that type might be swallowed up in a fissure, but it could not be rattled down.

We quote again the very intelligent article of the “Atlantic”:

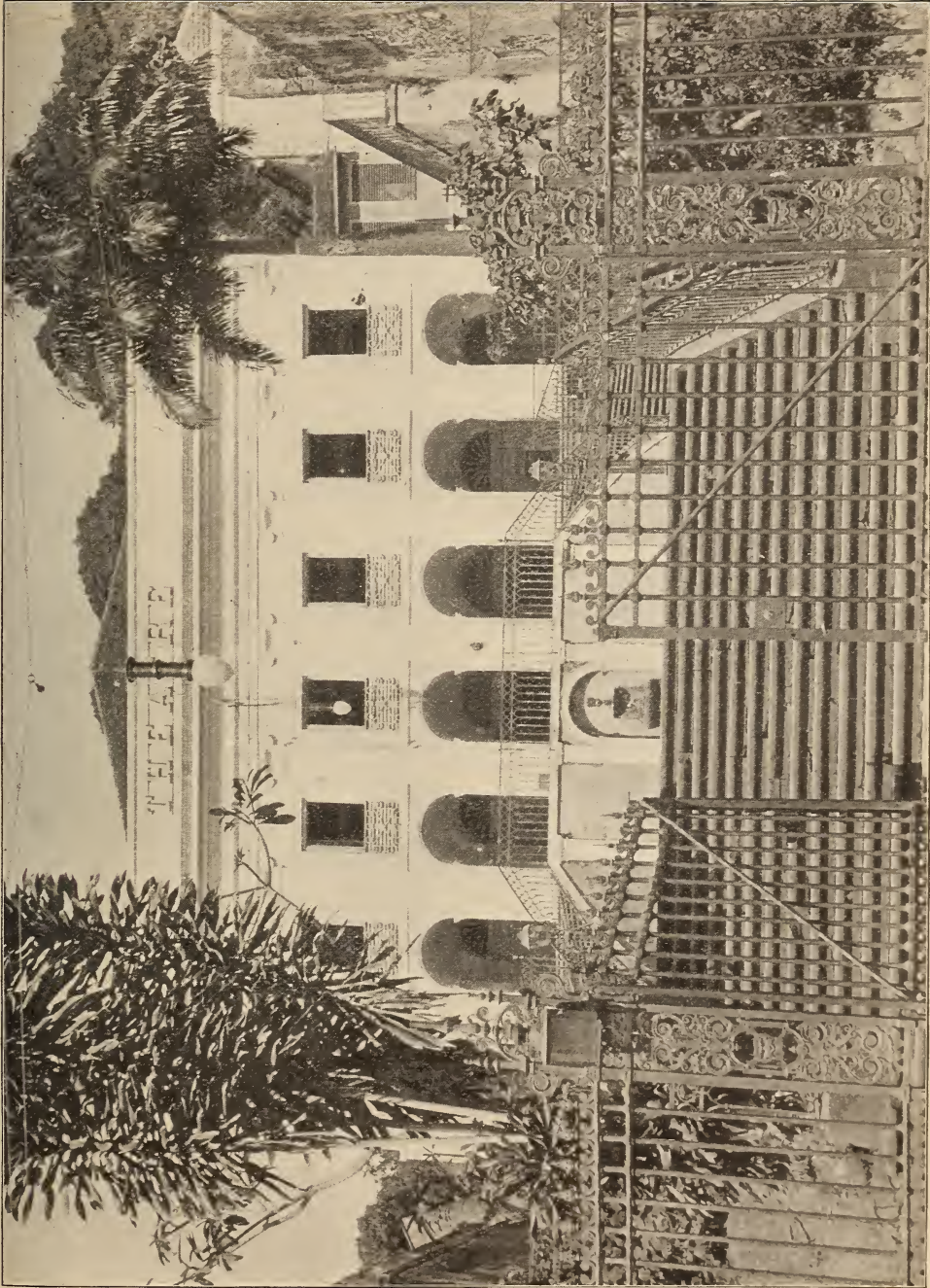
“Owing to the fact that the region of the greatest observed violence was in the country immediately about the village of New Madrid, on the west bank of the Mississippi, about fifty miles below the mouth of the Ohio, this earthquake is commonly known in history as the New Madrid shock; but the evidence leads us to suppose that the true center of the shock was farther to the west. The first shocks were evidently not vertical at New Madrid, but seemed to come from some point beyond the line of the most western settlements. The Indians described even

more terrible effects of the convulsion in the region between the Mississippi and the great plains,—forests overthrown, rocks split asunder, and other indications of great violence,—than were observed at any place near the river. Everywhere the first movements seemed to come from the west, so that we are obliged to refer the origin of this earthquake, as that of many other earthquakes of the same area, to some center of disturbance lying between the Mississippi River and the Rocky Mountains. Now that population is spreading over all that region, we shall doubtless yet know, possibly by sad experiences, the true seat of the several disturbances of which we have evidently observed only the westward prolongations.

“The first movements of the shock of 1811 were observed by parties of travelers on the Mississippi River; it occurred at about 2 A. M. and was exceedingly violent; we are so fortunate as to have from the pen of an English traveler, Mr. Bradbury, a botanist of some celebrity, a clear account of the occurrences of that night and the several succeeding days during which his voyage towards New Orleans carried him through the disturbed region.”

We quote Mr. Bradbury, with the note of his point of observations. This traveler was sleeping in his boat, which was moored to the bank of a small island just above the point known as the Devil's Channel, near the Chickasaw Bluffs. This point is about one hundred and fifty miles below the village of New Madrid, and without the center of the shock:

“In the night I was awakened by a most tremendous noise, accompanied by an agitation of the boat so violent that it appeared to be in danger of upsetting. Before I could quit the bed, or rather skin, upon which I lay, the four men who slept in the other cabin rushed in and cried out in the greatest terror, ‘O mon Dieu; Monsieur Bradbury, qu'est ce qu'il y a!’ I passed them with some difficulty, and ran to the door of the cabin, where I could distinctly see the river as if agitated by a storm, and although the noise was inconceivably loud and terrific, I could distinctly hear the crash of falling trees and the screaming of wild fowl



THE THEATER IN ST. PIERRE, Martinique, in Which Compantes from Paris Have Played Yearly.



STREET SCENE IN ST. PIERRE, Martinique, Showing Natives and Prevailing Character of Architecture.

on the river, but found that the boat was still safe at her moorings. I was followed out by the men and the patron, still in accents of terror inquiring what it was. I tried to calm them by saying 'Restez-vous tranquils; c'est un tremblement de terre!' which they did not seem to understand. By the time we could get to our fire, which was on a large flag in the stern of our boat, the shock had ceased, but immediately the perpendicular banks, both above and below us, began to fall into the river in such vast masses as nearly to sink our boat by the swell they occasioned, and our patron, who seemed even more terrified than the men, began to cry out, 'O mon Dieu! nous périrons!' I wished to consult with him as to what we could do to preserve ourselves and the boat, but could get no answer except, 'O mon Dieu! nous périrons!' and 'Allons á terre! allons á terre!' As I found Mr. Bridge the only one who seemed to have retained any presence of mind, we consulted together and agreed to send two men with a candle up the bank in order to examine if it had separated from the island, a circumstance that we suspected from hearing the snapping of the limbs of some drift trees which were deposited betwixt the margin of the river and the summit of the bank. The men on arriving at the edge of the river cried out, 'Venez á terre! Venez á terre!' and told us there was a chasm formed already, so wide that it would be difficult to pass it to attain firm ground. Immediately after the shock we noticed the time, and found it was near two o'clock. It was now nearly half past, and I determined to go ashore myself, after securing some papers and money, and was employed in taking them out of my trunks, when another shock came on, terrible, but not equal to the first. Mortin, our patron, called out from the island, 'Monsieur Bradbury, sauvez-vous! sauvez-vous!' I went ashore and found the chasm really frightful; it was not less than four feet in width; besides, the banks had sunk at least two feet. I took the candle and examined to determine its length, and concluded that it could not be less than eighty yards, and where it terminated the banks had fallen into the river. I now saw clearly that our lives had been saved by mooring

to a sloping bank. Before we had completed our fire we had two more shocks, and they occurred during the whole night at intervals of from six to ten minutes, but slight in comparison to the first and second. I had already noticed that the sound which was heard at the time of every shock always preceded it by about a second, and that it always proceeded from the same point and went off in an opposite direction. I now found that the shock came from a little northward of east and proceeded to the westward. At daylight we had counted twenty-seven shocks during our stay on the island, but still found the chasm so that it could be passed. The river was covered with drift-timber, and had risen considerably, but our boat was still safe. Whilst we were waiting till the light became sufficient for us to embark, two canoes floated down the river, in one of which we could perceive some Indian corn and some clothes. We considered this a melancholy proof that some of the boats we passed the preceding day had perished. Our conjectures were afterwards confirmed, as three had been overwhelmed and all on board had perished. I gave orders to embark, and we all went on board. The men were in the act of loosening the fastenings when a shock occurred nearly equal to the first in violence. The men ran up the bank in order to save themselves on the island, but before they could get over the chasm a tree fell close by them and stopped their progress. The bank appeared to me to be rapidly moving into the river.

“December 16, 1811.—At twenty-four minutes after two o'clock A. M., mean time, the first shock occurred. The motion was a quick oscillation of rocking, by most persons believed to be from west to east, by some south to north. Its continuance, taking the average of all the observations I could collect, was six or seven minutes.

“January 3, 1812.—A slight vibration between two and three o'clock A. M.

“From the 3d to the 22d no vibration strong enough to attract general notice occurred, and it was generally believed in Cincinnati that the earth hereabouts was quiet. Others, however, assert that they felt many

slight agitations, which undoubtedly was the case, for during that period shocks were every day felt along the Mississippi.

"23d.—About nine o'clock A. M. a great number of strong undulations occurred in quick succession. They continued four or five minutes, having two or three quick exacerbations during that time. An instrument, constructed on the principle of that used in Naples at the time of the memorable Calabrian earthquakes, marked the directions of the undulations from south-southeast to north-northwest. This earthquake was nearly equal to that which commenced the series, on the 16th ultimo.

"27th.—At forty-five minutes past eight A. M. a solitary heave, as strong as any single throe on the 23rd.

"March 3.—A few slight rockings about thirty minutes past six o'clock A. M.

"10th.—A stronger vibration about eight o'clock P. M.

"11th.—A slighter vibration between two and three o'clock A. M.

"April 30.—A moderate agitation.

"May 4.—About eleven o'clock A. M., a slight shock.

"10th.—About eleven o'clock P. M., a slight shock.

"June 25th.—In the night, a slight shock.

"26th.—About eight o'clock A. M., a slight agitation.

"September 15.—At the dawn of day, a moderate vibration.

"December 22.—About three o'clock, another.

"March 6, 1813.—About 10 o'clock P. M., a very slight shock.

"December 12.—Between ten and eleven o'clock A. M., another.

"December 12.—Between three and four o'clock P. M., another."

The scientists rank the New Madrid quakes with the Lisbon shock, and those convulsions stood alone as the greatest of which there was record until the Krakatoa outbreak, and that of Mont Pelee in May, 1902. It will be noticed that the Mississippi earthquake was coincident in the shakes of 1812 with those in that year that occurred in Martinique.

The grandfather of President Roosevelt, with his wife and children, passed through the New Madrid Mississippi River phenomena in the

first steamboat, the construction of which he had superintended at Pittsburg. This was to ascertain whether the great rivers of the West offered openings for steamboat enterprise, and Mr. Roosevelt reported favorably and built and navigated the first boat. The "Western Journal," in 1850, said, in an article on "Submerged Lands of Mississippi":

"The earthquakes of 1811-12 proved very injurious and disastrous to the south of Missouri, and was felt far and wide. They changed the course of the streams and rivers, which occasioned the waters to spread in every direction, and made high land where it was low previous, and in elevated places sunk them—thus causing the rivers and streams to overflow a great extent of the country. These earthquakes of 1811-12 are still remembered by many of our oldest settlers; when the whole land was moved and waved like the waves of the sea, and the majestic oak bent his head to the ground like a weed, and the terrible fact that the waters of the mighty Mississippi, opposite to the town of New Madrid, rolled up stream for ten miles, carrying on its bosom barks, keel-boats and every species of crafts, with a rapidity unknown, and causing destruction of property and life."

The New Madrid shocks were felt as far as the shores of Lake Michigan and St. Clair on the north, to the Atlantic on the east, and the Gulf of Mexico on the south. Nothing is known of the distance west that the shocks were felt. The quaking came from the far west.

CHAPTER IX.

SCIENCE TO THE FRONT.

EXTRAORDINARY INTEREST TAKEN IN THE CARIBBEAN CATASTROPHE —CHICAGO UNIVERSITY IN THE FIRST PLACE—SCIENCE TO SOLVE THE SEISMIC MYSTERY.

The world is stirred as never in all the historic ages by the outbreak of volcanoes. Those of Martinique and St. Vincent have been on a stupendous scale, wonderfully picturesque, terrible and fatal, attended by conditions that deeply demand scientific investigation and conclusions. The enlightened people of the world should no longer be subjected to the perils of universal ignorance, and helpless believers in the horrors of an endless and always menacing mystery.

This announcement came from Washington:

“Washington, May 12.—The National Geographic Society is preparing to send an expedition to investigate the West India calamity. It is intended to send two geologists, one topographer, a geographer, a meteorologist and an explorer.

“Professor R. T. Hill of the Geological Survey has been chosen as one of the geologists. The Weather Bureau will select the meteorologist. Professor I. C. Russell of the University of Michigan, who suggested the expedition, has been invited to be of the party. Professor Alexander Graham Bell will go if he returns from Nova Scotia in time.”

The Chicago University was foremost in taking into intelligible consideration the uses of scientific investigation, and it was urged that for the investigation to be of any scientific value the Island of Martinique must be reached quickly in order that live conditions might be studied, survivors talked with and other first-hand facts secured.

T. C. Chamberlain, Professor of Geology in the University, was

responsible for the idea and he was enthusiastic over such an exploration. In speaking on the subject Professor Chamberlain said:

"I am of the opinion that much valuable information could be obtained regarding the eruption if experts were to visit St. Pierre quickly. The Pelee disturbance, according to the reports, was unique in that the death list is among the highest on record while there was less lava emitted than by several of the other eruptions in history. It must have been a remarkable explosion. The lava, instead of flowing down the sides of the mountain, evidently belched into the air and descended like rain upon those so unfortunate as to be caught under it. This is evidenced by the reports that the bodies found were exposed, which would indicate that the people had been scorched, their bodies hit by the lava rather than drowned by it. This is an extraordinary feature and the one that gives this eruption an original place in volcanic explosions.

"Scientists would not hope to obtain data that would enable them to forecast eruptions more than they have in the past. There is no way of knowing when one of these explosions is going to occur except when the so-called cinders and-ashes begin to issue forth.

"There have been heavier losses of life than that in the Pelee eruption. Of course Pompeii recorded a greater death list, and in more modern times the explosion of Mount Krakatoa, on an island between Java and Sumatra, caused more persons to perish. Thousands have been killed also by the eruptions in Japan.

"There appears to be no way of ascertaining whether a volcano is entirely extinct, or rather permanently out of business. The entire chain of the Antilles is one ridge of volcanoes.

"The prime, fundamental cause of volcanic eruptions is acknowledged by all to be unknown. Of course there are theories, but nothing concrete or unquestionable. The immediate cause is a conduction of the high temperature of the deep interior toward the surface, so that the temperature of the subcrust may actually rise. This results in the melt-

ing of the rock most easily melted. This material in the form of lava finds its way to the surface.

"In the interest of science there ought to be no delay in sending an expedition to St. Pierre. Americans could reach there ahead of others, and thus ascertain the precise nature of the explosion. If the eruption continues some time all the earlier evidences of the explosion may be buried. If experts should go there at once they might still see active evidences of the disturbance.

"The apathy of the people living in the vicinity of Pelee toward the impending disaster is not to be explained. Residents of volcanic districts become familiar with the craters and the eruptions occurring so far apart causes the natives to become calloused. Then the so-called cinders and ashes at times issue forth without being followed by the death-dealing lava. But this condition is rare. These are usually advance agents of explosions. Of course there are no ashes or cinders. The stuff that is so called is rock material ground to the appearance of cinders and ashes."

Immediately after the eruption of Mount Krakatoa the Royal Society of England sent an expedition to investigate the explosion, and the results are embodied in a large printed volume. At the time of the Charleston earthquake the United States Geological Survey lost no time in sending an investigating party to the scene, and much valuable information was secured regarding the nature of the seismic disturbance.

James F. Kemp, A. B. E. M., of Columbia University, contributes to the public information a very clear statement of the cause of volcanoes, such as have desolated in the May days of 1902, two beautiful Caribbean islands. He is authority on the formation of the foundation of Vesuvius, as shown by deep borings. He says:

"The lowest stratum is limestone of undetermined thickness. The volcano occasionally casts out blocks of it borne aloft from below. Next above this is 150 feet of sandstone; then 700 feet of calcareous sandstone. On the top of the last-named (first as a submarine vent and

apparently in about 600 feet of water) the young volcano built up a great layer of dust and fragments 600 feet thick. Throughout this material are found marine shells. When the 600 feet had been accumulated the vent had risen above the water and was able to construct the old crater known to the ancients. But before human records begin the activity ceased and at 700 B. C. the cone was cold and dead."

The historical outbreaks followed. The heat of the earth increases at known rates and the average is about sixty feet of descent for an increase of one degree Fahrenheit and carry it out for twenty-five miles, we reach a temperature of 2,200 degrees, which is just about that of ordinary molten lava.

"It does not follow that the earth is a crust with liquid fire within, for astronomers and mathematicians remind the geologists that the earth is a rapidly rotating body which is subject to the deforming effects of centrifugal force and to the attractions of the moon and other heavenly bodies which are believed to cause the oceanic tides. They make the point that the earth behaves like a body as rigid as steel."

Professor Shales, of Harvard, says:

"Volcanic outbreaks are merely the explosion of steam under high pressure, steam which is bound in rocks buried underneath the surface of the earth and there subjected to such tremendous heat that when the conditions are right its pent-up energy breaks forth and it shatters its stone prison walls into dust.

"The common belief is that the water enters the rocks during the crystallization period and that these rocks through the natural action of the rivers and streams become deposited in the bottom of the ocean. Here they lay for ages, becoming buried deeper and deeper under masses of like sediment which are constantly being washed down upon them from above. This process is called the blanketing process.

"Each additional layer of sediment, while not raising the level of the sea bottom, buries the first layers just so much deeper and adds to their temperature just as does the laying of extra blankets on a bed.

When the first layer has reached a depth of a few thousand feet the rocks which contain the water of crystallization are subjected to a terrific heat. This heat generates steam which is held in a state of frightful tension in its rocky prison.

"It is at these moments that volcanic eruptions occur. The rocks containing the water are blown into dust, which sometimes is carried so high as to escape the power of the earth's attraction and float by itself through space. If the explosions have occurred lava pours forth. This is merely melted rock which overflows like water from a boiling kettle, but the explosion always precedes the flow."

Professor Kemp says: "The distribution of volcanoes is evidently along great lines of upheaval in the earth, and they and earthquakes are connected with fractures which penetrate the crust. Some force is, however, necessary to bring the lava to the surface. If the part of the earth which is one side of a great fracture sinks, it may force the lava in the underlying reservoirs to rise through the fissures, and we are reminded of the reports which state that the sea bottom has sunk off St. Vincent. Gravity is thus the propulsive force."

The professors say of the water converted into steam, that the vapor is not sea water or any other form of surface water which percolates downward, but it is regarded by our most reliable observers as having been in the rocks from the time in which they first became constituents of the earth.

A great many theories have been advanced to account for earthquakes and volcanoes since the recent dreadful catastrophe at Martinique.

The theory I have to offer, though original, is not altogether new. Some fourteen years ago it was published in the Kentucky Educational Journal and the Louisville Courier-Journal and in 1899 it was republished in the "Philosophy of Memory and Other Essays" by the writer.

The contentions of that essay are, briefly, these: The earth is in a condition of isostasy; that is, a cone of equal angle and inclination taken from the highest plateau or mountain elevation is neither more or less,

but just as heavy as a like cone taken from the level of the deepest sea. The sea then sinks down because the crust of the earth under the sea bottom is more dense, thicker and stronger than the earth crust of the dry land.

If a piece of cardboard and one of writing paper be pressed together edgewise while lying on a firm support, the thin paper will bend before the cardboard with an upward convexity near the point of contact.

So when contraction of the cooling cone of the earth causes the sea bottom crust of the earth and the dry land crust to press horizontally against each other, the thicker sea bottom crust will force the land crust to bend with an upward convexity at its edge. These bends must become proportionately sharper with the progressive shrinking of the earth.

Every increase in the curvature at the edge of the sea bottom crust will produce a greater or less number of A-shaped fissures in its under surface, and every increase in the convexity of the adjacent land crust will produce a greater or less number of V-shaped fissures in its upper part.

Now, into these A-shaped fissures, when formed, expansible incandescent matter will escape, and the shock of its arrested expansion will produce an earthquake intense in proportion to the forces developed.

But sometimes these fissures will extend quite up to the sea bottom. If the water is deep, which it probably always is under such circumstances, the inrush will take place with great force. Off Martinique is the West India deep, extending down nearly four miles. At this depth the water would rush into a fissure with about one-third the speed of a cannon ball, and a few miles from the bottom of the fissure it would meet with a great mass of glowing lava rising up from below. A great expansion of the water, now changed into steam, would result with probable explosion and violent earthquakes.

Under the unspeakable pressure the steam and the gases let loose from the lava would seek to escape through the fissure back to the sea, reaching the outlet with all the force of an explosion.

Not to mention the stupendous resistance of the narrowing cavity of the fissure, at the fissure itself it would meet the apex of a cone extending to the surface of the sea and having a width there equal to the depth of the sea. That is, coming to the outlet with the speed of explosion, this steam would have to lift sixteen cubic miles or about 75,000,000,000 tons of water.

Of course this effort would create terrible trembling of the earth, but could it succeed?

But first we must ask what started all of this. Why the incandescent core of the earth had, by contraction, taken away the support of the crust until the crust was forced to fall in on it. This would then, of course, signify that the road had been made easy up under the comparatively weak earth crust to the fissure at the top of the land curve, which by this time possibly reaches down to the incandescent mass beneath, and through it would make its exit.

Once started the rocking and trembling might close these fissures or they may be reopened or new ones formed. Or the pressure from beneath might be kept up until the lava could escape even through the bottom of the sea.

It will be observed by anyone who takes the trouble to look that all volcanic regions are in reach of deep seas. The Kuro deep is near Japan; there is a deep in the Mediterranean near Vesuvius, and Krakatoa is in the neighborhood of an abyssmal deep. Doubtless many additional theories and hypotheses are necessary to explain all the phenomena connected with volcanoes and their accompanying earthquakes, but I believe this theory, as far as it goes, to be unassailable.

A cable from Fort de France, May 31, announced that the National Geographical Society had scored a great triumph through its representative there, Professor Angelo Heilprin, who, with three guides, ascended to the top of the crater on the summit of Mont Pelee. Professor Heilprin is also president of the Philadelphia Geographical Society.

Professor Heilprin had gone to the plantation Vive, which is near

the crater, in company with Fernand Clerc and Mr. Reid, landed proprietors of Martinique. This expedition had been especially organized by United States Consul Ayme and Professor Heilprin and was led by the latter.

The expedition left Fort de France May 29, at noon. The day following was spent in studying the newly-formed craters on the north flank of the mountain. The second morning Professor Heilprin determined to attempt the ascent to the top of the crater, and with this purpose in view he set out at five o'clock.

The volcano was very active, but amid a thousand dangers Professor Heilprin reached the summit and looked down into the huge crater. Here he spent some time in taking careful observations. He saw a huge cinder cone in the center of the crater. The opening of the crater itself is a vast crevice 500 feet long and 150 feet wide.

While Professor Heilprin was on the summit of the volcano several violent explosions of steam and cinder laden vapor took place and again and again his life was in danger. Ashes fell about him in such quantities at times as to completely obscure his vision. One particularly violent explosion of mud covered the professor from head to foot with the hideous, viscid and semisolid matter. He still persisted in his study and observations, however, and twice more was showered with mud. He learned, as had been suspected, that there were three separate vents through which steam issued.

Professor Heilprin's journey down the side of the mountain was fully as perilous as the ascent. Mont Pelee seemed to resent the intrusion of a puny human being into her most awful precincts and belched out huge volumes of steam, ashes and boiling hot mud.

The professor made the important discovery that the crater at the head of the River Fallaise has synchronous eruptions with the crater at the summit of the volcano, and that it ejects precisely the same matter at such times. The River Fallaise crater and the crater at the summit showed during Professor Heilprin's visit a new phenomenon. Mud was

thrown up in high columns. Heretofore the mud had bubbled or boiled out and flowed downward in huge streams. In the course of one eruption of the River Fallaise crater an enormous mass of intensely hot mud was ejected. This flow reached the rum distillery on the Vive plantation and extinguished all the fires there.

Mr. Clerc furnished the following details of Professor Heilprin's ascent: The party proceeded on mules to an altitude of 700 meters, the ancient line of vegetation. From this point Professor Heilprin continued on foot, leaving the mule that had carried him up the steep hog-back to the tree line. Upon reaching the site of Lake Palmiste the professor found it completely dried up. He crossed the bed of the lake and continued on up the gently rising slope to the crater. Formerly the edge of the crater was a high bluff or shoulder. This, the explorer found, had fallen into the great crater, and he thinks this change probably occurred at the time of the great explosion of May 20. This is the first important topographic alteration in Mont Pelee which has been noted and verified.

Professor Heilprin arrived at the edge of the summit crater at 1:30 and remained there for over two hours. When he returned to Vive he resembled a statue of mud. The weight of the ashes and mud he carried on his person, the horrible atmosphere he breathed and the fearful difficulties he encountered reduced him to a condition of extreme fatigue, notwithstanding the fact that he ascended Mont Pelee from the most accessible and easiest side.

George Kennan and his party, who went to Morne Rouge, found on their return trip that a bridge across the road had been carried away by a torrent of hot mud. Negroes managed to get the party across the obstruction. They took the carriages to pieces and carried them and the members of the party to the other side of the river of mud, which was still hot.

Professor Heilprin's report of his observations is as follows:

"I left Fort de France with Mr. Leadbetter the morning of May 29. May 31 we made our first ascent of the volcano. We left Acier at half

past 5 and Vive at half past 7 o'clock in the morning. The party consisted of Mr. Leadbetter and myself and three colored boys. We were on mule-back. At an altitude of 700 meters we began the ascent of the arete. We passed along its east side and slightly to the north of the mountain. We arrived at the lip of the old crater, the former site of Lake Palmiste, at 11 o'clock.

"Here it began raining. Rain clouds and the clouds from the volcano enveloped us and we could not see ten feet. A terrific thunder storm had begun and we sat on the edge of the crater for some time speculating whether the detonations we heard were of thunder or from the volcano. As we afterward found the River Fallaise to be boiling, the detonations were probably volcanic.

"We could not tell how near we were to the crater, as, either from local attraction or the electric conditions, our compass refused to work. Its variation was about twenty degrees to the eastward, but later we found that it acted normally at the lip of the new crater.

"The colored boys with us were horribly scared. We finally groped our way down that awful arete, through gloomy clouds of rain and amid great electric discharges. At every step we dislodged the rain-soaked ashes and were in danger of being precipitated down the hideous gorges on either side.

"The extreme top of the volcano is covered with cinders, scoriae, bowlders and angular rocks which had been ejected from the crater. Further down, the mountain is covered with ashes and mud, and these are thick on the arete. On our way down we saw the River Fallaise rushing along with great velocity and full of steam and of mud. We reached Acier well, but soaked, caked with mud and very much disappointed.

"At Acier we met George Kennan and his party and determined to attempt a second ascent the next day, June 1. The ascent made this day with Mr. Kennan was more trying and difficult than the one I had previously made with Mr. Leadbetter.

“The day was intensely hot and it was raining. When we reached the old crater it was again enveloped in vapor. The temperature of the basin of Lake Palmiste, taken three inches below the surface, was 124 degrees Fahrenheit. Between rifts in the clouds of vapor we could see the new crater, of which Mr. Varian made an excellent sketch.

“Suddenly the vapor cleared away and we made a dash forward. We reached the edge of the new crater and from where we stood we could have dropped stones into the white hot mass within. The new crater is a crevasse running north and south and expanding into a bowl. This crevasse nearly rifted the mountain; it runs transversely to the old crater and might be called a huge gash. From it volcanic material has been freely erupted.

“As we stood on the edge of the crater a sublime spectacle began. I now have some conception of what is going on inside the earth and have been a spectator of nature’s secret interior work. We were assailed with noise. Far below there was a hissing of steam like that of a thousand locomotives, as well as violent detonations.

“The principal output of the crater while we were there was steam. The phenomenon was limited and was not essentially different from those of other volcanoes in action. Positive assurance was gained that no molten matter has flowed over the lip of the new crater.

“Several observations taken with the aneroid barometer showed that the height of Mont Pelee has not been changed. I agree with Professor Robert T. Hill, the geologist of the United States government, that Mont Pelee has erupted no lava and that there has been no cataclysm or any serious topographical alterations.

“No cinder cone was visible in the crater; what was taken for a cone is a pile of ejected rocks. Perhaps the bottom of the new crater may contain cinder cone, but we could see down only about 150 or 200 feet. I believe, however, that the crater is very much deeper than this.

“I think Mont Pelee has freed itself from the interior pressure and

that the volcano is not liable to further violent eruption. It is not safe, however, to make predictions about volcanoes.

"The eruption of Mont Pelee of May 8 was unique in that it resulted in the greatest destruction of life and property ever known by direct agency of a volcano. The phenomenon of explosion of flaming gases is probably new, but a careful study of observations is necessary before an opinion can be reached. The electrical phenomena are also new. They probably did not play the chief role in the destruction of St. Pierre, but were developed by and aided the other forces. I have specimens which show the effect of the bolts of lightning. The latter were small and intense and penetrated within the houses of the city. For rapidity of action and for lives lost Mont Pelee holds the record among volcanoes."

The following important points were settled by Professor Heilprin: The location of the new crater was accurately determined; it is positively known that there had been no overflow of molten matter from the lip of the crater; there had been no subsidence of the mountain and the height of Mont Pelee was unchanged; there had been no cataclysm and no topographical alteration of the country. The period of violent eruptions had probably ended, although the volcano may continue to be quietly active for a long time to come.

The following communication appeared in the London journals, and is interesting from a scientific viewpoint:

"To the Editor—

"Sir,—In 1883, in connection with the eruption of Krakatoa, you were good enough to allow me to appeal through your quickly and widely circulated columns for early information to enable me to test an idea connected with the spread of the glorious sunsets round the world which followed the event.

"Because the terrible catastrophes in Martinique and St. Vincent occurred at a well defined sunspot *minimum* I was led to inquire whether similar coincidences were to be traced in the past. I did not know then,



A ROAD IN THE SUBURBS OF ST. PIERRE, MARTINIQUE, SHOWING A PART OF THE CITY AND HARBOR AND MOUNTAIN FORMATIONS IN THE DISTANCE.



A FRENCH CREOLE in St. Pierre, Martinique.

but I know now, that Wolf, exactly half a century ago, had suggested a connection between solar and seismic activity; in his time, however, the record of solar changes was short and imperfect.

"In my own inquiry I have used our most recently compiled tables, which are now complete for the last 70 years, and I have only considered seismic disturbances within that period. I find it beyond question that the most disastrous volcanic eruptions and earthquakes, generally occur, like the rain pulses in India, round the dates of the sun-spot *maximum* and *minimum*. More than this, the 35-year solar period established by Dr. Lockyer, which corresponds approximately with Bruckner's meteorological cycle, can also be obviously traced, so that, indeed, the intensification of the phenomena at the *minimum* of 1867 is now being repeated.

"In 1867, Mauna Loa, South America, Formosa, Vesuvius were among the regions involved; in the West Indies it was the turn of St. Thomas. The many announcements of earthquakes in the present year before the catastrophe of St. Pierre will be in the recollection of everybody.

"In the *maximum* in 1871-72, to name only West Indian stations, Martinique first and then St. Vincent followed suit; in the next *maximum*, in 1883, came Krakatoa.

"At Tokio, in a country where the most perfect seismological observatories exist, we find that at times near both sun-spot *maxima* and *minima* the greatest number of disturbances have been recorded.

"Very fortunately, the magnificent work of the Indian Meteorological Department enables us to associate the solar changes with pressures in the tropics, and obviously these pressures have to be taken into account and carefully studied.

"This, sir, brings me to the point of this letter, which is, through your kindness, to ask from meteorological observers in the West Indies and the surrounding regions the favor of copies of their barometrical readings, showing the departures from the local means for the two months

preceding the eruption at St. Pierre. In this way one or two years may be saved in getting at the facts.

"I am, sir, your obedient servant,

"NORMAN LOCKYER.

"Solar Physics Observatory, May 17."

Professor Adolph G. Vogeler contributes an article of great interest to answer the public inquiry as to what is the cause of earthquakes. He says:

"While not a systematic student of geology and seismology, still the latter subject has enlisted my interest for many years. Thus it happened that a conception has evolved in my mind which, in view of the recent developments, has ripened to a conviction amounting almost to certainty as to its correctness. Whether this theory is entirely or partially original with me I am unable to say. I may have read something to that effect years ago, but it seems to have come to me slowly after reading the different explanations, now current, but which my mind rejected.

"Without attempting to refute the latter—namely, that water is the primary cause of volcanic disturbances, or else water of crystallization in the rocks or the weight of accumulated sedimentation of river soil—I will outline briefly my own views on this subject.

"When an apple dries out, its surface becomes covered with ridges and rills, precisely as our faces become wrinkled when the underlying fatty tissue disappears. The reason, it need not be explained, is that the inelastic covering occupies more space than the contracting body, and hence must be placated. So the earth.

"Originally our globe was fluid and smooth. The surface cooled and formed a hard crust. But the fluid core continued to cool down and to contract in diameter, and, as in the case of the apple, the rigid crust had to adjust itself by breaking along certain lines and throwing up ridges. Hence mountain chains are nothing but wrinkles upon the face of Old Mother Earth, who has passed the period of her youth.

“At first, when the crust was yet comparatively thin, these ridges and rills were of little permanence, and the topography of the earth’s surface underwent frequent and radical changes, and the mountains were not very high.

“By and by the aqueous vapors of the atmosphere were precipitated and an ocean of water covered the entire globe, while the crust went on growing thicker and thicker until at present it has attained an estimated thickness of about thirty miles.

“Now, however, the more rigid and solid crust no longer so readily adjusts itself to the receding fluid core, and as a consequence hollow spaces appear between the latter and the former.

“At length the strain becomes too great, the crust breaks down and ridges are thrown up so mighty that their crests are raised far above the level of the surrounding ocean, and with the waters retreating into the depressions the continents make their appearance. But there is more to tell.

“In the first place, the mountains are strata of rock standing on end and leaning against each other, so that along their crests runs a crack extending down to the very space beneath formed by the roof of rock and below which in turn extends the level of the molten interior core.

“In the second place, the mountain chains are most likely to rise straight out of the water and to be bathed by the same. Thirdly, mountains are not the result of volcanic upheaval, but the natural result of the earth’s contraction. And now, with these preparatory explanations, I come to my own conception of the cause of quakes and eruptions.

“When, after a period of readjustment and subsequent quiescence the crust once more breaks down, it presses upon the liquid core and forces it up into the domes of the mountains, and out of the less resistant crest if the pressure be sufficiently great. Here then would be presented an eruption, or rather flow of molten lava without accompanying volcanic explosions, while after readjustment we might have a volcanic crater filled with incandescent lava in a quiescent state.

“But now imagine that in the process of settling of the crust cracks form under the adjacent water, then we will have all the terrible phenomena of an active volcano, caused not alone by the sudden vaporization of water, but by the gases formed through the contact of the former with the heated chemicals, foremost among these sulphur.

“The quaking of the earth, of course, is due to the settling of the strata and a general readjustment. Thus, the foregoing view being correct, every extensive mountain chain is potentially a volcanic region; not because it has been produced by volcanic action, but because it represents a place of weak resistance against the periodical pressure of the earth’s molten interior mass.

“The theory here laid down fully explains why volcanic and seismic disturbances may take place simultaneously at so widely separated localities, extend over a limited period with decreasing severity, and then subside for perhaps another long interval, during which the molten lava of the craters cools and forms regions of least, i. e., weakened resistance, while that along the western coast of the Americas is of more recent date.

“The last two weeks have given us an excellent illustration of the actuality of these belts. Extending from the Caribbean Sea, there have been disturbances in Central America, California and Alaska, while eastward seismic phenomena have been manifested in Spain, Italy, Austria and further on.

“This time there appears to have occurred an unusually extensive settling, and the layers are now in process of readjustment. Seismic phenomena may, hence, be possible for an indefinite period to come, in which even the Appalachian chain may become involved. It is the flow of beautiful, if treacherous, lakes, while credulous humanity fondly deludes itself into the sweet thought that the thin shell upon which it wears out its little throbbing heart will outlast eternity.

“Thus, in my humble opinion, volcanic action and quakes are not local there, but general in nature, the local phenomena being of a sec-



A MARTINIQUE BELLE, Showing Style of Dress and Headwear



MONT PELÉE. Showing Condition of the Volcano on May 12. Four Days after the Great Eruption. (Copyright, May 21, 1902, by The Press Publishing Company—New York World.)

ondary character entirely. We now also can understand why active volcanoes are largely situated near the sea.

“This theory further explains in a manner why there may be formed such volcanic belts as at this geologic era encircle the earth, one longitudinally and the other approximately equatorially. The equatorial belt probably is the older. Furthermore, it is not impossible that even now entire islands may disappear and others arise in their stead.

“In conclusion it may be said that in addition to the physical structure of the local geologic strata and the contour and rotation determining the time, place and direction of formation of the earth’s wrinkles, giving rise to mountains and ocean beds, the tidal action upon the earth’s liquid interior produced by the moon and augmented by the fortuitous position of the planets, must be assumed to play an important role.”

It is claimed for science that there was predicted fifty years ago, in 1851, by scientific writers, that before another half century there would be a violent earthquake or other volcanic disturbance in the group of islands of which Martinique is the center.

There were assigned as chief causes of such disturbances—first, volcanic explosions, and, second, overloading. The St. Pierre disaster, say the scientists, was caused by the latter.

By overloading it means the carrying down of silt or sand by large rivers, thus creating an extra pressure on a certain spot of the thin surface for the earth. This increases until it makes a slight crack in the crust of the earth, causing the eruption of lava or a disaster like the earthquakes of Lisbon and Charleston.

The West Indian islands, including Martinique, were especially exposed to this danger. They are the dumping ground for all the sand silt and sediment washed down by the Ohio and Mississippi rivers, besides all the smaller rivers that flow into the Gulf of Mexico.

Very few people have any idea of the great quantity of sediment that is washed down by a large river. But a scientist has estimated that a

belt line of freight cars could not haul more than half as much as the Potomac river deposits at its mouth.

“What, then, shall be said of the sediment-carrying power of a mighty torrent like the Mississippi, which deposits its enormous load among the West Indies.

Every city or island near the mouth of a large river is in danger of earthquakes and volcanic explosions.

Such dangerous districts are, for instance, the land near the mouth of the River Po, into which a number of other rivers empty great quantities of silt, the Bay of Bengal, which is the dumping ground for the famous Ganges and other rivers; the Yellow sea, which empties loads of sandy deposit from the Chinese river Yang-tse, and the district around the mouth of the Amazon.

Smaller and slower rivers, such as the Hudson and Rhine, are not apt to cause earthquakes, though they are certain to do so if only given sufficient time.

The surface of the earth is very thin in proportion to its bulk. The skin of an ordinary orange, so say scientists, is much thicker than the rind of the earth upon which we tread in proportion to its size.

Any very serious alteration in the weight which rests upon this thin earth surface, therefore, is liable to cause a pressure that results in earthquakes and similar disturbances.

Every region, whether of land or water, that lies at the foot of a large sloping territory and thus at the mouth of great rivers, is in danger of such sudden disasters as have befallen Lisbon, Charleston, Peking and St. Pierre.

No means known to modern science can be used to avert such disasters. They are the result of gigantic natural forces, beyond all human power. No human engineer can control the fires that rage in the earth's center.

At the most, nothing can be done except to foresee such happenings and to warn the inhabitants of all near-by towns and cities that there

is imminent danger in their locality of overloading and consequently of earthquakes and volcanic eruptions.

A report, as follows, was made to the hydrographic office last year by Captain Thomas, and it attracts a good deal of attention:

The Captain says that on May 5, 1901, while about thirty-two miles east of the southern point of Martinique, the sea suddenly rose with great fury, breaking as if on rocks. This continued, he says, for about four hours, when the sea became smooth again. His ship labored very heavily, and was uncontrollable during the phenomenon.

The superintendent of the United States coast and geodetic survey reports that the delicately suspended magnetic needles at the two coast and geodetic survey magnetic observatories, the one situated at Cheltenham, Md., sixteen miles southeast of Washington, and the other at Baldwin, Kan., seventeen miles south of Lawrence, were disturbed, beginning at about the time the catastrophe at St. Pierre occurred. The wave of fire struck St. Pierre about eight o'clock a. m. May 8 and a clock was stopped at 7:50.

The magnetic disturbance began at the Cheltenham observatory at a time corresponding to 7:53, St. Pierre local mean time, and at the Baldwin observatory at 7:55, St. Pierre time.

The delicate apparatus installed at these observatories is so arranged that it registers automatically by photographic means the minutest variations in the direction and intensity of the earth's magnetic force. It is a noteworthy fact that no seismological observatory has thus far reported a seismic disturbance during the eruption.

Up to the present time no magnetic effect due to eruptions of distant volcanoes have ever been recognized at magnetic observatories. Purely mechanical vibrations caused by earthquakes have been often registered by the delicately poised magnetic needles. The Guatemalian earthquake on April 18, for instance, was recorded not only by seismographs at various places, but also at the Cheltenham magnetic observatory of the coast survey. This earthquake simply caused a mechanical vibration of the

magnetic needles about their mean position of rest, and lasted about one-half hour, whereas the disturbance of May 8 was a distinct magnetic effect, pulling the needles aside from their usual direction and lasting many hours.

It is denied by the scientists, generally, that the report of the deepening of the sea near the scene of the great Caribbee Island eruptions can be true to the extent reported. The story was that a French cable ship that had been taking soundings in connection with the recent breaking of the cables by the earthquakes, discovered that the bed of the ocean had in parts sunk to an enormous extent, and the evidence seems to be very particular. The French cable ship had, of course, been in the habit of taking soundings as a matter of business, and had a business occasion to take them over again where the cables were broken, and they made the exact statement that near Guadeloupe the lead showed formerly a depth of 900 feet, where now there is a depth of 4,000 feet, or a sinking of the bottom of the sea of 3,100 feet. This was at some distance from Pont a Patrie, and it is argued by those who understand the consideration of the earth's crust, that such a serious change, as so great a distance from the scene of eruptions of Martinique and St. Vincent might produce and are likely to do so a still greater change in the West Indies, and might even involve the loss of entire islands.

The islands, from St. Vincent in the south to St. Thomas and even Jamaica in the north, form a continuous chain of volcanic craters rising from the ocean bed. These enormous chimneys penetrate through the ocean bed to the substratum of molten lava, and elementary substances that is ever seething and boiling. This liquid mass of burning molten substance, set free by contraction of the overlying strata and generating huge masses of explosive steam from the inrush of sea water, is believed to have produced and to be still producing serious changes in the sea bed that may yet involve the whole volcanic chain of the Lesser Antilles.

Reports from St. Lucia, Dominica, Guadeloupe, Montserrat, Antigua and even the Danish West Indies tell of the great apprehension of the

inhabitants in these islands. They are all volcanic and have extinct volcanoes, some of which are already showing signs of disturbance. The thinness of the earth's crust throughout the Lesser Antilles region, which corresponds in formation to that of the Mediterranean, being well known, creates apprehension lest the volcanic wave may burst through at all these points and involve the West Indies in common ruin. With St. Vincent and Martinique in trouble the disaster is bad enough, but there are not wanting many pessimists who fear the worst and spread alarm.

CHAPTER X.

THE LAST DAYS OF ST. PIERRE.

THE FICTION OF A GREAT NOVELIST RELATING TO THE LAST DAYS OF POMPEII, OVERWHELMED BY VESUVIUS, BECOMES HISTORY APPLIED TO MONT PELEE'S DESTRUCTION OF ST. PIERRE.

Bulwer's novel, "The Last Days of Pompeii," pictures the later decades of the first century of the Christian era, and condenses the accounts of the burial of Pompeii and Herculaneum, written by a man of genius, whose studies of history were scholarly, thorough and accurate. The purpose of the fiction was to introduce characters fitted to the age and surroundings, and at the supreme moment of the dramatic action in the amphitheater, introduce the overwhelming outburst of Vesuvius. We present the passages of the story of the Last Day most striking as descriptive of the uproar and outpour of destructive clouds and floods of fire, following precisely the course of events, and sketching the scenery of the spectacle of the burial of two cities nearly two thousand years ago, the curtain falling in the theater on the catastrophe.

"The Last Days" of the long-lost cities are rendered with the hand of a master of literary art, who spared no pains to be true to the times, the scenes and the persons, to make his outline drawings historical; and the dramatis personæ are embodiments of the manners and customs of Rome in her moral decline, when drifting to her inevitable fall.

The picture Bulwer drew of the last hours of Pompeii and Herculaneum answers closely to the volcanic phenomena, that in the Caribbee Islands have alarmed and aroused the world.

It was a night of bloody games and high festivity in the theaters of the doomed cities by the sea. The gladiators and wild beasts were slaughtering each other. There were present Athenians and Egyptians,

and a mighty man of mystery was about to perish, when he who was soon to be sacrificed, and had been dreaming of terrors, praying for the disappointment of the mob, and certain there was something awful in the air, saw the answer to his prayers, and—

“Behold!” he shouted with a voice of thunder, which stilled the roar of the crowd; “behold, how the gods protect the guiltless! The fires of the avenging Orcus burst forth against the false witness of my accusers!”

The eyes of the crowd followed the gesture of the Egyptian, and beheld, with ineffable dismay, a vast vapor shooting from the summit of Vesuvius, in the form of a gigantic pine-tree, the trunk, blackness; the branches, fire—a fire that shifted and wavered in its hue with every moment, now fiercely luminous, now of a dull and dying red, that again blazed terrifically forth with intolerable glare.

There was a dead, heart-sunken silence, through which there suddenly broke the roar of the lion, which was echoed back from within the building by the sharper and fiercer yells of its fellow beast. Dread seers were they of the burden of the atmosphere, and wild prophets of the wrath to come!

Then there arose on high the universal shrieks of women; the men stared at each other, but were dumb. At that moment they felt the earth shake beneath their feet; the walls of the theater trembled, and beyond in the distance they heard the crash of falling roofs; an instant more and the mountain cloud seemed to roll toward them, dark and rapid, like a torrent; at the same time it cast forth from its bosom a shower of ashes mixed with vast fragments of burning stone! Over the crushing vines, over the desolate streets, over the amphitheater itself, far and wide, with many a mighty splash in the agitated sea, fell that awful shower!

No longer thought the crowd of justice or of Arbaces; safety for themselves was their sole thought. Each turned to fly—each dashing, pressing, crushing against the other. Trampling recklessly over the

fallen, amidst groans, and oaths, and prayers, and sudden shrieks, the enormous crowd vomited itself forth through the numerous passages. Whither should they fly? Some, anticipating a second earthquake, hastened to their homes to load themselves with their more costly goods, and escape while it was yet time; others, dreading the showers of ashes that now fell fast, torrent upon torrent, over the streets, rushed under the roofs of the nearest houses, or temples, or sheds—shelter of any kind—for protection from the terrors of the open air. But darker, and larger, and mightier, spread the cloud above them. It was a sudden and more ghastly night rushing upon the realm of noon!

The Athenian had learned from his preserver that Ione was yet in the house of Arbaces. Thither he fled to release—to save her. The few slaves whom the Egyptian had left at his mansion when he had repaired in long procession to the amphitheater had been able to offer no resistance to the armed band of Sallust; and when afterward the volcano broke forth, they had huddled together, stunned and frightened, in the inmost recesses of the house. Even the tall Ethiopian had forsaken his post at the door; and Glaucus passed through the vast hall without meeting one from whom to learn the chamber of Ione. Even as he passed, however, the darkness that covered the heavens increased so rapidly that it was with difficulty he could guide his steps. The flower-wreathed columns seemed to reel and tremble, and with every instant he heard the ashes fall cranchingly into the roofless peristyle. He ascended to the upper rooms; breathless he paced along, shouting out aloud the name of Ione; and at length he heard, at the end of a gallery, a voice, her voice, in wondering reply. To rush forward, to shatter the door, to seize Ione in his arms, to hurry from the mansion, seemed to him the work of an instant! Scarce had he gained the spot where Nydia was than he heard steps advancing toward the house, and recognized the voice of Arbaces, who had returned to seek his wealth and Ione ere he fled from the doomed Pompeii. But so dense was already the reeking atmosphere, that the foes saw not each other, though so



RUINS OF ST. PIERRE Along the Shore.—(Copyright, May 21, 1902, by The Press Publishing Company—New York World.)



RUINS OF ST. PIERRE as Seen from the Sea.—(Copyright May 21, 1902, by The Press Publishing Company—New York World.)



INTERIOR OF CATHEDRAL AT ST. PIERRE, Showing Wreckage of Bell and Frame-work on the Ground. Remainder of Church Entirely Destroyed.—(Copyright, May 21, 1902, by The Press Publishing Company—New York World.)

near, save that, dimly in the gloom, Glaucus caught the moving outline of the snowy robes of the Egyptian.

They hastened onward, those three. Alas! Whither? They saw not a step before them—the blackness became utter. They were encompassed with doubt and horror; and the death he had escaped seemed to Glaucus only to have changed his form and augmented its victim.

O, Jupiter! what sound is that? The hissing of fiery water! What! does the cloud give rain as well as flame! Ha! what! shrieks? And, Burbo, how silent all is now! Look forth!

Amidst the other horrors, the mighty mountain now cast up columns of boiling water. Blent and kneaded with the half-burning ashes, the streams fell like seething mud over the streets in frequent intervals. And full, where the priests of Isis had now cowered around the altars, on which they had vainly sought to kindle fires and pour incense, one of the fiercest of those deadly torrents, mingled with immense fragments of scoria, had poured its rage. Over the bended forms of the priests it dashed; that cry had been of death; that silence had been of eternity. The ashes, the pitchy stream, sprinkled the altars, covered the pavement and half concealed the quivering corpses of the priests.

“They are dead,” said Burbo, terrified for the first time, and hurrying back into the cell. “I thought not the danger was so near and fatal.”

A sudden flash of lightning from the mount showed to Burbo, who stood motionless at the threshold, the flying and laden form of the priest. He took heart; he stepped forth to join him, when a tremendous shower of ashes fell right before his feet. The gladiator shrank back once more. Darkness closed him in. But the shower continued fast, fast; its heaps rose high and suffocatingly; deathly vapors steamed from them. The wretch gasped for breath; he sought in despair again to fly; the ashes had blocked up the threshold; he shrieked as his feet shrank from boiling fluid. How could he escape? He could not climb

to the open space; nay, were he able, he could not brave its horrors. It were best to remain in the cell, protected, at least, from the fatal air. He sat down and clenched his teeth. By degrees the atmosphere from without—stifling and venomous—crept into the chamber. He could endure it no longer. His eyes, glaring round, rested on a sacrificial axe, which some priest had left in the chamber; he seized it. With the desperate strength of his gigantic arm he attempted to hew his way through the walls.

Meanwhile the streets were already thinned; the crowd had hastened to disperse itself under shelter; the ashes began to fill up the lower parts of the town; but here and there you heard the steps of fugitives cranching them wearily, or saw the pale and haggard faces by the blue glare of the lightning, or the more unsteady glare of torches, by which they endeavored to steer their steps. But ever and anon the boiling water, or the straggling ashes, mysterious and gusty winds, rising and dying in a breath, extinguished these wandering lights, and with them the last living hope of those who bore them.

In the street that leads to the gate of Herculaneum, Clodius now bent his perplexed and doubtful way. "If I can gain the open country," thought he, "doubtless there will be various vehicles beyond the gate, and Herculaneum is not far distant. Thank Mercury! I have little to lose, and that little is about me!"

"Holla! Help there—help!" cried a querulous and frightened voice. "I have fallen down, my torch has gone out, my slaves have deserted me. I am Diomed—the rich Diomed; ten thousand sesterces to him who helps me!"

The air was now still for a few minutes; the lamp from the gate streamed out far and clear; the fugitives hurried on, they gained the gate, they passed by the Roman sentry; the lightning flashed over his livid face and polished helmet, but his stern features were composed even in their awe. He remained erect and motionless at his post. That

hour itself had not animated the machine of the ruthless majesty of Rome into the reasoning and self-acting man.

The cloud, which had scattered so deep a murkiness over the day, had now settled into a solid and impenetrable mass. It resembled less even the thickest gloom of night in the open air than the close and blind darkness of some narrow room. But in proportion as the blackness gathered did the lightnings around Vesuvius increase in their vivid and scorching glare. Nor was their horrible beauty confined to the usual hues of fire; no rainbow ever rivaled their varying and prodigal dyes. Now brightly blue as the most azure depths of a southern sky; now of a livid and snake-like green, darting restlessly to and fro as the folds of an enormous serpent; now of a lurid and intolerable crimson, gushing forth through the columns of smoke, far and wide, and lighting up the whole city from arch to arch; then suddenly dying into a sickly paleness, like the ghost of their own life.

In the pauses of the showers you heard the rumbling of the earth beneath, and the groaning waves of the tortured sea; or, lower still, an audible but to the watch of intensest fear, the grinding and hissing murmur of the escaping gases through the chasms of the distant mountain. Sometimes the cloud appeared to break from its solid mass, and, by the lightning, to assume quaint and vast mimicries of human or of monster shapes, striding across the gloom, hurtling one upon the other, and vanishing swiftly into the turbulent abyss of shade; so that to the eyes and fancies of the affrighted wanderers, the unsubstantial vapors were as the bodily forms of gigantic foes, the agents of terror and of death.

The ashes in many places were already knee-deep; and the boiling showers which came from the steaming breath of the volcano forced their way into the houses, bearing with them a strong and suffocating vapor. In some places, immense fragments of rock, hurled upon the house-roofs, bore down along the streets masses of confused ruin, which yet more and more, with every hour, obstructed the way; and as the

day advanced, the motion of the earth was more sensibly felt; the footing seemed to slide and creep, nor could chariot or litter be kept steady, even on the most level ground.

Sometimes the huger stones, striking against each other as they fell, broke into countless fragments, emitting sparks of fire, which caught whatever was combustible within their reach; and along the plains beyond the city the darkness was now terribly relieved, for several houses, and even vineyards, had been set on flames; and at various intervals the fires rose sullenly and fiercely against the solid gloom. To add to this partial relief of the darkness, the citizens had, here and there, in the more public places, such as the porticos of temples, and the entrances to the forum, endeavored to place rows of torches; but these rarely continued long; the showers and the winds extinguished them, and the sudden darkness into which their sudden birth was converted had something in it doubly terrible and doubly impressing on the impotence of human hopes, the lesson of despair.

Frequently, by the momentary light of these torches, parties of fugitives encountered each other, some hurrying toward the sea, others flying from the sea back to the land; for the ocean had retreated rapidly from the shore; an utter darkness lay over it, and upon its groaning and tossing waves the storm of cinders and rock fell without the protection which the streets and roofs afforded to the land. Wild, haggard, ghastly with supernatural fears, these groups encountered each other, but without the leisure to speak, to consult, to advise; for the showers fell now frequently, though not continuously, extinguishing the lights, which showed to each band the death-like faces of the other, and hurrying all to seek refuge beneath the nearest shelter. The whole elements of civilization were broken up. Ever and anon, by the flickering lights, you saw the thief hastening by the most solemn authorities of the law, laden with, and fearfully chuckling over, the produce of his sudden gains. If, in the darkness, wife was separated from husband, or parent from child, vain was the hope of reunion. Each hurried



REFUGEES FROM ST. PIERRE, Reaching Fort de France in a Boat.—(Copyright, May 21, 1902, by The Press Publishing Company—New York World.)



AMERICAN MARINES. From One of the United States Relief Ships, in Main Street, St. Pierre, after the Eruption.—(Copyright, May 21, 1902, by The Press Publishing Company—New York World.)

blindly and confusedly on. Nothing in all the various and complicated machinery of social life was left, save the primal law of self-preservation!

Through the darkness glared forth two burning eyes—the lightning flashed and lingered athwart the temple—and Glaucus, with a shudder, perceived the lion to which he had been doomed crouched beneath the pillars; and close beside it, unwitting of the vicinity, lay the giant form of him who had accosted them—the wounded gladiator, Niger.

That lightning had revealed to each other the form of beast and man; yet the instinct of both was quelled. Nay, the lion crept nearer and nearer to the gladiator, as for companionship; and the gladiator did not recede or tremble. The revolution of nature had dissolved her lighter terrors as well as her wonted ties.

Suddenly, as he spoke, the place became lighted with an intense and lurid glow. Bright and gigantic through the darkness, which closed around it like the walls of hell, the mountain shone, a pile of fire! Its summit seemed riven in two; or rather, above its surface there seemed to rise two monster shapes, each confronting each, as demons contending for a world. They were of one deep blood-red hue of fire, which lighted up the whole atmosphere far and wide; but below, the nether part of the mountain was still dark and shrouded, save in three places, adown which flowed serpentine and irregular rivers of the molten lava. Darkly red through the profound gloom of their banks, they flowed slowly on as toward the devoted city. Over the broadest there seemed to spring a cragged and stupendous arch, from which, as from the jaws of hell, gushed the sources of the sudden Phlegethon; and through the stilled air was heard the rattling of the fragments of rock, hurtling one upon another as they were borne down the fiery cataracts, darkening, for one instant, the spot where they fell, and suffused the next, in the burnished hues of the flood along which they floated!

The slaves shrieked aloud, and cowering, hid their faces. The Egyptian himself stood transfixed to the spot, the glow lighting up his

commanding features and jeweled robes. High behind him rose a tall column that supported the bronze statue of Augustus; and the imperial image seemed changed into a shape of fire!

A simultaneous crash resounded through the city as down toppled many a roof and pillar. The lightning, as if caught by the metal, lingered an instant on the imperial statue, then shivered bronze and column. Down fell the ruin, echoing along the street, and riving the solid pavement where it crashed. The prophecy of the stars was fulfilled.

The sound, the shock, stunned the Athenian for several moments. When he recovered, the light still illumined the scene, the earth still slid and trembled beneath. Ione lay senseless on the ground; but he saw her not yet; his eyes were fixed upon a ghastly face that seemed to emerge without limbs or trunk, from the huge fragments of the shattered column, a face of unutterable pain, agony and despair! The eyes shut and opened rapidly, as if sense were not yet fled; the lips quivered and grinned; then sudden stillness and darkness fell over the features, yet retaining that aspect of horror never to be forgotten!

At length it occurred to Nydia that as it had been resolved to seek the sea-shore for escape her most probable chance of rejoining her companions would be to persevere in that direction. Guiding her steps, then, by the staff which she always carried, she continued, with incredible dexterity, to avoid the masses of ruin that encumbered the path, to thread the streets, and unerringly (so blessed now was that accustomed darkness, so afflicting in ordinary life), to take the nearest direction to the sea-side.

Poor girl! Her courage was beautiful to behold, and Fate seemed to favor one so helpless. The boiling torrents touched her not, save by the general rain which accompanied them; the huge fragments of scoria shivered the pavement before and beside her, but spared that frail form; and when the lesser ashes fell over her she shook them away with a slight tremor, and dauntlessly resumed her course.

Weak, exposed yet fearless, supported but by one wish, she was

a very emblem of Psyche in her wanderings; of Hope walking through the Valley of the Shadow; of the soul itself, lone but undaunted, amidst the dangers and snares of life!

"The world is to be destroyed by fire," said an old man in long loose robes, a philosopher of the Stoic school: "Stoic and Epicurean wisdom have alike agreed in this prediction and the hour is come!"

"Yea; the hour is come!" cried a loud voice, solemn but not fearful.

Those around turned in dismay. The voice came from above them. It was the voice of Olinthus, who, surrounded by his Christian friends, stood upon an abrupt eminence on which the old Greek colonists had raised a temple to Apollo, now time-worn and half in ruin.

As he spoke there came that sudden illumination which had heralded the death of Arbaces, and glowing over the mighty multitude, awed, crouching, breathless, never on earth had the faces of men seemed so haggard; never had meeting of mortal beings been so stamped with the horror and sublimity of dread; never, till the last trumpet sounds, shall such a meeting be seen again! And above rose the form of Olinthus, with outstretched arm and prophet brow, girt with the living fires. And the crowd knew the face of him they had doomed to the fangs of the beast, *then* their victim, *now* their warner; and through the stillness again came his ominous voice—

"The hour is come!"

The Christians repeated the cry. It was caught up; it was echoed from side to side; woman and man, childhood and old age, repeated, not aloud, but in a smothered and dreary murmur—

"THE HOUR IS COME!"

At that moment a wild yell burst through the air; and, thinking only of escape, whither it knew not, the terrible tiger of the desert leaped among the throng and hurried through its parted streams. And so came the earthquake, and so darkness once more fell over the earth!

CHAPTER XI.

A DAY ON SOUFRIERE.

A LOOK INTO THE CRATER OF THE SOUFRIERE—THE INVISIBLE SONG-BIRD AND BEAUTIES OF THE TROPICS—THE HAUNTING IRON LANCE, BLACKSNAKE.

St. Vincent contains the last of the West Indian volcanoes from which the present century has witnessed destructive eruptions. A traveler with poetry and history in his ink, says: "The Soufrière, that towered above and overlooked the Richmond plantation, having, in 1812, burst upon the island with terrible force, causing an eruption which seemed to relieve a pressure upon the earth's crust, extending from Caracas to the Mississippi Valley, was most disastrous in its effects, having covered the whole island with ashes, cinders, pumice, and scorix, destroyed many lives and ruined several estates. It lasted three days, commencing on or near that fatal day, in 1812, when Caracas was destroyed, and ten thousand souls perished in a moment of time."

Ashes from this volcano descended upon Barbados, ninety-five miles to windward; and this fact is cited by Elise Reclus, in "The Ocean," to show the force of different aerial currents: "On the first day of May, 1812, when the northeast trade-wind was in all its force, enormous quantities of ashes obscured the atmosphere above the Island of Barbados, and covered the ground with a thick layer. One would have supposed that they came from the volcanoes of the Azores, which were to the northeast; nevertheless, they were cast up by the crater in St. Vincent, one hundred miles to the west. It is therefore certain that the debris had been hurled, by the force of the eruption, above the moving sheet of the trade-winds into an aerial river proceeding in a contrary direction."

Since that terrible outburst the volcano has remained inactive; having done its allotted work, it rested.

An eye-witness thus describes its appearance previous to the eruption: "About three thousand feet above sea-level, on the south side of the mountain, opened a circular chasm exceeding half a mile in diameter, and between found hundred and five hundred feet in depth. Exactly in the center rose a conical hill nearly three hundred feet in height, and about two hundred in diameter, richly covered and variegated with shrubs, brushwood, and vines about half-way up, and the remainder covered over with virgin sulphur to the top. From the fissures of the cone a thin white smoke was constantly emitted, occasionally tinged with a slight, bluish flame. The precipitous sides of this magnificent amphitheatre were fringed with various evergreens and aromatic shrubs, flowers, and Alpine plants. On the north and south sides of the base of the cone were two pieces of water, one perfectly pure and tasteless, the other strongly impregnated with sulphur and alum. This lonely and beautiful spot was rendered more enchanting by the singularly melodious notes of a bird, an inhabitant of these upper solitudes, and altogether unknown to the other parts of the island—hence called, or supposed to be, invisible, as it had never been seen.

"A century had now elapsed since the last convulsion of the mountain, or since any other elements had disturbed the serenity of the wilderness, besides those which are common to the tropical tempest. It apparently slumbered in primitive solitude and tranquillity; and from the luxuriant vegetation and growth of the forest, which covered its sides from base to summit, seemed to discountenance the fact and falsify the record of the ancient volcano.

"To ascend the volcano was the object of my visit to Richmond, and also to procure that famous bird call 'Invisible.' For a century, the people crossing the mountains had heard this bird, and for a century no one had looked upon it. No one could affirm that he had seen it. Its weird music, ascending from the frightful ravines on either side the

narrow mountain trail, seemed to float near them, but the bird ever remained undiscovered. By a preliminary ascent I found that it would be necessary in order to procure the bird to spend several days on the mountain-top, as it dwelt in deep gorges and ravines, requiring patience and courage to penetrate.

“At last came the perfect day, when the Soufrière emerged from the mist that had enveloped it for two weeks, and stood out clear against a sky of blue and clouds of silver gray. A glorious day was that last day in October, with its bright sun illumining the mountain, over whose crest were flitting shadows cast by fleeing clouds. The good people with whom I had rested for a week or more, added to my provisions luxuries I could not purchase, such as guava jelly, Java-plum wine, limes and oranges, and Mr. Evelyn and his son rode with me a little way on my journey.

“At first the road was along the shore, beneath cliffs and groo-groo palms; we crossed a turbulent river, with wide, rocky bed, and soon came to the bed of the famous ‘dry river’—the channel worn by that resistless flood of lava when on its way to the sea. It is two hundred yards in width, barren in vegetation for a mile from the sea, inclosed between high cliffs, clothed in verdure, hung with vines, spiny palms, tree-ferns—a wonderful hanging garden. There are three of these ‘dry rivers,’ where the lava filled up the bed of some flowing stream, or excavated an immense furrow for itself in its descent; nothing will grow in them near the sea, though their banks are rank with vegetation.

“We went through a cane-field, and then over an attractive pasture land, leaving which I commenced the ascent. Here, at the foot-hills of the Soufrière, my friends left me, and here my friend’s mule (‘Betsey,’ the best mule on the estate) manifested a desire to return also. Vigorously I applied the spur, and she slowly ascended the winding path, over ridges covered with calumet grass and through forest-like groups of tree-ferns and wild plantains. Having given Betsey a taste of the grass while she was resting beneath a shade, she was prone to stop and loath

to go ahead, and it was late when I reached the 'maroon tree,' half-way up the mountain-side.

"Over and through the broad-leaved plants darted the humming-birds—crested, violet-breast, and crimson-throat. Most conspicuous and numerous was the latter, with back of purple-black and throat of crimson-gold. I found him oftenest in the upper forests, in the dark recesses of untrodden glens and along the borders of the mountain path. If you hear a sharp chirp in these silent woods, or are started by a sudden whir, be sure it is he. Sparrows, finches, and humming-birds were in profusion; they flew hurriedly across the space in front of the tree, and darted at once into the thicket, as though afraid in the open, but reassured in the shade.

"Finally my men appeared, loudly complaining of their loads; though I knew they had loitered and were at that moment chuckling to themselves over the manner in which they had 'fool Massa Buckra.' A wood-pigeon had been all the while feeding in the trees above, and parrots had proclaimed their presence by loud cries below, but both disappeared at the arrival of the men. After a biscuit and a sup of beer we went on; the trail, increasing rapidly in steepness, left the tall trees behind, and led through smaller ones scarcely fifteen feet in height. Soon even these altogether ceased, and we climbed the backbone of the long hill leading to the summit, which is destitute of anything like trees, and densely covered with a fern with flat, branching head, and giant lycopodiums. One would fancy he could walk over this hill in any direction, so dense and solid appears this leafy carpet, but a step outside the trail almost anywhere would plunge him waist-deep in ferns, and probably neck-deep in a hole. The view of the grand, rugged, dark-green mountains near at hand, and of the constantly unfolding shore, green with sugar-cane, is superb. Here St. Vincent seems but two or three miles across, and one sees what a little island it is; but, upon reflection, how grand are the works of nature contained herein!

"Half a mile from the summit I heard the weird notes of the 'Souf-

rière-bird,' that songster about which hung the mystery I hoped to penetrate. Slowly climbing the winding-path, I at length reached a cave, hollowed out of the bank, hung with ferns dripping with moisture. My cave, however, was a mile farther, and without halting I passed on; a sudden turn revealed the crater deep and vast, on the very brink of which I stood. As my mule refused to go further, and kicked and reared in a manner not desirable on the brink of a crater half a mile deep, I was forced to return to the cave and tie the mutinous mule; then I returned to the contemplation of the great work before me. The vapors wafted on the trade-wind, vapors in odor sulphureous, had, by their strength, warned me of its proximity.

"It was a vast amphitheatre, a mile in diameter, as nearly circular as it is possible to be, three miles in circumference; the walls run straight down from my feet to a lake at the bottom. The lip, or top, is irregular, of a wavy outline, rising into pointed peaks, sinking into hollows; but from any point in this vast circumference the wall descends rapidly, and almost perpendicularly, to the water beneath. The sides are covered with a stunted vegetation, forming a smooth, sloping surface, which might deceive the spectator into the belief that he could walk down to the bottom. On the southern and southwestern sides it assumes more the amphitheatre shape, perpendicular ranges of rocks being piled one above another, circling around the southeastern side in columns that call to mind the ruins of the Coliseum.

"The eastern wall divides the two craters—the 'old' and 'new,' the latter blown out in the eruption of 1812, where before was solid mountain. It is a mere jagged escarpment, along which no one now dares climb. Before the rain and force of the violent winds had crumbled it so much it was once sealed. It is said that Prince Alfred attempted it in 1861, on the occasion of his ascent of this volcano, but failed to accomplish it. It is so narrow that no one can stride it, and so steep down either side that it makes the head swim to measure it from above. The northern brim is the lowest, and it is here that the lava poured out toward the

Caribbean Sea at Morne Ronde; and beyond is the higher peak, against which was forced the fiery flood, as seen by the wondering inhabitants of the coast. On the southern side the trees seem blasted and blackened by sulphur fumes. The southern wall rises high, and in its dome-shaped summit is excavated the cave, my home for nearly a week; its dark portal can be distinctly seen, though a mile away.

"The whole shore of the lake at the bottom of the crater is incrustated with sulphur, a gray and yellow rim lining the base of the cliffs that dip down, no one knows how deep, into the water of the basin. Around the shore are little caves, grottos, and black openings to the many ravines that seam the side of the bowl. A little islet is formed on the eastern side—the 'new crater' side—by a detached rock, or water-worn pinnacle from a submerged rocky base. In some of the ravines are scattered tree-ferns, stunted, to be sure, yet possessing grace and beauty that the fern, especially the tree-fern, never loses.

"But how shall I describe that sheet of water slumbering in the bowels of the crater? It lies in the bottom of the bowl at least twelve hundred feet beneath the brim, serene, unmoved, a lake beneath the power of the elements to ruffle. Clouds of mist sail over it, and are blown into the crater from the eastward, but the fiercest gusts, and they are strong and frequent, cannot disturb that silent lake reposing in its bosom. Its hue is almost indescribable; pearl-green, creamy in hue yet with a decided greenish tint, opalescent with a tinge of the faintest aquamarine. Against gray cliffs, dark gorges and green moss, as it lies with its circling rim of golden sulphur, it resembles a huge opal in a setting of gold and emerald.

"In the apex of the southern hill bordering the crater, some one, long ago, hollowed out a place for shelter. It is only about ten feet across in depth, and it is open on the northern side overlooking the lake, and, excepting a slight hollow, at the top, also; but it gives shelter from the keen, mist-laden winds of the Atlantic, and by crouching in one corner, one can avoid the rains from any quarter but the northwest.

"I found that the surface was cut up into ravines and gullies starting from the crater-rim. Probably the deepest of them were gouged out by the flood of lava that poured over the crater's edge in that terrible overflow of volcanic wealth. Rain flowing through the loose volcanic ashes may have cut the more recent, but it could not have descended with sufficient impetuosity to have hollowed out the deep well-holes and cut those deep ravines with perpendicular walls. Starting from the narrow edge of the crater, they spread out like a fan, furrowing the outer surface of the cone, growing deeper, broader, and gloomier, until lost in the dark recesses below. Over all grew the small trees, densely crowded; ferns, filamentous yuccas, moss and wild pines covered the earth and rocks in impenetrable confusion, so concealing the openings to the narrower gullies that it was impossible to ascertain their whereabouts without a very careful examination. It was into this wilderness that I plunged, floundering through tangled masses of branching fern and through dense clusters of ground-orchids. But I found few birds (save a sparrow or two and a sucrier, and the prospect was more discouraging.

"A death-like stillness pervaded that gloomy slope, disturbed only by the swirl of the volumes of mist as they slept over the eastern spur, and faint notes of the Soufrière-bird down below. Suddenly I bethought myself of a bird-call taught me by the Caribs of Dominica; and with such success did I use it, that, in ten minutes, the hitherto silent trees were alive with stirring feathered forms, hurrying forward in anxious flight. The first to respond—and I afterward found it always in advance of the others—was a flycatcher; it flew precipitately to the very tree beneath which I stood, and hopped about the branches, peering anxiously beneath; closely following him was his mate.

"Soon I heard a low call-note, such as I had heard that bird give utterance to, and imitating it closely as possible, I was gratified to hear it approaching. Suddenly it came within gunshot. In a thought it saw me, just as I caught a snap-shot. Through the smoke I caught

sight of a few floating feathers, and hurried forward through the matted masses of ferns, until I stood beneath the tree upon which he had for a moment rested. There was nothing in sight; but searching lower down, I found it lodged in a wild pine on the verge of a ravine. In my anxiety to possess the bird, I neglected to examine the ground beneath my feet, and it gave way, and I, wildly grasping at overhanging roots, was thrown into the ravine, fifteen feet deep. I landed on my feet, bruised and a little torn, but without serious injury.

“But how was I to get out? The walls were as smooth as falling water could make them, and the lower portion of the ravine disappeared suddenly in the direction of the lake. The head of the ravine was a hole like a well, and into this I had fallen, with little intermittent showers of water coming down.

“A shower heavier than the others came down fiercely, setting rivulets running down the crater and washing the earth from beneath my feet, warning me to be out of the hole, if possible. Clinging to some projections in the rock, I worked my way slowly up until near the top; when about to thrust my arm through the vines that darkened my chamber, I was startled by the appearance of a black, shining head with glittering eyes, thrust into my face. But for the nearness to the opposite wall I should have fallen, this apparition took me so by surprise, for it was none other than an immense black snake. Fortunately, I could secure myself in position by bracing my legs against each opposing cliff, and was near enough to the top to clutch some roots, otherwise I could not have maintained the ground I had gained. The snake crawled out on a crevice in the rock, and though he may not have intended to harm me, I will confess to a feeling of fear at that time, and remembered with regret how thoughtlessly I had laughed at poor Toby, the day before, when he fled in terror from a snake I had caught by the tail. My gun, which had not been injured in my fall, was slung at my back, and by loosening it I managed to strike the snake a smart blow, which, though it angered him, caused him to glide down the cliff instead of up. Thus

relieved, I scrambled through the dank vegetation, and stood once more above the ground.

“From the lake came up a strange, hissing sound, as though the water was boiling, caused by the many streams set in flow by the rain running into it. Its usually placid surface was agitated and I could detect a perceptible change in its color.

“My precious bird had landed safely at the bottom of the gulch and he now reposed in my game-basket the first Soufrière-bird that had ever been secured.”

CHAPTER XII.

THE THEORY OF VOLCANOES.

DR. SAMUEL KNEELAND, RICHARD A. PROCTOR, JOHN MILNE, WALTER T. BRIGHAM AND OTHERS ON THE SCIENCE OF VOLCANOES—CAUSES GIVEN AND RESULTS DESCRIBED.

Dr. Samuel Kneeland, A. M., M. D., has made special studies of volcanic phenomena, visiting the Hawaiian Islands and Iceland, making personal observations. In his excellent book, "Volcanoes and Earthquakes," he gives the following interesting scientific information:

"According to Prof. Judd, the first step toward the exhibition of volcanic action must be the production of an opening in the earth's crust. The almost universal occurrence of the heated stratum above referred to, between the crust and the center, would explain, better than a fiery nucleus, the rise of the degree Fahrenheit for every fifty to sixty feet of descent. But this would vary according to the conducting power of the rocks and the depth of the heated stratum.

"There are three hundred to three hundred and fifty great volcanoes on the globe. Including extinct ones, ancient and modern, there are about one thousand. There are tens of thousands of smaller volcanoes, and millions of stufas, geysers, hot springs, fumaroles, mud ejections, and the like. These last may make up in number what they lack in individual energy, and may be quite as useful as the larger ones in relieving the imprisoned dying volcanic forces. The greatest number of the principal volcanoes (about one hundred and seventeen) in North, Central and South America, are on the continents, and twice as many in the oceanic islands. At an early geological period the whole line of the present Atlantic was probably traversed by a chain of volcanoes on the grandest scale; but at present only a few parts of this range are above the sea, forming the isolated islands and groups now seen. From the

pressure of the ocean—a ton on every square inch of bottom, for each one fathom of water—it does not seem possible that volcanic cones could be built up from the bottom, if a deep sea, and reach the surface; but quiet outwellings might in many cases occur from fissures in the ocean beds.

“The periodical activity of volcanoes, their violent paroxysms and seasons of rest, sometimes for centuries, seem natural on the theory of subsidence and fissure, according as it is sudden and great, or slow and slight, letting in water, and thus exciting and perpetuating steam action along lines of weakness. Explosive forces seem inadequate to account for them. The shifting of the axis of eruption, as in Etna, and the linear arrangement all the world over, indicate subsidence as the primary cause, and eruption as a secondary effect.

“As Prof. Judd states, Mr. Scrope pointed out that the ordinary argument for the explanation of volcanic outbursts is simply ‘reasoning in a circle.’ It is assumed, on the other hand, that the fissures are produced by steam and other forces set free by the passage of sea water to interior heated masses; and, on the other, that the production of these fissures leads to the influx of water. If the passage of water by the fissures produces eruptions, what had caused the fissures? If the subterranean forces can produce the fissures, why not the eruptions also? It would seem, then, that only subsidence or fracture, as above explained, can resolve the difficulty.

“Changes of two inches in barometric pressure within a brief period are not uncommon. A fall to this extent indicates the removal of a weight of about two million tons from each square mile of the surface of the earth implicated. This relief of pressure is enough to cause the flashing into steam of the superheated water, or escape of explosive gases, which we have good reason to believe exist in volcanic areas. Such a relief of pressure, whether from terrestrial movements or atmospheric changes, may be better appreciated by an allusion to what has been called the ‘potentially liquid condition.’

“The boiling point of liquids, and the fusing point of solids, are very much raised by great pressure, so that water may remain liquid at a temperature far above two hundred and twelve degrees Fahrenheit in the depths of the earth, while masses of rock may be in a solid state at a temperature far above that at which they would melt at the surface. They are then said to be in a ‘potentially liquid condition.’ Upon the relief of this pressure, the water would flash into explosive steam, and the rock assume the liquid or lava state. This would explain how by a fissure the ejecting force and the ejected material of a volcano might arise, with or without an earthquake.

“This chapter may be closed with the four following conclusions, deduced from Prof. Judd’s researches and an examination of volcanic records, ancient and modern :

“I. A long period of quiescence is generally followed by an eruption, either long or violent.

“II. A long-continued or very violent eruption is usually followed by a prolonged period of repose.

“III. Feeble and short eruptions ordinarily succeed one another at brief intervals.

“IV. The violence of a great eruption is generally inversely proportional to its duration.

“In a single sentence, then, it may be stated, as deduced from the history of volcanic phenomena, specimens of which have been here detailed from personal experience, that such phenomena are due to one simple cause, viz. : the escape of imprisoned steam from masses of molten matters in the crust of the earth. That this is occasioned by the water from the surface of the land, or from the seas, gaining access to the sedimentary strata between the crust and the center, and becoming heated by the crushing movements, uplifts, depressions, and fractures, consequent on the secular cooling of our globe. And that this occurs whether we consider an eruption of the majestic Etna or the humblest bubbling hot spring.

“From Christmas, 1884, to the early part of January, 1885, a series of earthquake shocks occurred, extending over a large part of Southern Spain, but especially destructive of life and property in Grenada and Andalusia. Loud rumblings were heard, the ground was cleft, and men, animals and houses fell into the abyss. Its course was in some places from west to east, in others from south to north, according to the strata involved. The longest shock lasted fifty seconds. In some places there were three, in others, at a little distance, seventeen shocks; pointing distinctly to rupture and shock till the dislocated strata attained rest. There was, no doubt, great electrical disturbance from the immense friction attending the depression, as was shown by the flashes of lightning from a clear sky.

“There is little need of adducing any more instances, although hundreds could be given, to show that earthquakes occur the world over in regions not now volcanic, and in some, like rock-ribbed New England, where there are no traces of volcanic activity in the present geological epoch.

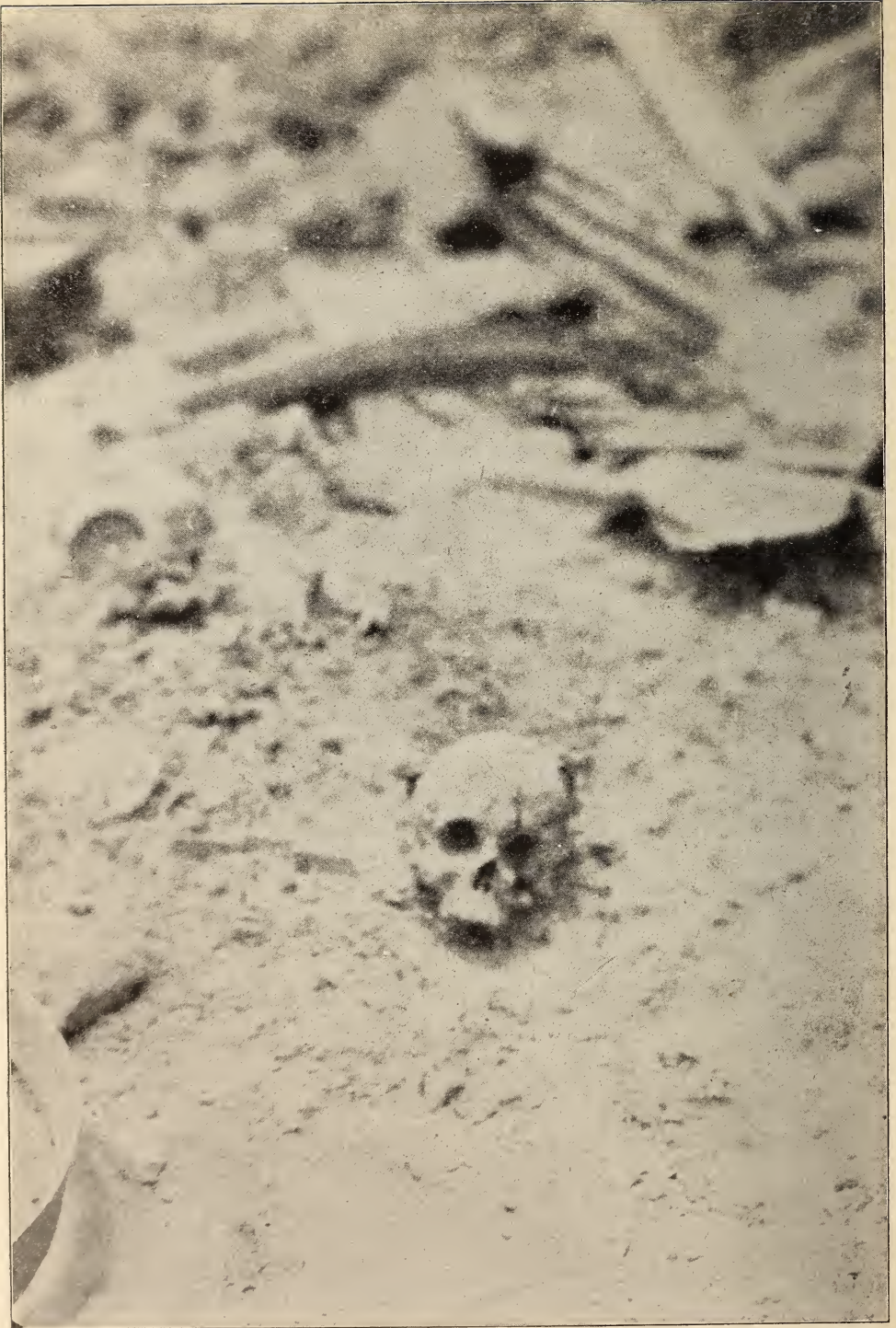
“The theories brought forward to account for earthquakes are numerous and fanciful in the extreme. No satisfactory connection with atmospheric conditions has been proved, except as these are an accessory, and possibly exciting causes. They occur everywhere, at all seasons of the year, at all times of the day, and in all geological formations and epochs; they seem to follow no laws of periodicity, and, in many remarkable instances, are independent of volcanoes. Attempts have been made to connect their phenomena with the solar spots, terrestrial magnetism, the phases of the moon, and the tides, but without satisfactory results.

“Prof. Guyot states that there can be no doubt that within the tropics, at least, earthquakes are most common at times of greatest atmospheric disturbance, but a precise relation between the two classes of phenomena has never been established.

“Mallet is of opinion, from studying the data of eighteen and one-half centuries, that they are the least frequent before the autumnal equinox,



BODIES OF MOTHER AND CHILD, Found in the Lava Near St. Pierre after Mont Pelee's Eruption.—(Copyright, May 21, 1902, by The Press Publishing Company—New York World.)



A SKULL Found in Main Street, St. Pierre, after Mont Pelee's Eruption.—(Copyright, May 21, 1902, by The Press Publishing Company—New York World.)

while others regard the solstices and equinoxes as all-critical periods. Where the doctors so disagree it is a great satisfaction to be able, as far as present knowledge goes, to refer the earthquake as well as the volcano to a simple dynamic force depending on the secular cooling of the globe. The cause is the same in all, while the effects vary according to geological and wholly terrestrial circumstances."

Richard A. Proctor, in "Notes on Earthquakes," gives the following valuable information on the same subject :

"Earthquakes occur in all regions adjacent to active volcanoes. Thus the neighborhood of Vesuvius, Etna, and Teneriffe is infested by subterranean convulsions, which also are frequent over the neighborhood of the Greek Archipelago, and in Syria. In fact it seems probable that the whole of the Mediterranean basin and the surrounding lands for a distance of many miles from its shores form a single earthquake district, whereof Teneriffe, Vesuvius, Etna, Strumboli, the Archipelagic and the Syrian volcanoes are the safety valves. Then there is another earthquake district surrounding Hecla, or—some say—extending in a long line from the Jan Mayen volcano, through Hecla, the Azores, and the Cape Verde Islands, to St. Helena and Tristian d'Acunha. Japan, Sumatra, Java, and the islands of the Archipelago are liable to fearful earthquakes—some of the most destructive of which have occurred within the past few years. In the West Indies there is another region to which must be referred those which have recently taken place. Probably this district belongs to the great earthquake region in Colombia and Peru, around the celebrated volcanoes Cotopaxi and Chimborazo. The southwestern district of the United States is also liable to earthquake shocks, apparently referable to the great Mexican volcanoes. There is one region of the earth in which subterranean shocks occur which cannot be referred to the neighborhood of volcanic vents. Upper India and all parts of Western India are liable to frequent earthquakes, insomuch that between the years 1800 and 1842 no less than 162 earthquakes were recorded in these places. Undoubtedly we may place these disturbances to the great mountain chains which

traverse this part of Asia. The subterranean forces which upheaved the great Himalayan range, for instance, may be assumed to be still existent, though not for awhile dormant, or, 'perhaps,' says John Herschel, 'expended in maintaining the Himalayas at their present elevation.'

"On the other hand there are some regions wholly free from earthquake shocks. Among such may be mentioned the great alluvial plains of America east of the Andes, the plains on the northeast of Europe and the northern parts of Asia. There are monuments, natural and artificial, which prove the absolute fixity of some regions. The slightest shock would have flung down that strange mass which is perched upon the summit of the Peter Botte mountain, 1,500 feet above the sea-level. Pompey's Pillar justifies the assertion of Strabo that Egypt has long been free from earthquakes; though nothing short of subterranean convulsion could have flung down the more ancient obelisks which lie prostrate amidst the sands of Western Lower Egypt. Even that masterpiece of Egyptian labor, the Great Pyramid, though surpassing all other human erections in stability, shows unmistakable evidence of the slow action of subterranean forces. In Mexico, again in the very center seemingly of earth-rocking forces, there is a region in which rocks of grotesque figure attest the perfect immunity which the region has enjoyed even from considerable shocks. The Cheese-ring in Devonshire is another instance of the kind of evidence we are considering.

"And as there are instances of regions near to a disturbed district which yet are free from shocks, so there are spots liable to frequent shocks though the neighboring country for miles on every side is seldom (if ever) disturbed. Such is the district—very limited in extent—near Comrie, in Perth, where a year scarcely ever passes without a shock being experienced.

"It would seem, also, as if regions free from subterranean disturbance for many centuries must not count upon permanent immunity. For a violent earthquake will often open out, as it were, a passage for subterranean impulses to new regions. 'The circles of concussion enlarge,'

says Humboldt, 'in consequence of a single extremely violent shock.' Since Cumana was destroyed (December 14, 1797) every shock of the southern coast is felt in the peninsula of Maniguarez, which before suffered no disturbance. Again, in the successive earthquakes which traversed (in 1811-13) the Valley of the Mississippi, Arkansas and Ohio rivers, it was noteworthy how the motion traveled farther and farther northward on each occasion. It seemed as if the subterranean forces were gradually breaking a way through successive barriers.

"No earthquake has ever happened the circumstances attending which have been so carefully noted as in the case of the earthquake of Calabria, in 1783. This celebrated earthquake began in February, 1783, and lasted until the end of 1786. The first shock threw down, 'in two minutes, nearly every house in all the cities, towns, and villages, from the western flanks of the Apennines, in Calabria Ultra to Messina in Sicily, and convulsed the whole country.' The second took place seven weeks later, and was scarcely less violent. Sir Charles Lyell mentions that 'the great granite chain which passes through Calabria from north to south, and attains the height of many thousand feet, was shaken but slightly by the first shock, but rudely by those which followed.'

"And just as such a cloth would 'rumple up' as soon as the motion of one end was checked, so the soil of the Calabrian plains was found to be in some parts abnormally raised, in others as strangely depressed. 'In the town of Terranouva,' says Sir Charles Lyell, 'some houses were uplifted above the common level, and others adjoining sunk down into the earth. In several streets the soil appeared thrust up, and abutted against the walls of houses; a large circular tower of solid masonry, part of which withstood the general destruction, was divided by a circular rent, and one side was upraised, and the foundations heaved out of the ground.'

"As might be expected, the soil did not continue unbroken by the violent shocks to which it was subjected. In the central parts of the disturbed region the earth opened so widely as to swallow up large houses. In Cannamaria many buildings were 'completely engulfed in one

chasm,' insomuch that not a trace of them was ever seen afterward. So violently did these chasms close their yawning jaws, that afterward, when excavations were made for the recovery of valuables, the workmen found the contents of houses crushed into a compact mass with detached portions of masonry. In some instances persons were engulfed by one shock and thrown out again alive by the following one.

"The magnitude of some of the fissures which were formed during this earthquake affords startling indications of the tremendous violence of the earth's internal throes. Grimaldi observed in the territory of San Fili a newly-formed ravine half a mile long and twenty-five feet deep, and another of similar dimensions, in Rosarno. In the district of Plaisano three enormous fissures were formed: One a quarter of a mile long, about thirty feet in width, and 225 feet deep; the second, three-quarters of a mile long, 150 feet broad, and 100 feet deep; and the third, nearly a mile long, 105 feet broad, and thirty feet deep.

"If any evidence were required as to the true nature of the disturbance, it would be found in the remarkable motions of masses slightly attached to the surface-soil. Paving-stones were flung into the air, masses of loose soil flung in showers over the surrounding objects.

"In this earthquake 40,000 persons are supposed to have perished, and about 20,000 by the epidemics which followed. Dolomieu gives a painful account of the Calabrian cities. 'When I passed over to Calabria,' he writes, 'and first beheld Polistena, the scene of horror almost deprived me of my faculties; my mind was filled with mingled horror and compassion; nothing had escaped; all was leveled with the dust; not a single house or piece of wall remained; on all sides were heaps of stone so destitute of form that they afforded no idea of there having ever been a town on this spot. The stench of the dead bodies still arose from the ruins. I conversed with many persons who had been buried for three, four, or even five days; I questioned them respecting their sensations in so dreadful a situation, and they agreed that, of all the physical evils they endured, thirst was the most intolerable; and that their mental agony was

increased by the idea that they were abandoned by their friends, who might have rendered them assistance.'

"The destruction of the Prince of Scilla and a great number of his vassals was one of the most remarkable events attending this deplorable catastrophe. He had persuaded his servants to seek their fishing-boats for safety, and went with them to encourage them. During the night of February 5, while they were sleeping, an enormous mass of earth was flung from Mount Jaci upon the plain near which the boats were moored. Immediately the sea rose more than twenty feet above the level of the plain. Every boat was sunk or dashed upon the beach, and hundreds of persons who had been sleeping on the plain were swept out to sea. The Prince and 1,430 of his servants perished.

"One of the most remarkable earthquakes ever experienced was that which overthrew Riobamba on February 4, 1797. A district 120 miles long and 60 broad was shaken by an undulatory motion which lasted for four minutes, and a far wider district felt the effect of the disturbance. Within the space first named, in which the movement was more energetic, every town and village was leveled to the ground; and many places were buried under large masses flung down from the surrounding mountains. Among these was the flourishing town of Riobamba. Preceded and accompanied by no warning noises whatever, the terrific concussion in a few moments effected the complete desolation of the unhappy district. The earthquake was a singular combination of perpendicular, horizontal and rotary vibrations. So violent was the perpendicular, or as it may be termed, the explosive movement, that hundreds of the wretched inhabitants were flung upon the hill La Culla, several hundred feet high, on the further side of the small river Lican. Then came a horizontal movement, so rapidly succeeding the other that in many instances the furniture of one house was found beneath the ruins of another.

"The subterranean noises heard during earthquakes are sometimes singularly striking. 'The nature of the noises is very various,' says Humboldt, 'rolling, rattling, clanking like chains, occasionally like thunder

close at hand; or it is clear and ringing, as if masses of obsidian or other vitrified matters were struck in caverns underground.' These noises were not only heard much farther off than they could be if they were transmitted in the air, but they travel much more rapidly. In 1744, when the great eruption of Cotopaxi took place, the subterranean noises were heard at Honda, on the Rio Maddelena. The crater of Cotopaxi, 17,000 feet above the level of Quito, is separated from it 'by the colossal mountain-masses of Quito, Pasto, Papayan, by innumerable valleys and precipices, and by an actual distance of no less than 500 geographical miles.' The eruption which took place in the Island of St. Vincent on April 30, 1812, produced subterranean noises resembling the loudest peals of thunder in Caracas, in the plains of Calabozo, and on the banks of the Rio Apure, a distance of upward of 700 geographical miles.

"We are so in the habit of regarding the earthquake as an agent of destruction that it may sound paradoxical to assert that the phenomenon is surpassed by no other as a regenerative and restorative agent. Yet this is strictly the case. But for earthquakes our continents would continually—however slowly—diminish in extent through the action of the sea-waves upon their borders, and of rain and rivers on their interior surfaces. 'Had the primeval world been constructed as it now exists,' says Sir John Herschel, 'time enough has elapsed, and force enough directed to that end has been in activity, to have long destroyed every vestige of land.' It is to the reproductive energy of the earth's internal forces that we are alone indebted for the very existence of dry land. To the same cause, undoubtedly, we owe that gradual process of change in the configuration of continents and oceans which has been for ages and still is in progress—a process the benefit derived from which cannot possibly be called in question. Our forests and our fields derive their nourishment from soils prepared, for long ages, beneath the waves of ocean; our stores of coal and of many other important minerals have been in like manner prepared for our use during the long intervals of their submergence; we build our houses even with materials many of which owe their perfect

adaptation to our wants to the manner in which they have been slowly deposited on what was once the bed of ocean, and compressed to a due solidity and firmness of texture beneath its depths. If it is indeed true, as Humboldt asserts, that 'the destiny of man is in part dependent on the fashion of the outer crust of the globe, on the partitioning of continents, on the direction of the mountain chains which traverse them, and on the distribution of land and water,' then we must look upon the earthquake as the most important of all agencies which tend to the renovation of our terrestrial globe. So far from dreading lest the earth's subterranean forces should acquire new energies, we ought rather to fear lest they should lose their force. We may, therefore, gladly hail the opinion of the great geologist who asserts that 'the energy of subterranean movements has always been uniform as regards the whole earth. The force of earthquakes,' adds Lyell, 'may for a cycle of years have been invariably confined, as it is now, to large but determinate spaces;' gradually, however, this force shifts in position, so that other regions, for ages at rest, become in their turn the grand theater of action.

"Geology shares with astronomy the interest arising from the study of the life of worlds. In the star-depths we see uncounted millions of suns of many orders—in size, in structure, and in condition—but each probably like our own in being the center of its family of planets. In our sun we study the one star near enough to present to us the general features of sun-life."

John Milne, in "Earthquakes and Other Earth Movements," gives the following interesting facts:

"During the twenty-four hours succeeding the destruction of Lima (October 28, 1746), 200 shocks were counted, and up to the 24th of February in the following year 451 shocks were felt.

"At St. Thomas, in 1868, 283 shocks were counted in nine and a quarter hours.

"Similar examples might be taken from the description of almost all destructive earthquakes of which we have records. For a large earth-

quake to occur, and not to be accompanied by a train of succeeding earthquakes, is exceptional. Sometimes we find that a large number of small earthquakes have occurred without a large one being felt. Seismic storms of this description have happened, even in England—for instance, in the year 1750, which appears to have been a year of earthquakes for many portions of the globe.

“In this year, which is known as the ‘earthquake year,’ shocks were felt in England as follows: On March 14, in Surrey; March 18, in south-west England; April 2, at Chester; June 7, at Norwich; August 23, in Lincolnshire; September 30, Northamptonshire.

“Synchronism of earthquakes.—One of the first writers who drew attention to the fact that two shocks of earthquakes have been felt simultaneously at distant places was David Milne, who published a list of these occurrences.

“In two instances, February and March, 1750, shocks were simultaneously felt in England and Italy. In September, 1833, shocks appear to have been simultaneously felt in England and Peru. These, and many other similar examples, are discussed by Mallet, who thinks, with Milne, that these coincidences are in every probability matters of accident. According to Fuchs, Calabria and Sicily appear often to have had earthquakes at the same time, as for instance in 1169, 1535, 1638, when the town Euphemis sunk, and in the years 1770, 1776, 1780, and 1783.

“A remarkable example of coincidence occurred on November 16, 1827, when a terrible earthquake was felt in Colombia, and at the same time a shock occurred on the Ochotsk plains, nearly antipodal to each other.

“Kluge also gives a large number of instances of simultaneous earthquakes; thus, on January 23, 1855, on the same day that Wellington, New Zealand, so severely suffered, there was a heavy earthquake in the Siebengeberge, and also in North America. To this might be added the fact that the last destructive earthquake in Japan occurred within a few days of this time.

“Inasmuch as many phenomena, like the motion of the tides, the rise and fall of the barometer, fluctuations in temperature, are all more or less directly connected with the relative position of our planet with regard to the sun and moon, any coincidence between the phases of these bodies and the occurrence of earthquakes more or less involves a time relationship with the other phenomena resultant on lunar and solar influence.

“Earthquakes and the position of the moon.—Many earthquake investigators have attempted to show the connection between earthquakes and the phases of the moon.

“The first and most successful worker in this branch of seismology was Professor Alexis Perrey, of Dijon, who, after many years of arduous labor in tabulating and examining catalogues of earthquakes, declared that they were more likely to occur at the following periods than at others.

“1. They are more frequent at new or full moon (syzygies) than at half moon (quadratures).

“2. They are more frequent when the moon is nearest the earth (perigee) than when she is farthest off (apogee).

“3. They are more frequent when the moon is on the meridian than when she is on the horizon.

“One of the earliest records of a severe earthquake and a volcanic eruption occurring simultaneously is found in the accounts of the destruction of Herculaneum and Pompeii. The throwing up of Monte Nuovo in the neighborhood of Pozzuoli was accompanied with a dreadful earthquake.

“In 1868 the earthquake of Arequipa was accompanied by the opening of the volcano Misti, on its north side. The distance of the volcano is about fourteen miles.

“Earthquakes consequent on the explosion of steam.—Humboldt regarded volcanoes and earthquakes as the results of a common cause, which he formulated as ‘the reaction of the fiery interior of the earth upon its rigid crust.’ Certain investigators, who have endeavored to reduce Humboldt’s explanation to definite limits, have suggested that

earthquakes may be due to sudden outbursts of steam beneath the crust of the earth, and its final escape through cracks and fissures.

“Admitting that steam may accumulate by separating out from the interior of our globe, its sudden explosion might be brought about by its own expansive force or by the movements in the bubbling mass from which it originated.

“Others, however, rather than regard the steam as being a primeval constituent of the earth’s interior, imagine it arises from the gradual percolation of water from the surface of the earth down to volcanic foci, into which it is admitted against opposing pressures, by virtue of capillary action.

“Mallet, in his account of the Neapolitan earthquake, shows that the whole of the observed phenomena can be accounted for by the expansive force exerted on its walls rent open. Just as at the Geysers we hear the thud and feel the trembling produced by the sudden evolution and condensation of steam, so may steam by its sudden evolution and condensation in the ground beneath us give rise to a series of shocks of varying intensity, accompanied by intermediate motions—that is to say, a motion which, as judged by our feelings, is not unlike many earthquakes. Often it may happen that the result of the explosion may be the production of a fault, or at least a fissure; and thus in the resulting movements we may have a variety of vibrations, some being those of compression and distortion, produced by the blow of the explosion, and others being those of distortion alone, produced by the shearing action which may have taken place by the opening of the fault. Sometimes one set of these vibrations may be prominent, and sometimes the other. Thus, when we say that an earthquake has shown evidence by the nature of its vibrations that it was produced by a fault, this by no means precludes the possibility that an explosion of steam may also have been connected with the production of the disturbance. Mallet threw out the suggestion that the opening of fissures beneath the ocean might admit water to volcanic foci. During the time that the water was in the spheroidal state the preliminary tre-

mors, so common to many earthquakes, would be produced. These would be followed by the explosion, or series of explosions, constituting the shock or shocks of the earthquakes.

"The chief reasons for believing that the earthquakes of Northeastern Japan are partly due to explosive efforts are:

"1. That the greater number of disturbances, perhaps ninety per cent., originate beneath the sea, where we may imagine that the ground, under the superincumbent hydrostatic pressure, is continuously being saturated with moisture.

"2. Many of the diagrams show that the prominent vibrations, of which there are usually from one to three, in a given disturbance have the same character as those produced by an explosive like dynamite, the greatest and probably the most rapid motions being inward toward the origin.

"It may here be remarked that a very large proportion of the destructive earthquakes of the world have originated beneath the sea, as has often been testified by the succeeding sea waves. Also, it must be observed, that earthquake countries are chiefly those which have a coast-line sloping at a steep angle beneath the sea—that is to say, earthquakes are frequent along coasts bordered by deep water.

"The earthquake which, in 1840, caused Mount Cernans, in the Jyra, to fall is also attributed to the solvent action of waters in undermining its foundations. This undermining action was in a great measure probably due to a large spring, which, twenty-five years previously, had disappeared, and which subsequently may possibly have been slowly disintegrating the foundations of the mountain. Earthquakes of this order would be principally confined to districts where there are rocks which are more or less soluble, as, for instance, rock salt, gypsum, and limestone."

In his "Notes on the Volcanoes of the Hawaiian Islands" Walter T. Brigham, A. M., gives the following interesting information about volcanoes in our own territory:

“In a letter dated September 27, 1855, Mr. Coan says: ‘On the evening of the 11th of August a small point, glowing like Sirius, was seen at the height of 12,000 feet on the northwestern slope of Mauna Loa. This radiant point rapidly expanded, throwing off coruscations of light, until it looked like a full-orbed sun.’

“Sixty-five days after, the fissure which permitted the escape of the lava was still open, and in awful activity. The stream was flowing directly toward Hilo and there were no valleys or ridges of sufficient size to turn its course. The inhabitants of this beautiful village were exceedingly anxious and made frequent excursions to the scene of the lava-flow. On the 2d of October, Mr. Coan, with a party of friends, passed through the thick forest, following the course of the Wailuku, and on the 5th reached the lava-stream early in the morning at a narrow point, where it was about three miles wide. ‘In some places it spread out into wide lakes and seas, apparently from five to eight miles broad, enclosing, as is usually the case, little islands not flooded by the fusion.’ Mr. Coan continues in this letter, which is dated October 15, 1855:

“‘Early on Saturday, the 6th, we were ascending our rugged pathway amidst steam and smoke and heat which almost blinded and scathed us. At ten we came to open orifices down which we looked into the fiery river which rushed furiously beneath our feet. Up to this we had come to no open lake or stream of active fusion. We had seen in the night many lights like street-lamps, glowing along the slope of the mountain at considerable distances from each other, while the stream made its way in a subterranean channel, traced only by these vents. From ten a. m. and onward these fiery vents were frequent, some of them measuring ten, twenty, fifty, or one hundred feet in diameter. In one place only we saw the river uncovered for thirty rods and rushing down a declivity of from ten to twenty-five degrees. The scene was awful, the momentum incredible, the fusion perfect (a white-heat), and the velocity forty miles an hour. The banks on each side of this stream were red-hot, jagged and overhanging, adorned with burning stalactites and festooned with im-

mense quantities of filamentose, or capillary glass, called "Pele's hair." From this point to the summit crater all was inexpressibly interesting.

"Valve after valve opened as we went up, out of which issued "fire and smoke and brimstone," and down which we looked as into the caverns of Pluto. The gases were so pungent that we had to use the greatest caution, approaching a stream or orifice on the windward side, and watching every change or gyration of the breeze. Sometimes whirlwinds would sweep along, loaded with deadly gases, and threatening the unwary traveler. After a hot and weary struggle over smoking masses of jagged scoriae and slag, thrown in wild confusion into hills, cones, ridges, and spread out over vast fields, we came at one p. m. to the terminal or summit crater (not Mokuaweoweo).

"This we found to be a low elongated cone, or rather series of cones, standing over a great fissure in the mountain. Mounting to the crest of the highest cone we expected to look down into a great sea of raging lavas, but instead of this the throat of the crater, at the depth of one hundred feet, was clogged with scoriae, cinders, and ashes, through which the smoke and gases rushed up furiously from seams and holes. One orifice within this cone was about twenty feet in diameter, and was constantly sending up a dense column of blue and white smoke which rolled off in masses and spread over all the mountain, darkening the sun, and obscuring every object a few rods distant. So toppling was the crest of this cone, so great the heat, and so deadly the gases, that we could find no position where we could look down the throat or orifice; and could we have done so, it is not probable that we should have seen the deep fountain below us, as the lavas were forced up its hot chimney from the burning bowels of the earth. I have no doubt that the point at which the igneous river flowed off in its lateral duct was at least five hundred, perhaps a thousand, feet below us.

"The summit cone which we ascended was about one hundred feet high, say five hundred feet long and three hundred broad at its base. Several other cones below us were of the same form and general character,

presenting the appearance of smoking tumuli along the upper slope of the mountain. As you descend the mountain these become lower and less frequent, but here they are the rims or jagged jaws of those orifices through which we look into that subterranean tube of angry fusion which hurries with fearful speed down the side of the mountain. The molten stream first appears some ten miles below the fountain crater, and as we viewed it rushing out from beneath the black rocks, and, in the twinkling of an eye, diving again in its fiery den, it produced indescribable feelings of awe and dread.

“This summit crater I estimate at twelve thousand feet elevation; the principal stream (there are many lesser and lateral ones), including all its windings, sixty miles long; average breadth, three miles; depth, from three to three hundred feet, according to the surface over which it flowed. The present eruption is between those of 1843 and 1852, and from our high tower we could see them both and trace their windings.

“Early on Monday we decamped and set our faces for Kilauea, distant some thirty-five miles, hoping by a forced march to reach it at night. At eight a. m. we passed the seat of the grand eruption of 1852, and traveled for miles on its cinders. A little steam only issues from that cone whose awful throat, in 1852, sent up a column of glowing fusion to the height of a thousand feet. We explored Kilauea, and on Thursday reached Hilo.

“Hilo is now in a state of thoughtful suspense. The great summit fountain is still playing with fearful energy and the devouring stream rushes madly down toward us. It is now about ten miles distant—nearly through the woods, following the right bank of the Wailuku, and heading directly for our bay.

“October 22. It is now seventy-two days since the eruption commenced and the fountain is in full force. The matter disgorged is of the same general character as in former eruptions. We saw nothing new. Among the salts, sulphur and sulphate of lime are the most abundant. They are scattered freely at several points along the line of flow.’

“Mr. Coan, it will be seen, struck the flow at a point above the terminus and followed it to the source. On his return he determined to cut through the forest and meet the stream. Following a branch of the Wailuku in a drenching rain, which made the stream almost impassable, he thus describes the scene :

“So soon as we entered this stream we found it discolored with pyroligneous acid from burning wood, whose odor and luster became more and more positive the further we advanced up the stream. The discoloration also became more apparent as we proceeded, until the water was almost black. This showed that the lava flow had crossed the head waters of the stream and its small tributaries, consuming the forest and jungle, and sending down what could not be evaporated of the juices to mingle with the stream.

“A little before sundown our guide led us at right angles from the stream we had been threading for six hours, and in a few minutes the fires of the volcano glared upon us through the woods. We were within six rods of the awful flood which was moving sullenly along on its mission toward Hilo. Thrusting our poles into the lava, we stirred it, and dipped it up like pitch, taking out the boiling mass and cooling all the specimens we desired. We were on the right or southern verge of the stream, and we also found that we were about two miles above its terminus, where it was glowing with intense radiance and pushing its molten flood into the dense forest, which still disputed its passage to the sea.

“We judged the stream to be two or three miles wide at this point, and over all this expanse, and as far as the eye could see above, and down to the end of the river, the whole surface was dotted with countless fires, both mineral and vegetable. Immense trees, which had stood for hours, or for a day, in this molten sea, were falling before and below us, while the trunks of those previously prostrated were burning in great numbers upon the surface of the lava.

“You are aware that the great fire-vent on the mountain discharges its floods of incandescent minerals into a subterranean pipe which extends.

at the depth of from fifty to two hundred feet, down the side of the mountain. Under this arched passage the boiling lava hurries down with awful speed until it reaches the plains below. Here the fusion spreads out under a black surface of hardened lava some six or eight miles wide, depositing immense masses which stiffen and harden on the way. Channels, however, winding under this scorified stratum conduct portions of the lava down to the terminus of the stream, some sixty-five miles from its high fountain. Here it pushes out from under its mural arch, exhibiting a fiery glow, across the whole breadth of the stream. Where the ground is not steep, and where the obstructions from trees, jungle, depressions, etc., are numerous, the progress is slow, say one mile a week.

“On the evening of our arrival we encamped within ten feet of the flowing lava, and, as before stated, on the southern margin of the stream, some two miles above its extreme lower points. Here, under a large tree, and on a bank elevated some three feet above the igneous flood which moved before us, we kept vigils until morning. During the whole night the scene was indescribably brilliant and sublime. The greater portion of the vast area before us was of ebon blackness, and consisted of the hardened or smouldering flood which had been thrown out and deposited here in a depth of from ten feet to one hundred.

“Not only was the lava, as aforesaid, gushing out at the end of this layer, but also at its sides. These lateral gushings came out before and behind us, and two-thirds surrounded our camp during the night, so that in the morning, when we decamped, the fusion was just five feet, by measurement, in front of us, six feet in our rear, and three feet, or the diameter of the trunk of our camp-tree, on our left. The drenching rain and our chilled condition induced us to keep as near the fire as we could bear it. Evening and morning we boiled our tea-kettle and fried our ham upon the melted lava, and when we left, our sheltering tree was on fire.’

“M. Dufresnoy declares that lavas, to be compact and crystalline, must have cooled on a slope of less than 3 degrees. This statement has been proved incorrect by Sir Charles Lyell in his valuable ‘Memoirs on the



LOUIS H. AYME, OF CHICAGO, U. S. Consul at Guadeloupe, Who Visited St. Pierre Immediately After the Eruption of Mont Pelee and Cabled His Government for Aid.—(Copyright, May 21, 1902, by The Press Publishing Company—New York World.)



NATIVE DIVERS in the Harbor at St. Pierre, Martinique, showing the style of the Skiffs Used along the Shore.

Lavas of Etna,' and on the Hawaiian Islands slopes of every degree of inclination occur. I have measured streams that have consolidated on angles of from 10 degrees to 90 degrees, and in all cases they were continuous. Rev. Mr. Coan has done even more, and I quote his own words: 'On the mountain and in Kilauea I took the angles of several lava-streams, one of 49 degrees, another of 60 degrees, and two of 80 degrees each; several streams on the mountain flowed down banks of scoriae twenty-five and thirty feet high. The fusion was complete—the streams cooled in a perfect state.

"I saw thin strata, say one inch thick or less, which had flowed down the face of perpendicular rocks, adhering to the rocks like paste, and thus cooling.'"

THE ERUPTION OF KRAKATOA, AND SUBSEQUENT PHENOMENA.

In May, 1680, an eruption appears to have broken out at Krakatoa, of which we have unfortunately only very meagre accounts in the writings of Vogel and Hesse. Great earthquakes are said to have been felt in the neighborhood, and vast quantities of pumice to have been ejected, which covered all the surrounding seas. The eruption seems to have continued with little intermission till the November of the following year, and to have destroyed the rich tropical forests that covered the island. Which of the volcanic cones composing Krakatoa was then in eruption is not certainly known, but it may be plausibly conjectured that it was Perboewatan, upon the slopes of which conspicuous and very fresh lava-streams of enstatite-dacite are recorded as being seen by several later authors. The eruption at this time seems to have been of the continual moderate character by the repetition by which the small cones occupying the greater part of Krakatoa, and filling up the vast submerged crater, had been formed.

From the effects of this outburst, however, Krakatoa soon recovered, and the event seems to have been so far forgotten that doubts have been

expressed as to the accuracy of the narratives recording it. For these doubts there do not seem to be any very good reasons. The rich vegetation which clothed the island made the inhabitants of the neighboring shores and passers in ships forget the terrible forces which slumbered beneath a scene of so much beauty. Some, however, who landed on the island and made their way into the most impenetrable forests, declared that they had met with hot springs, and one such spring is indicated on the Admiralty chart of the island.

Six or seven years ago it became evident that the volcanic forces, which for nearly two centuries had remained dormant beneath the Sunda Strait, were once more awakened into activity. Earthquakes were of frequent occurrence, and during one of these, on September the 1st, 1880, the lighthouse on Java's First Point was seriously injured. These earthquakes were felt as far away as North Australia.

On the morning of Sunday, May the 20th, 1883, booming sounds like the sounding of artillery were heard at Batavia and Buitenzorg, which towns are situated nearly 100 English miles from Krakatoa, and for many hours a rattling of the doors and windows maintained in these towns and in all the neighboring villages; on board a mail-steamer passing through the Strait, it was noticed that the compass-needles were violently agitated.

On the morning of May 21st a sprinkling of ashes was noticed to fall at Telok Betong and Semanka, on one side of the Strait, and at Buitenzorg and the mountains around that place on the other. But it was not till the evening of the same day that a steam-column, issuing from Krakatoa, revealed to the inhabitants of the district the true locality of the disturbance which had been going on for two days. On the 22d of May, at 8 p. m., the captain of a vessel passing close to Krakatoa was able to see that the dome-shaped mass of vapor issued from the lower parts of the island, and not from the top of the peak of Rakata; a succession of fiery flashes, each followed by a loud explosion, accompanied the discharge of fragments of pumice and dust into the atmosphere, while vivid

flashes of lightning were seen playing around the vapor-column. Much of the pumice and dust fell beyond the limits of the island, and on May the 23d a ship encountered a large quantity of this pumice off Flat Cape, in Sumatra, which was found to increase in amount until Krakatoa was passed. The pumice was then floating out into the Indian Ocean.

It is evident from these accounts that Krakatoa had re-entered on a phase of moderate (Strombolian) activity, similar to that which it had exhibited for some months during the years 1680 and 1681. That the outburst was one of considerable violence, however, especially at its commencement, was shown by the fact that the commander of the German war-vessel, *Elizabeth*, estimated the height of the dust-column issuing from the volcano as 11 kilometers (36,000 feet, or 7 miles); and falls of dust were noticed at the distance of 300 miles.

On May the 26th an excursion party was formed at Batavia and proceeded in a steam vessel to the scene of the eruption. They reached the volcano on the Sunday morning, May the 27th, after witnessing, during the night, several tolerably strong explosions, which were accompanied by earthquake shocks. Krakatoa and the adjoining islands were seen to be covered with fine white dust like snow, while the trees on the northern parts of Krakatoa and Verlaten Islands had been, to a great extent, deprived of their leaves and branches by falling pumice—a fate which those of Lang Island and Polish Hat, as well as on the Peak of Rakata, had to a great extent escaped.

It was then seen that it was the cone of Perboewatan which was in activity—explosions occurring at intervals of from five to ten minutes, and each of these explosions being attended with the uncovering of the liquid lava in the vent, whereby the overhanging steam-cloud was lighted up and glowed for a few seconds. The column of vapor was estimated as rising to a height of less than 10,000 feet, and the fragments of pumice being shot to the height of about 600 feet. It appears from these accounts that the violence of the eruption had somewhat diminished since the first detonations, which were heard so far off and were accompanied by so

lofty a vapor-cloud. From some of the accounts, however, it appears that certain of the explosions were of exceptional violence, and that pieces of pumice were thrown to very great heights in the atmosphere; for it is said that they were caught by the upper currents of the air and carried away in a direction opposite to that toward which the wind was blowing at the time. The noise made by the explosions, and the hurtling of the ejected fragments in the air, is said to have been so great that when a rifle was discharged its sound might be compared to "the popping of a champagne-cork amid the hubbub of a banquet."

On August 11th, however, the island was visited by Captain Ferzenaar, the chief of the topographical staff of Bantam. Sailing along the northeast side of the island in a native boat he was able to make a sketch of that part of the island, the heavy masses of vapor and dust driven by the wind preventing him from examining the other portions of the island. By this time the forests of the whole of Krakatoa appear to have been completely destroyed, only a few trunks of trees being left standing above the thick covering of pumice and dust. This mantle of dust near the shores was found to be 20 inches in thickness.

Three large vapor-columns were seen ascending and carrying up immense clouds of dust and pumice from as many craters, one of these being the original crater of Perboewatan, while the other two were in the center of the island. Of the latter, one was probably the original crater of Danan, enlarged and deepened by the explosive action so as to diminish the height of the cone, while the other crater seems to have been opened at the northern foot of Danan. But besides these three principal craters no fewer than eleven other foci of eruption would be observed on the visible portions of the island, from which smaller steam-columns issued and ejections of dust took place.

It is evident, therefore, that at this period the activity of the volcanic forces in the island had increased in a remarkable manner, and that from all portions of the lower-lying parts of the island situated to the north of the Peak of Rakata, that is, from the areas within the walls of the

original crater, outbursts were going on. This account of the state of the volcano on August the 11th is very interesting, indeed, as being the last which we have before the great paroxysm which occurred toward the end of the same month.

The vessels which passed close to Krakatoa between the 11th of August and the time of the great catastrophe reported a heavy rain of pumice and dust and constant loud explosions as taking place. On the 25th the dust had been carried to such a height as to begin to fall at Telok Betong, nearly fifty miles distant.

The eruption which began on May the 20th, and culminated in the tremendous explosion of August the 7th, thus appears to have exhibited the following vicissitudes: Bursting out with somewhat sudden violence, the eruption from Perboewatan seems to have had sufficient force to carry the volcanic dust to various points along the shores of Java and Sumatra.

The changes which took place in the forms of the islands, and in the depth of the sea around them, have been supposed by some to indicate a general elevation of the islands of the Krakatoa group, accompanied by a great subsidence of the central or crateral area. A careful study of these changes in the light of what is known to have taken place at other volcanic centers leads me to adopt a wholly different conclusion.

The action going on within a volcanic vent during eruption is in all essential features identical with that which takes place in the throat of a geyser. In both cases we have a mass of heated liquid, in the midst of which large quantities of gaseous materials are being disengaged so as to escape into the atmosphere as the pressure is relieved, and these escaping gases carry up with them portions of the liquid in which they have been confined.

In order, therefore, to determine the most probable moment of the origin of the wave, it has been considered best to deal only with the data obtained from the stations nearest to, and immediately surrounding, viz.: Calcutta, Zi-Ka-Wei (Shanghai), Bombay, Melbourne, Mauritius,

and Sydney; at all which the records of the first passage of the wave are well defined and satisfactorily comparable, while their distances from Krakatoa are not so great as to make it likely that important variations of the velocity of the wave took place during the time occupied in reaching them.

If T is the time of the origin of the wave, which is to be determined; t , the time of the passage of the wave at any station, d , the distance in degrees from the point of origin; and V , the velocity of the waves transmission, assumed to be the same in all cases.

The distance of Krakatoa from Batavia being 1 degree 22 minutes, the wave, with velocity before calculated, would reach the latter place in 8 minutes, so that it would have been felt there at 3 hours 4 minutes, G. M. T., or 10 hours 11 minutes, local time. The gasometer shows a sudden and most extraordinary increase of pressure at some time between 10 hours 15 minutes and 10 hours 20 minutes a. m., local time, agreeing as exactly as with that above arrived at as could be expected from the somewhat rough character of the trace, the inertia of the recorder, and the possible error of the clock at a non-scientific establishment.

The oscillations of the gasometer indicator were very numerous and very violent on the day of the great explosion, but following the maximum increase just referred to, there appears to have been a maximum reduction of pressure between 10 hours 40 minutes and 10 hours 50 minutes, local time, corresponding, therefore, with the maximum fall shown in the barometric traces of the wave. It has not been possible to connect any other of the gasometer indicator oscillations with any available recorded barometric disturbances, and from this it must be inferred that the explosion at 2 hours 56 minutes, G. M. T., was far more violent in its character than any of the others.

The intervals of time between the origin of the great wave and its first passage over the several stations, direct from Krakatoa; as well as the time intervals between the successive subsequent recurrences of the wave in its progress round the earth, after passing through the antipodes

and again returning through Krakatoa; together with the deduced velocities of the wave's transmission, are shown in Table VI.

Now, from Table VI. it will be found that the mean velocity of the wave for twenty-nine of these stations, in passing for the first time from Krakatoa to them, is 10 degrees 23 minutes per hour. The average velocity in the same direction between the first and third passages, over twenty-seven of the same stations, during which the wave completed the circuit of the earth, was reduced to 9 degrees .89 per hour; the mean time occupied in the passage being 36 hours 24 minutes. For the next passage round the earth the mean velocity for eighteen of the stations was 9 degrees .86 per hour, and the time occupied 36 hours 30 minutes; while for the last observed passage over ten stations the mean velocity was 9 degrees .77 per hour, and the period which elapsed was 36 hours 50 minutes.

The corresponding quantities for the alternate passages of the wave, extracted from Table VII., as follows: The mean velocity of the wave, while traveling from Krakatoa through its antipodes, to the same twenty-nine stations as before dealt with, is 10 degrees .47 per hour; for twenty-four the mean velocity between the second and fourth passages, during which also the circuit of the earth was completed, is 10 degrees .35 per hour, the mean time occupied being 34 hours 46 minutes; while, for the next passage, which is also observed in this direction, thirteen stations give a mean velocity of 10 degrees .27 per hour, with a period of transit of 35 hours 4 minutes.

The velocities observed at Mauritius and Loanda, the paths of the waves passing over which lies respectively within 20 degrees and 10 degrees of the equator, are very nearly alike; the wave traveling to the west not being sensibly retarded; while that traveling to the east is so retarded. This may be caused by the paths of the waves falling entirely within the zone of the trade-winds, which both north and south of the equator blow from the east, and would, therefore, cause a relative retardation of the wave traveling with the earth's rotation.

The path of the wave that passed over the Canadian and United States stations, and Havana, lies nearly on the meridian drawn through Krakatoa, and must have crossed both the polar circles very near the poles. The velocities obtained from these stations are peculiar. The direct wave from Krakatoa, which traveled nearly due north and close to the north pole, and its repetitions after passing around the earth in the same direction, had nearly the same velocities as those observed at the European stations, with an apparent decided retardation in the intervals between the first and third passages, and (but to a less extent) between the third and fifth. The wave that passed through the antipodes before reaching the North American stations went nearly due south, close to the south pole; and its velocity on this, its first partial passage round the earth, was very decidedly reduced; but in its next complete circuit, that between the second and fourth passages over the stations of North America, the velocity appears to have been much increased, almost reaching the full rate of the true sound-wave. It is difficult to account for this, but the fact seems to be indisputable.

The first of the more distant tide gauges is that at Port in South Africa, 4,624 miles, with an interrupted sweep from Krakatoa. This gauge, although placed inside a bar, gives a very good diagram. It is on the scale of $1\frac{1}{2}$ inches to the foot, and 1 inch to the hour. The curve is quite smooth to 7 hours on the 27th, when an irregular oscillation commences sharply. This gradually increases to a height of 6 inches, when a distinctly higher wave, of a height of 1 foot 4 inches, is shown at 17 hours 10 minutes.

Eleven waves of an average interval of 65 minutes can be traced, although their height is much varied by interference. One cannot be sure that the 17 hours 10 minutes is that which should be taken as corresponding to the 10 o'clock wave from Krakatoa, but it is apparently the commencement of a fresh series of waves.

Let us see how thick a stratum this quantity would produce when spread out uniformly at a height of 70,000 feet over the entire globe.

If it were reduced to the form of a solid continuous layer, this quantity would, in such a case, equal .0003 inch in thickness, or a trifle less than that inferred by Dr. Hann on a different assumption to be a probable mean value. This quantity certainly seems to be rather microscopic, and it appears, *prima facie*, quite incapable of producing the transmissive or reflective which were witnessed. Before, however, we call in the aid of any concomitants, or assume a larger quantity of material to have been ejected in the form of very fine dust, let us endeavor to arrive at some idea of the possible effect of such a quantity of dust alone.

Ten, in 5 degrees 38 minutes, S. 106 E., Mr. J. Wooldridge, writing in the "London and China Telegraph" (January 16th, 1884), thus describes the scene. After alluding to the eruption on August 27th, 1883, of the volcano, which was within sight, he says: "At sunset the heaven represented a very terrible appearance, the dense mass of clouds covered with a blood-red appearance, the sun being seen through the volumes of cloud being discharged by Krakatoa."

He also mentions the clouds at sunset being red and yellow.

Prior to the convulsions of Mont Pelee, at Martinique, in 1902, the most remarkable of volcanic eruptions in recent years was that of Krakatoa, in the Straits of Sunda, in 1883. It is estimated that ash and fragments from this cone were lifted 50,000 feet in air, and that the finer particles of pumice were a year in reaching the earth again. With these ash layers drifting with the winds, the sunsets of that year were made remarkably brilliant and are remembered by most people old enough at the time to be attracted to the phenomenon.

Not only in this dust was the eruption made spectacular but vessels sailing the East Indian seas thereafter encountered such vast areas of floating pumice stone that navigation was seriously impeded. Gradually this stone became waterlogged and sank, however. Fifty thousand lives are said to have been lost in this eruption, and every vestige of life on that and neighboring islands destroyed.

One of the noteworthy facts connected with the destructive upheaval

of Krakatoa was that the humble peak, less than 3,000 feet in height, has attracted no special attention among scientists because of the region in which it stood. It was located in the midst of about fifty towering volcanic mountains, some of them 12,000 feet high, and most of them in almost chronic disturbance. In the midst of these surroundings little Krakatoa was overlooked until about ten years ago it broke out with terrible fury and wrought fearful loss of life and destruction of property.

For the first few hours terrific explosions came every few minutes. The sea was driven back, and at every outburst black columns of smoke, dust and lava were sent miles into the air. As the hours passed the explosions became more and more frequent. The concussions shattered stone walls, upset lamps and created general havoc hundreds of miles away. The explosions were heard over a sound zone covering one-thirteenth of the earth's surface. All the towns and villages on the shores of Java and Sumatra bordering the straits were destroyed. The average height of the tidal wave which struck the shores of Java and Sumatra was fifty feet, and at many places it was much higher and was felt in all the ocean waters of the globe. A man-of-war lying off the Sumatra shore was carried a mile and three-quarters inland up a valley and left in a forest thirty feet above sea level.

A large part of the Indian Ocean was showered with lava dust and mud to a depth of several inches, and in the immediate vicinity of Krakatoa the sea was so thick with fallen lava dust that vessels pushed through it as though plodding through a field of broken ice. The whole northern portion of the island, with an average height of 700 feet above sea level, was submerged, and remains so to-day under 150 fathoms of water.

The wonderful eruption of Krakatoa, which reddened the sunsets of the world for months, began with splendid display of colors, August 26. Captain Strachan, of the *Anerly*, when passing through the Straits of Banca, saw "an arch of light at sunset stretching to the zenith."

In the evening of the same day, after the eruption had continued for

some hours, the Ardgowan, in latitude $7^{\circ} 54'$ S., longitude $85^{\circ} 37'$ E., notices a "flare" and "coppery-red colour" at sunset; and the Barbarossa, $1^{\circ} 42'$ S. and $93^{\circ} 12'$ E., at sunset observed "the whole sky a peculiar red, like bright polished copper."

On the 27th the Simla, in $5^{\circ} 35'$ S., 88° E., observes the sky as "very hazy," and the barque Jonc, in latitude from $4^{\circ} 46'$ S. to $7^{\circ} 45'$ S., longitude 90° to 93° E., Captain Reid noticed that, from August 26th to 28th, "the sun on rising had a very strange appearance, as though the earth were on fire."

On August 27th, besides the observations we have already given from districts in Sumatra and Java adjacent to the volcano, we hear that at Batavia the sun on emerging from the cloud of smoke of the eruption was green, and Captain Strachan, of the ship *Anerly*, near N. Watcher Island, about ninety English miles northeast of Krakatoa, at 4:30 a. m., says: "Before daybreak the whole heavens were lighted up by a pale yellow light of changing hues, which lit up the entire ship and turned everything on board the same color. This lasted forty-five minutes and then died out. Daylight, such as it was, broke about 6 a. m."

At a considerably greater distance, but still within sound of the eruption, we have the following account from Labuan Island, in which the cloud-haze and a green sun were clearly recognized by Captain the Hon. F. C. P. Vereker, of H. M. S. *Magpie*, among the effects of the outburst:

"The noise of the detonations caused by Mount Krakatoa, resembling distant heavy cannonading, was distinctly heard by us and the inhabitants of the coast as far as Banguay Island on August 27th. The weather at the time was also much unsettled, with thick, hazy weather, and peculiar clouds to the southward, and the sun, while at a low altitude, assumed a greenish hue for several days."

Farther off, again, towards the west, we have the series of observations which include a green sun at Mullaittivu and Kokkulai, in Ceylon, gorgeous sunsets at Diego Garcia, the Seychelles, Reunion, Rodriguez

and Mauritius, and a smoky appearance and haze at the Seychelles, the St. Brandon Rocks (Car gados Garajos), and Diego Garcia.

On the 28th, they are embraced by the appearances was more extensive, while ships not far from Java, such as the *Ida*, 1° N. 108° $42'$ E., *Charlotte*, 7° $18'$ S. 106° $12'$ E., *Simla*, 6° $12'$ S. 88° $17'$ E., *Barbarossa*, 3° $48'$ S. 93° $30'$ E., and *Salazic*, 9° S. 93° E., observe "a blood-red sunset with uninterruptedly hazy air for several days thenceforward," "hazy air," "sky very hazy," "a yellow glow and clear silvery light," "the sun reddish and the sky white," respectively, the glows appearing at Mauritius, the Seychelles, 7° , with more brilliancy than before.

In the island of Java is a remarkable example of a volcano's suffering from its own titanic forces. *Papandayang*, in 1772, undermined itself in an eruption to such an extent that its crater fell inward, taking down with it a district fifteen miles long and nearly six miles wide. More than forty villages were destroyed and 3,000 lives are said to have been lost. In this settling of the cone the height was reduced from 9,000 to 5,000 feet.

In the formation of a volcano the growth is that of cooling lava, which is erupted and flows down the sides of a gradually increasing shell. The eruption of lava tends to produce a much flatter cone than does ash, and in some volcanoes where there is a prevailing cool wind from a certain direction the side of the crater to the windward is higher than on any other side. In eruption the character of the lava emitted may vary greatly in consistency, though coming from the same crater.

CHAPTER XIII.

MARTINIQUE IN ITS BEAUTY.

GAY AND BRILLIANT UNDER THE GLOOMY MOUNTAIN—PEN PICTURES OF THE SCENERY—THE STORY OF THE EMPRESS JOSEPHINE—THE TERRORS OF THE FER DE LANCE, MORE DEADLY THAN THE COBRA—AN EARTHQUAKE SCARE.

The journals recording the frightful disasters in the islands of Martinique and St. Vincent have a great deal to say of the sense of security of the inhabitants, but the volcanoes that have recently flamed forth as destroyers had an ancient reputation for harboring mysterious dangers. One of the most interesting and charming writers who has visited the fateful mountains, many years ago, is Mr. Frederick A. Ober, who published his picturesque sketches under the head "Camps in the Caribbees," heading one of his communications with the lines :

"To-morrow I sail for those cinnamon groves,
Where nightly the ghost of the Caribbee roves."

When on his way, in 1800, to the scene of the recent astounding desolation, he writes :

"Up from Tobago, the island of Crusoe's adventures, I sailed, one week in June, for Barbados. Ten weeks of camp-life in that historic island had brought me rich returns, in rare birds and pictures of interesting scenes. The captain of a Nova Scotia schooner gave me passage from Barbados to the Isle of Martinique, good Captain Rudolph, who navigated his vessel so skillfully that we sighted the mountains of Martinique on the morning of the second day; the same mountains I had first looked upon eighteen months previously, coming down from the north.

"The wind was light; flying-fish darted in all directions; little sharp-prowed canoes came sailing in out of the distance, hailed us with cheerful

bon jours, and disappeared again in the spray and mist. We sailed in under high, frowning cliffs, down which fell silver streams into the sea; past broad fields of cane, smiling in the sunshine; past long stretches of yellow sand, overtopped by silent palms; beneath a towering, gloomy mountain hiding its crest in a cloud. A shower came down from those impending clouds and pattered over deck and sea, ending as suddenly as it had commenced; and a rainbow, born of the mist and the sunshine, spanned the bay of St. Pierre from headland to headland, dissolving at either end above a little fishing-village, bathing-houses and boats, and nets, and beach, in glorious showers of light."

He describes the second time when he sailed into the Bay of St. Pierre, and the second time he looked upon the volcano rising above it. His account of the visit to the city destined to be the scene of the most awful destruction known in the annals of the world, is of increased interest, and throws upon the picture of untold horrors the light of other days: "The town is about a mile in length, straggling at the north away down the coast, ending in scattered villages; and at one place, where a river makes a break in the cliffs, creeping up toward the mountains. A narrow belt between high cliffs and the sea, built into and under them; the houses, of stone and brick, covered with brown earthen tiles, tier upon tier, climbing up to the hills. With the soft mellow tints of the tiles, the gray of the walls, the frequent clumps of tamarind and mango, and with the magnificence of living green behind it, St. Pierre strikes one as a beautiful town—until he comes to analyze it. Then, the windowless loopholes—there is hardly a square of glass in the town, save in the stores—the flapping shutters, the conglomerate material used in its construction, combine to produce a feeling of revulsion. But, viewed from a vessel lying in the harbor, sufficiently remote to hide its incongruous elements, St. Pierre again appears charming, picturesque.

"Aside from the hills that embrace the town and come down to the sea in bold spurs, forming an arc with a chord three miles in length, there is the noble Montague Pelee, above four thousand feet in height, a mass

of dark green with jagged outline, cleft into ravines and black gorges, down which run rivers innumerable, gushing from the internal fountains of this great volcano.

“The streets are narrow but well-flagged, and every few squares is a fountain; and adown the gutters through them all run swift streams, carrying to the sea the refuse of the city. St. Pierre is the commercial port of the island, and there are many stores filled with wines and wares of France. There are a fine cathedral, and a theatre of large capacity, to which for three months each winter a troupe from Paris draws crowded houses.”

Were these islands once a part of the continents? Certain it is, the adjacent islands of Dominica and St. Vincent, separated from these channels less than thirty miles in width, are free from the scourge of the Lancehead. Nay, more; it is recorded that, during the wars between the English and the Caribs, in the last century, the Lancehead was carried to the islands just named, but could not be made to live.

Annually, during the crop season, many laborers are killed in each island, for this snake has its hiding places in the canes as well as in the forests. It has been so abundant in this garden that the pleasant walks and shady drives are nearly always deserted. A serpent over seven feet in length, killed in the garden, is shown in the Museum.

Martinique is the largest of the Lesser Antilles, being about forty miles in length, and containing, it is estimated, about three hundred and eighty square miles. The surface is very uneven, the interior being one grand region of hills and mountains. The highest of these is Mount Pelee, over four thousand feet in height, northwest of the principal town, St. Pierre. There are many mineral springs in the mountains, two of which—one reached from St. Pierre and the other from Fort de France—are famous resorts for the inhabitants.

Morne Rouge is a holy city; to it every year the people of the coast, high and low, make pilgrimage on foot. The church here is beautifully decorated, the interior containing valuable paintings and frescoings. The

Virgin is magnificently arrayed and enriched by the spoils of the faithful and credulous. All about are shrines and crosses and sacred mounts of Calvary; and near the town is a most charming grotto, containing an image of the Virgin, overhung by tree-ferns, hollowed from a rock dripping with water, with a clear pool and fountain at its base.

A little steamer runs between St. Pierre and Fort de France, the seat of government of the island, coasting the shore, past a most interesting landscape twenty miles, the banks high and precipitous, exhibiting many different strata, and affording to a geologist a glimpse of the manner in which the island is formed. Huge rounded hills come down to the sea, where they are abruptly cut down, looking like the halves of Dutch cheese, the slices smooth and straight. The summer rains had caused an accumulation of water in the hills above, and I counted eight streams pouring over the precipices, all of which a few days later would have disappeared. Half-way down, the surface slopes farther back from the shore, though there is but little cultivation until the bay of Fort Royal is reached. A large stone fortress, a large usine, or sugar refinery, an open park, a few government buildings, and a river, are all that particularly claim attention.

Fort de France was originally known as Fort Royal, but this was before the days of republican rule. It is situated between two rivers, the Riviere Madame and the Riviere Monsieur; the former, on the north, is very beautiful during its short length, especially near its embouchure; palms reflect themselves in the still water, and a church, on the bank, sees its image on the glassy surface. The hills, such as hem in St. Pierre, here recede a greater distance from the shore, and the town occupies a low level plain, with wide streets crossing at right angles, lined with well-built wooden houses. There are few trees save in the park, which lies near the shore between fortress and town. Here there are long and thickly planted rows of tamarinds and mangoes overshadowing the broad, level walks. Enclosed by this double row of trees is a large savane, or common, covered with a luxuriant carpet of grass, palace, and governor's residence, with large and handsome barracks for the troops.



RUINS OF POMPEII, as Seen in Stabienne Street After the Excavations Had Been Made.



CITY OF NAPLES, ITALY, With the Volcano Vesuvius in the Distance.

Landing, I went, as a matter of course, to the consulate, where a picture of an eagle, grasping the red man's arrows, and digging his claws into a prostrate shield, smiled serenely above an open doorway. The consul, a Massachusetts man, extended to me a warm welcome. He had been in the naval service, retiring wounded, and, being connected with influential politicians, has secured this mission to Martinique. It is well with what liberal hand our government rewards its wounded heroes, giving the more importunate positions like this, where, with a salary of fifteen hundred dollars, each year calls upon the incumbent of the office for an expenditure of at least two thousand. The British Consul had resided in Martinique fifteen years, and received a salary sufficient to maintain him in comfort. Within eighteen months the American consulate had had two representatives. As soon as one is prepared to execute duties, he is kicked out and room made for another.

Knowing that the consul was from Boston, I was not surprised to see in his office an "Old Farmer's Almanack;" but I was greatly enlightened as to its uses when one day I saw him take it from its nail and gravely announce that, according to the tables for July, it was "time to take a drink." As the tables in that almanac are prepared for the latitude of Boston, I wondered at the genius that could adapt them to the latitude of Martinique; but it is probably owing to the fact that much latitude is allowed, and that there a drink is in order at any time.

Through the aid of the consul, I secured a room and board in a private family, whose delightful dejeuner and suppers will long be a pleasant remembrance; and may the good old mulattress who prepared them fulfill her mission for many years to come! She could originate savory stews and ragouts from as nearly nothing as any cook it has been my misfortune to meet; her "ros-bif" was excellent; and with a few potatoes and a little flour and fat she could produce "pomme de terre a la Martinique"—as she called it—that would make an exile from Erin howl with delight. With each plate a bottle of wine and a little twisted loaf of bread; and after the dessert, of bananas, oranges and sapadillos, or soup-

sops, came a decanter of rum, a little cup of black coffee with sugar, and cigarettes. My vis-a-vis at these delightful repasts was the Commissaire of Police, an ex-officer of the navy of France, and a Chevalier of the Legion of Honor. It need not be added that he was courteous and agreeable.

The creoles of Martinique, as well as the inhabitants coming from France, have but few vices, the chief of which is that they will smoke the vilest, rankest, most disgusting of cigars. These obnoxious fabrications are of American tobacco, twisted by the hand of the negress, or mulattress, into a long cigar, called by the sailors "long-toms," and sold at a sou apiece. The better classes smoke cigarettes of imported French tobacco, and are as expert in rolling them when wanted as a Cuban; but the negroes all, male and female, smoke the "long-toms." In enumerating the good qualities of my ancient cook, I overlooked the fact that from morning to night, while attending to her domestic duties, anxiously bending over the pots and kettles, she never once relinquished the comforting weed.

Through the kindness of the photographer of St. Pierre, Monsieur Hartmann, an amiable and accomplished gentleman, I was introduced into the cercle, or club, where French in its purity is spoken. The universal language, however, is that of the common people, the patois, or provincial dialect; and even the cultivated speak, colloquially, the French tongue in this rude form. The prejudice against everything not exclusively French is exceedingly bitter.

In the center of the principal square stands the statue of her of whom I came to learn. Majestic in poise, graceful in outline, carved of marble spotless as her own soul, Josephine stands calmly aloft, surrounded by a circle of magnificent palms; the orcodoxas, glories of the mountains, add their glorious crowns to that which adorns the head of the empress. For hours I have gazed on that beautiful creation, as, seated beneath the spreading tamarinds, I have striven to impress upon my memory an ineffaceable image of its loveliness. There is one view that is inexpressibly

beautiful, with the snow-white statue sharply outlined against a distant group of mountain-peaks, the Trois Pitons, which are sometimes deep blue, against light green, or partially obscured by drifting clouds. Against this background Josephine stands out white as an angel. Another view, at a little distance, gives a background of tamarinds; another that of the purple-green mango. From any position it appears a perfect composition; an inimitable grace pervades the sweep of the royal robes, and the whole suggests a master's hand.

The statue fronts the sea, but the face is turned a few points south, so that it looks toward a line of hills, five miles away, nestled among which is the valley in which Josephine was born. The sentiment conveyed in the look of wistful yearning in that sweet face, turned longingly to the scenes of her childhood, is as beautiful as truthful. In front is the Caribbean Sea; the great fort hides the hills from the view of one standing by the statue, but a few steps to the eastward brings them in sight.

Upon a medallion of Napoleon, Josephine rests her left hand. On the pedestal, a bas-relief in bronze represents the famous coronation scene, recalling that extraordinary pageant, when Bonaparte surpassed all preceding coronations in the magnificence of this, summoning the venerable Pius VII. from the Vatican to assist in his assumption of royalty. In the center, the Pope; Napoleon, in the act of placing the crown upon the head of Josephine, who kneels before him. The inscriptions upon the dies are as follows:

North: "L'an 1868. Napoleon III Regnant, Les Habitants de la Martinique ont élevé ce monument à L'Impératrice Joséphine. Née dans cette Colonie."

East: "Née Le XXIII Juin, MDCCLVII." (Crown, shield, and eagle of France.)

South: The bas-relief—Coronation scene.

West: "Marié Le LX Mars, MDCCXCVI." (Draped shield, eagle, and crown.)

The statue is enclosed by a neat iron fence, and is further surrounded by a ring of palms, planted, I believe, at the time it was erected. In the distance, on a hill, is an old fort and a little chapel, where the Virgin Mother extends her hands in a benediction, and where a candle burns, bright by night and dim by day.

As amateur photographer I sought a resident artist, Monsieur Fabre, who received and aided me cheerfully, especially when he learned that I bore a letter from our good friend Hartmann, of St. Pierre. In his capacious court-yard I was soon busily at work preparing my chemicals, wrapped in a vapor of collodion. I was suddenly awakened by a strange shock, as though some one had shaken me strongly and was about standing me upon my head. At that instant, in rushed my friend, the photographer, with loud cries: "Ah, mon Dieu! Tremblement de terre! Tremblement de terre!" "Earthquake! Earthquake!" The ground shook, walls cracked, and, in common with every one else, I rushed into the street. There was the entire populace crowded together in terror, most of them wildly shrieking and gesticulating. The shock lasted but a few minutes, and then all went calmly back to their houses. After this the sky was as serene and blue, and the trees as quiet, as before, and I finished my photographs of beautiful Josephine, who had been an unmoved spectator of it all, without interruption.

The town of Fort de France is intimately connected with scenes in the early life of Josephine, and of her parents. In 1755, Joseph Gaspard de La Pagerie, father of Josephine, returned to Martinique from France, whither he had been sent to school. That year war was declared between England and France, and the young officer, first lieutenant of artillery, was actively engaged in erecting batteries at Fort de France, then, as now, the naval port of the island. He aided in the repulse of the English under General Moore in 1759, and took such active part in the second defense, in 1762, when the town was captured, that he was complimented by the general commanding the English forces and allowed to retire to his estates at Trois-Ilets.

In June, 1760, there was baptized in the church at Saint Louis, at Fort Royal, an infant, born the preceding May, and named Alexander de Beauharnais, who was destined to be the husband of Josephine. An aunt of Josephine was godmother to this child. The Marquis de Beauharnais, father to Alexander, had been appointed governor of Martinique and the French colonies three years previously, with authority over all the respective governors of the other islands. Leaving Martinique for France in the following year, the Marquis left his infant son in charge of Madame de La Pagerie, grandmother to Josephine. This lady resided principally in Fort de France, and when Josephine attended school at the near convent, she was a frequent visitor at the house of her grandmother, if indeed she did not reside with her.

But the most interesting event in the history of the island was the marriage of the parents of Josephine, the register of which I found among the musty archives of the island, in Fort de France. The document is long, and though I have a fac-simile copy of that page in the ancient register containing it, I will give but the substance here. It states that "Messire Joseph Gaspard de Tascher, chevalier, seigneur de La Pagerie, native of the parish of St. Jacques du Carbet, of said island of Martinique, lieutenant in the artillery, son in legitimate marriage of Messire Joseph-Gaspard de Tascher, chevalier, seigneur de La Pagerie, and of Madame Marie-Francoise Boureau de La Chevalerie, living in the town of Port Royal," was married to demoiselle Rose-Claire des Vergers de Sannois, native of the town of the parish of Trois-Ilets, daughter in legitimate marriage of Messire Joseph des Verges de Sannois and of dame Marie-Catherine Brown, natives of and dwellers in the parish of Trois-Ilets," etc.

Thus we have in this register of marriage, dated November the ninth, 1761, the names and rank of the parents and grandparents of Josephine, and, what is of equal importance, their place of residence at that time, only eighteen months previous to her birth.

Let us turn for a moment to her biographies. One or two will suffice

to show how inaccurate are their statements. Thus, in "Memoirs of the Empress Josephine," by John S. Memes, LL. D., I find that the parents of the Empress were "both natives of France, though married in St. Domingo, about 1761." * * * "Of this parentage, the only child, the subject of these Memoirs, was born in St. Pierre, the capital of Martinico, on the 23d of June, 1763."

A French dictionary of biography also repeats that Josephine was born in St. Pierre; but this is refuted by the register of baptism at Trois-Ilets, which the author of the "Histoire de l'Imperatrice Josephine," M. Aubenas (to whose volume I am indebted for the facts relating to the early life of Josephine) quotes entire.

A deep bay nearly divides the island of Martinique near the southern end. On the northern side, Fort de France; at its right, La Montague and Riviere Salee; and directly south of Fort de France is the little town (petit bourg, it is called) of Trois-Ilets—the Three Islets—hidden from sight by a high cape.

Lieutenant La Pagerie resided with his bride, in 1761, on the estate of his father-in-law, a portion of which was given him in time of his marriage. A few years later he came into possession of it, and it is known at the present time as La Pagerie. The estate was a large one, employing one hundred and fifty slaves in the cultivation of cane and coffee, and yielding annual revenue.

Here, on the 23d of June, 1763, Josephine was born. She had scarcely reached the age of three years when the island was visited by a terrible hurricane that destroyed an immense amount of property and many lives. The hurricane was accompanied by shocks of earthquake, thunder and lightning. None so serious had occurred in the memory of man. The mansion of La Pagerie was utterly ruined and the crops swept away. The walls of the sugar-house alone were left standing, and to this building M. La Pagerie fled for shelter with his wife and two children. Shortly after they had taken up their residence in the sugar-house, a third child, a daughter also, was born to M^{me}. La Pagerie. This child,

with the other sister of Josephine, died young; and a mistake on the records of the burial of the youngest caused the erroneous statement subsequently that Josephine had an elder sister.

Down the hill, within stone's throw of the dwelling, is the sugar-house to which M. La Pagerie removed after the visit of the hurricane. It is of stone, the walls are very thick, at least two feet, and it is covered with the durable brown tiles so in harmony with the landscape. In the eastern half are, or were, two large chambers extending two-thirds the length of the building, which is above one hundred feet long and fifty wide. The roof is fallen in at one place, and you can look into the interior of one of the chambers in which Josephine and her parents lived during her youth.

Of the first years of this illustrious child we know little. She resided here with her parents until ten years of age, when she was sent to the convent at Fort Royal, where she remained until fifteen. During the brief period which elapsed between her return from the convent and her marriage to Beauharnais, she dwelt with her family, engaged in domestic duties and in the education of her sisters. At the age of sixteen she was married to Alexander de Beauharnais, in France. In 1788, having separated from her husband, she returned to her birthplace, and passed three tranquil years. With her little daughter, the charming Hortense, then five years old, she rambled over hills and valleys endeared to her by the memory of childhood days.

With a loving mother and father, and in the company of her youngest sister, surrounded by sympathetic neighbors, she seems to have passed some of the happiest days of her existence. Thus she writes of her retreat, during the separation from Beauharnais:

"Nature, rich and sumptuous, has covered our fields with a carpeting which charms as well by variety of its colors as of its objects. She has strewn the banks of our rivers with flowers, and planted the freshest forests around our fertile borders.

"I cannot resist the temptation to breathe the pure aromatic odors

wafted on the zephyr's wings. I love to hide myself in the green woods that skirt our dwelling; there I tread on flowers which exhale a perfume as rich as that of the orange grove, and more grateful to the senses. How many charms has this retreat for one in my situation! * * * I find myself in the midst of my relations and the old friends who once loved and still love me tenderly."

One hundred years ago!

Leaving the river, we climbed the hills to the west and began our search for birds. Above a tangled mass of thorny acacia hovered a tiny humming-bird, with slender beak and pointed helmet, darting at the spicy blossoms of an unknown vine; gold and silver was he in the sunshine. The little gem dropped into the thicket with quivering wings that never again would bear their owner upward. Quickly my little companion darted forward to tear the vines apart to get at the bird which lay upon the ground beneath. He had hardly forced his hand through, when he uttered a shriek of terror and fell back, then ran quickly to me and clung to my legs, trembling and weeping. Pointing to the bushes, he faintly murmured, "Fer de Lance."

Cautiously approaching, I saw a wicked-looking head, belonging to a snake as large around as my arm. It was broad, triangular in shape, and flat, with gleaming eyes, and thrust itself toward us savagely, murder in its every look and motion. My gun was charged for another humming-bird, and the load of small shot I fired into the snake did not cause its death, and it unwound itself and crawled rapidly toward us, its eyes flashing fire, intent upon striking us with its fangs, one blow of which would cause certain death. When we got within reach of a stout cudgel my boy handed me, I mauled him so severely that he gave up to ghost after a short but severe fight; for the "Fer de Lance" is no coward, and, like the rattlesnake, will fight even fire.

Never was scene more peaceful, nor solitude more sweet. Little wonder that Josephine should recur to it in memory again and again, when

surrounded by the pomp and magnificence of courts. An hour passed, I lay silently musing, gazing on the waving fields and shimmering sea :

“ 'Tis the fervid tropic noontime ; faint and low the sea-waves beat ;
Hazy rise the inland mountains through the glimmer of the heat.”

From this day-dream I was awakened by a tremor of the earth beneath me ; it seemed to tremble, to vibrate ; and then ensued that feeling of uncertainty that one experiences when, at the crest of a mighty wave, he is about to descend into abysmal depths, with his heart in his mouth.

That afternoon, the river came down from the mountains a roaring torrent, washing away a bridge and a great deal of cane along its banks ; and my host lamented the loss of several hundred francs the flood had cost him. That night, another earthquake occurred, which awoke me all too rudely and caused me to reflect upon the strength of the thin strips of bamboo above my head that had supported the heavy ties for a hundred years.

My little garcon went with me to the boat at early morn, and wept bitterly because I would not take him with me ; and I left him, regardless of my doucour of silver, a picture of rags and melancholy.

St. Pierre lies, like all the ports of the Lesser Antilles, on the western or leeward coast fronting the Caribbean. The reason for this is that the east coasts are exposed to the storms of the Atlantic, while the west coasts afford better protection for shipping. The coast on which St. Pierre stood has the advantage of deep water close inshore. Ten miles southeast of Cape St. Martin, the northwestern point of the island, the coast line curves a little inland like a slightly bent bow. As an indentation it would scarcely be observed, but for five miles the waves roll upon the shore a mile or so nearer the mountains than elsewhere. Midway on this slight recess of the land stood St. Pierre, a town without a harbor, fronting merely an open roadstead with deep water inshore ; without very good anchorage, except at the extreme southern part of the port ; with mooring buoys in a straight line north and south where shipping

might tie up in 200 to 300 feet of water; the buoys a quarter of a mile from the shore, because when a storm brews the sea captains cast off and scuttle out into the open as quickly as possible. There is forty feet of water almost anywhere in the roadstead within less than 300 feet of the buildings fronting the sea.

Torrents pouring down the hillsides in the rainy season have for ages been pulverizing the volcanic rock and strewing the fine particles along the sea edge, making a flat foreshore, on which the city of St. Pierre stood. Its shops and sugar houses fronted the sea for more than a mile and within 100 feet of it, following the gentle curvings of the shore line. All the space between the front street and the hills that wall in the city site was filled with buildings and streets along that mile; some eighteen or twenty streets extended from the hills down to the water front; the width of the city from the shore inland was according to the advance or retreat of the hills, here two or three and there six or seven blocks wide; with the greatest width in the northern and better part of the town where the Mouillage River, flowing swiftly from the hills, crossed the city to the sea. From Point St. Marthe in the north to a hill that falls abruptly to the shore in the south, the city was about one and an eighth miles in length.

The living things in the underbrush, on the trees and in the grass of Martinique are not all agreeable. The low bushes are covered with land-snails, and lizards dart out from every crevice, from under every rock and dead limb, and run up the trunks of trees by scores—lizards of all sorts, sizes and colors; and they are sluggish, too, and it is easy to catch them. But in searching for snails, I encountered an insect not very agreeable, whose bite is certain fever, sometimes death. Horribly gay is this spider, the tarantula, in the long hair that covers body and legs, which serves well to conceal it while waiting for its prey in a dark crevice or under a drooping leaf. They like to conceal themselves beneath the leaves of such plants as the aloes, where one broad leaf underlaps the other, and where they can rest almost unseen. You see it also

on the walks, its hairy legs outstretched, its ugly body flat to the earth, resembling a bunch of catkins from the trumpet tree, which everywhere lie scattered about. Poke it with a stick, and, instead of trying to escape, it will climb up that stick so vigorously toward your hand that, ten to one, you will drop it and run. Turn it over, and it discloses a pair of sharp, beak-like jaws, red within, which, with its gleaming eyes, have a cruel appearance. With its legs spread, this spider will sometimes cover the area of a saucer.

Centipedes, and scorpions also, abound here. Indeed, it seems that nature has bestowed upon the isle of Martinique all the pests and scourges known to these islands; for only here and in the adjacent island of St. Lucia is found that most venomous and vengeful of all serpents, the lance-head snake—*Craspedocephalus lanceolatus*. Contempt is the child of familiarity, and the frequency with which such pests are seen divests them of the terror they might otherwise inspire. There is one disturber of the peace in Martinique which is not only carefully avoided, but feared. This is the poisonous serpent called the *Fer-de-Lance*. It is aggressive and venomous, and though its home is in the forest, yet it frequently descends to the gardens and even enters the dwellings. Ever since the island has been in possession of the white man, this serpent has been a terror and scourge. It invades the cane-fields, where it strikes down the negro laborer; suspends itself from limbs of trees that stretch above the forest paths; lies in wait for its victims in every conceivable situation, except within the cities, where the streets are lighted.

CHAPTER XIV.

THE ANCIENT HISTORY OF THE CARIBS AND THEIR ISLANDS.

HOW THE LATTER ARE ASSOCIATED WITH THE WARS THAT LASTED TWO CENTURIES BETWEEN THE ENGLISH, FRENCH AND SPANIARDS—THEIR ASSOCIATION WITH COLUMBUS—A THEORY THAT IN THE PEARL ISLANDS THE WORD "AMERICAPAN" WAS IN USE, AND THAT FROM IT WAS EVOLVED THE NAME OF THE NEW WORLD, AMERICA.

The contest between the three great Western Nations of Europe for the mastery of the West Indies, which had been advertised to the whole world in the discovery by Columbus, lasted for centuries. Spain for a long time made a strenuous resistance to the English, and the decision as to the predominance of England on the sea was finally settled in that part of the world by the great victory won by Admiral Rodney over D'Estange, which happened while the French, with a fleet and army, were on the way to Jamaica to dispossess the English, who regarded their victory there as avenging their decisive discomfiture at Yorktown. It was the fleet under Grasse which beat back the British fleet sent from New York for the relief of Cornwallis, a reverse to the British at sea that forced the surrender of Cornwallis.

Admiral Rodney was famous for his career in the West Indies. In 1762 he sailed from Barbadoes, for Martinique, in command of eighteen ships of a line, and on the fourth of February the island capitulated to him. Then followed the surrender of Dominica, Tobago, St. Vincent and St. Lucia, which gave the whole of the French Caribbees into possession of Great Britain.

The sulphur pits of the island of Martinique were known to Cortes, and their volcanic reputation was established not long after the time of

Columbus. In the Natural and Moral History of the Indies, by Father Joseph De Acosta, he gives in his quaint way the following characterization of the famous mountains :

“And they holde it for certaine that there is some correspondence betwixt this Vulvan and the Sierra of Tlascalá, which is neare vnto it, that causeth the great thunders and lightnings they doe commonly heare and see in those parts.

“Some Spaniards have mounted vppe to this Volcano, and given notice of the mine of sulphre to make powder thereof. Cortes reportes the care hee had to discover what was in this Volcano. The Volcana of Guatimala are more renowned, as well for their greatnesse and height, which those that saile in the South Sea discover a farre off, as for the violence and terrour of the fire it casts. The three and twentieth day of December, in the yeere of our Lord God one thousand five hundred eighty and sixe, almost all the Cittie of Guatimala fell with an earthquake, and some people slain. This Volcano had then, sixe months together, day and night, cast out from the toppe, and vomited as it were a floud of fire, the substance falling vpon the sides of the Volcan was turned into ashes, like vnto burnt earth—a thing passing man’s judgement to conceive how it would cast so much matter from its centre during sixe moneths, being accustomed to caste smoke alone, and that sometimes with small flashes.”

The pleasing writer, Frederick A. Ober, had a fancy in his journeyings so pleasantly related in the West Indies, of following in the wake of Columbus, and refers to his halt at the “Maroon Tree,” in St. Vincent, for rest and refreshment, and at noon were at a cave under the brim of the crater, where they partook of lunch. His former visit had been to capture a song bird inhabiting the upper slopes of the volcano, called the “Invisible” bird because its song was heard, but the singer never could be found until Mr. Ober secured specimens by living on the crest of the volcano for four days. Returning to the place, he says he heard the strains of the “Soufriere” bird all along the trail. It is the crater

of this mountain in which the frightful agitation of the lake in the crater, before the final outburst, has been so graphically described. He speaks of the crater in these terms: "Far below it lies a pearly lake, slumbering in beauty two thousand feet above the sea. The volcano peak is three thousand feet above sea level, and only attained after hard climbing." The path to the top was deeply gullied and almost impassable, plunging deep into ferns until the heat was well nigh intolerable. The last mile was through thickets of mountain palms, and emerging from them the adventurer entered the open pasture lands of Mahoe, thickly studded with great bread fruit trees.

Mr. Ober, at one of the villages on the mountain, had noted at his previous visit the prettiest Indian child he had ever seen, and when he made his second call he said she was "now changed into a coarse but comely woman. She took me to the site of her mother's hut on the hill, and described the terrible hurricane that had blowed the hut away, and destroyed their garden." Near this place was the central settlement of the Yellow Caribs, who had no reservation of their own, but hired land of the government, living by the cultivation of arrow root, with occasional expeditions upon the sea and spells of work on the sugar plantations.

Their habits were like those of the Dominica Caribs and there were about the same number of full blooded Indians there as in the Northern islands. The number of the Indians distinctly descended from the Indians discovered by the first Spaniards were variously estimated, sometimes as low as three hundred. There is a pathetic interest in this story of the original Caribs now, because they are all said to have perished in the outburst of the old sulphur pit, and with them is extinguished the last trace of the blood of the native islanders found by Columbus.

The island of St. Vincent is believed to have been discovered by Columbus on his third or fourth voyage to America. The Spaniards never made a settlement there, which perhaps accounts for the survival of some of the natives. It lies three degrees further south than the

more important island of Trinidad, which was first seen by Columbus in his third voyage in 1498. The island of Trinidad was named by Columbus because he had promised to name his next discovery after the sacred Triad, in token of gratitude at the sign of land. He approached the island from the southern shore, entering the Bay of Paris through the passage which he named the Serpent's Mouth. He had expected to find the people in that latitude with African characteristics, but they resembled the Caribs in the islands to the north, and were equally comely. Pietero Martire, one of the first chroniclers of the discoveries of Columbus, said of this :

“So that, as he (Columbus) saith, it (the earth) is not round after the form of a ball or apple, as others think, but rather like a pear as it hangeth on the tree; and that Paria is that region which possesseth the super-eminent or highest part thereof, nearest unto heaven. Insomuch that he earnestly contendeth the Earthly Paradise to be situate in the top of those three hills which the watchman saw out of the top-castle of the ship; and that the outrageous streams of the fresh waters which did so violently issue out of the said gulf, and strive so with the salt water, fall headlong from the tops of the said mountains.”

He coasted the inner shores of the Trinidad, delighted with the scenery, and discovering troops of monkeys sporting in the forests; then he stood across for the peninsula of Paria, where he found the most agreeable the Spaniards had ever seen. Here he saw the first pearls, and gained information of the Pearl Islands, which he later sailed to, and from which he brought away some valuable specimens. He found oysters growing on trees, and recalling what the learned Pliny had written regarding the information of pearls from dew, inferred that they hung there with their mouths open to receive the dew that was to be transmuted into the precious pearls. Oysters may be seen there now, growing in the same manner, suspended from the twigs and roots of the mangroves; but no one has yet found pearls in any quantity in the Gulf of Paria. It was about mid-August that he sailed through the Serpent's

Mouth (which he named so because of the terrible currents he encountered there) and steered northwardly, first visiting the Pearl Islands, Cubagua and Margarita, and thence making for Hispaniola.

Arrived there, he found the island in turmoil, and eventually he was made prisoner by Bobadilla, an official sent by the king of Spain, and returned home in chains. Columbus would have remained longer among the Pearl Islands, which gave such promise of wealth, but a malady of the eyes made him nearly blind, and he was obliged to seek the island of Hispaniola, where there was promise of relief.

During the year that followed he sent home to Spain an account of his discoveries and specimens of the finest pearls, by which other adventurers became aware of the richness of the newly-discovered land, and one of his old companions, Alonzo de Ojeda, a brave soldier, obtained the king's permission to fit out an expedition to explore where Columbus left off. With Ojeda was another adventurer, then unknown, but who subsequently became famous through his narrative of the voyage and through having his name given to the country discovered by Columbus. This man was Americus Vespucci, and he arrived at the Gulf of Paris and the Pearl Islands in the year following the visit of Columbus, 1499.

It has been denied by some investigators that our country was named after the Florentine, but that it derived its name from an aboriginal word in use on this very Peninsula of Paris, Americapan, which is applied to a settlement there. This may be so; let the geographers decide it. But one thing is certain, Vespucci gave the name to the richest country on the north coast of South America—Venezuela.

Sailing beyond the Pearl Islands, these purloiners from the fame of Columbus discovered Curacoa.

It is curiously interesting that in the studies of the history of the Carib Islands we find the last feeble tribe of the once warlike natives of the southern islands of the great American archipelago, overwhelmed in their habitation on that which was sacred soil to them, because they were worshippers of the Fire God that dwelt, according to their ideas of



THE VOLCANO VESUVIUS in Italy, That Once Destroyed Pompeii and Herculaneum, Showing Light Eruptions in 1880.



WAIANAЕ COFFEE NURSERY, SHOWING YOUNG COFFEE PLANTS, IN OAHU, HAWAIIAN ISLANDS

supernatural beings they must worship, in the fiery mountain. And if they had the facility of expression, and had left a literature, it would appear that the destruction of themselves was a sacrifice to which the race was foredoomed to the gods whose habitations were the fiery mountains.

There is a later theory about the Caribs, who were supposed early in the eruption of Soufriere to have been annihilated:

That the last of the Caribs have been exterminated by recent eruptions of volcanoes on the Windward Islands is denied by authorities, who say that there was no member of the race on Martinique, and if any remnant was destroyed on St. Vincent it was not the fault of the English government which deported 6,000, the entire number then inhabiting this island, in 1876. They are scattered throughout South and Central America, and representatives of the tribes are found occasionally on the group of islands in the sea that gets its name from them.

Students of ethnology have found the Caribs interesting and baffling subjects. Their origin is shrouded in mystery, and the black types often found in Belize and Honduras are taken by some scientists as proof that African blood was mixed with that of the Caribs long before the whites brought slaves to America.

The pure type of Carib differs radically from that of other natives of the Americas. It is now difficult to find the red native with the characteristics that distinguished him when his country was discovered by the Spanish navigators. Negro and Arowak blood is now so mixed with the Carib that the casual traveler in the tropics is confused.

When England deported the 6,000 men, women and children of the Caribbean race from St. Vincent they were taken to Granada. A few years later they were taken to Belize. Professor Starr of the University of Chicago, who has spent some time in Central America, is of the opinion that no Caribs were destroyed by the recent volcanic disturbances in the Caribbean Sea.

"They once inhabited most of the Lesser Antilles," he said, "but to-day they are mostly on the mainland. There were once three kinds,

classified as island, coast and inland Caribs. When Columbus discovered America the island Caribs were a powerful race in the Antilles. Ethnologists differ as to their movements previous to that time. Some authorities maintain that they were of a southern race moving north, but it is my opinion that the theory of a northern race going south is the correct one.

“As far back as any authentic history goes we find records of black Caribs. There is much evidence to prove that the black Carib existed long before the white people brought African slaves to this country. This has caused much interesting speculation and no doubt is proof of movements of people that we know nothing of.

“The Carib is of the South American Indian type. He is a very sturdy man. It is said they are the handsomest race native to the Americas. The Carib proved himself superior to other natives before the arrival of the whites arrested the progress of Indian affairs. They were good potters and were the only Indians that used sails for their canoes, which were the best-made vessels found in America.”

Caribs are often pointed out to travelers in South and Central America. They are proud of their race. They are industrious.

CHAPTER XV.

THE ISLE OF NEVIS.

ONE OF THE STRING OF THE CARIBBEE PEARLS—ALEXANDER HAMILTON'S BIRTH-PLACE, AND SCENE OF THE EPISODE OF MARRIAGE IN LORD NELSON'S LIFE—THE STORY OF NELSON'S CAREER AS A LOVER IN THE WEST INDIES.

John C. Hamilton, the son of Alexander Hamilton, and his biographer, traced the life of his father in his writings and says of his birth and blood:

“Alexander Hamilton was born in the Island of Nevis, on the eleventh of January, seventeen hundred and fifty-seven. On his father's side his origin was Scottish, and his lineage may be traced in the ‘Memoirs of the House of Hamilton’ through the Cambuskeith branch of that house to a remote and renowned ancestry.”

It is evident, however, that the beautiful mother rather than the House of Hamilton, was the inspiration of the life of the boy of genius, and that his gifts that took the charm of oratory or the glow of heroism, were hers. Senator Henry Cabot Lodge, in his analytical life of Hamilton, gives this summary of his birth and the splendid inheritance that was his distinction.

The Senator says among many things a few lines as follows:

“On the eleventh day of January in the year 1757, the wife of a Scotch merchant in the Island of Nevis gave birth to a son, who received the name of Alexander Hamilton. Many varying elements were mingled in this boy. He was a British subject born in the tropics, Scotch on his father's side and of French Huguenot descent on his mother's, and to this conjunction many of the qualities which Hamilton exhibited in after life may be traced. But that which strikes us most at the outset is his extraordinary precocity; his mind and char-

acter seemed to partake of the nature of those luxuriant tropical plants which in a few months attain a growth permitted only after years of conflict and care in the harsher climate of the North."

John T. Morse, Jr., in his "Life of Alexander Hamilton," opens by saying he was still very young when he had the misfortune to lose a mother "who is represented to have been no ordinary woman. It was her rare beauty that attracted the attention of her first husband; but the child, Alexander, had a precocious appreciation of her higher charms of mind and character. Of her cultivation, her noble and generous spirit, and her refined and elegant manners, he ever retained and was wont often to express the most lively and tender memory.

"It would be an interesting speculation for one fond of such obscure studies, to inquire how far the peculiar qualities of the mind and character of Hamilton were due to this intermingling of the blood of two widely different races, and to the superadded effect of his tropical birth-place."

Mr. Morse says:

"In 1730, Alexander Hamilton, of Grange,—one of the illustrious Scottish family or clan of that name,—was married to Elizabeth, the eldest daughter of Sir Robert Pollock. Many children were born of this marriage. The fourth son, James," became a merchant in the West Indies, and married the daughter of a French Huguenot, and of this lady he says:

"She had previously espoused, in early youth, at the command of her mother though against her own inclination, a rich Dane named Lavine. But these forced nuptials were followed not long after by a divorce, and subsequently by the second and happier marriage with Mr. James Hamilton. Several children were born to this couple; but only one, the youngest, Alexander Hamilton, lived to mature years."

Beyond this—and we quote all the authorities—it is as hard to trace the descent or ascent of Alexander Hamilton as that of William Shakespeare. Between father and mother there is no question Alexander

Hamilton was well born; that is, he had health, strength and brains, and became a leader of men, and a man of extraordinary elevation and illumination of intellect.

Alexander Hamilton's father, James Hamilton, was Scotch, and his mother French. His mother was married to an elderly man, a Dane named Lavine, and was unhappy with him, for the wealth of the Dane was urged upon her by her mother as advantageous. She was a beautiful woman, and the suitor of advanced years greatly admired her, but her inclination against the match was hard to overcome. The marriage turned out so uncongenial that she sought and obtained a divorce. Her influential mother had the unfortunate responsibility for the misfortune of this marriage. Mrs. Lavine removed after her divorce to St. Christopher's, and there married James Hamilton. There were several Hamilton children, the younger named Alexander, and he only survived infancy. The statesman's grandfather, "Alexander Hamilton of Grange" (the family seat situate in Ayrshire), about the year seventeen hundred and thirty, married Elizabeth, the eldest daughter of Sir Robert Pollock, and had numerous issue, of whom James, the fourth son, was the father of the Alexander the great.

Bred a merchant, and the West Indies opening an extensive field to commercial enterprise, James left Scotland for St. Christopher's, where, though at first successful, through a too generous and easy temper, he failed in business and was, during the greater part of his life, in reduced circumstances.

In the early period of his reverses he was supported by his friends in Scotland, and in advanced age, by his son Alexander. He died in St. Vincent in the year seventeen hundred and ninety-nine, having declined, by the advice of his physician, the earnest solicitations of his son to join him in the United States.

The distinguished Alexander Hamilton's maternal grandfather was a French Huguenot. His name was Fancette. In the general expatriation of his protestant countrymen, which followed the revocation of the

edict of Nantes, he emigrated to the West Indies, and settled in Nevis, where he successfully pursued the practice of medicine.

He was a man of letters and of polished manners, whether his original profession was that of a physician, but the particulars of his educational advantages are not ascertained. Alexander Hamilton's rare and lofty qualities seem in greater part to have been inherited from his mother. She died when he was a child and her character remained vividly impressed upon his memory. He recollected her with inexpressible fondness, and often spoke of her as a woman of superior intellect, highly cultivated, of elevated and generous sentiments, and of unusual elegance of person and manner. On her decease, the indigence of her husband threw their only surviving child upon the bounty of his mother's relatives, Mr. Peter Lytton, and his sister (afterward Mrs. Mitchell), who resided at Santa Cruz, where he received the rudiments of his education. As an instance of which, rarely as he dwelt upon his personal history, he mentioned his having been taught to repeat the Decalogue in Hebrew, at the school of a Jewess, when so small that he was placed standing by her side on a table.

Many endearing traits of that generous and independent temper which were so conspicuous in his after life, appeared during his childhood. Hence, though his superiority occasionally awakened the envy of his comrades, it was soon disarmed by the amenity of his manners.

There is reason to believe, from the low standard of education in the West Indies, that the circle of his early studies was very limited, probably embracing little more than the rudiments of the English and French languages, the latter of which he subsequently wrote and spoke with the ease of a native.

A letter from Alexander Hamilton, written to a school-fellow, Edward Stevens, reads thus:

“St. Croix, Nov. 11, 1769.

“Dear Edward—This serves to acknowledge the receipt of yours per Capt. Lowndes, which was delivered me yesterday. The truth of Capt.

Lightbown and Lowndes' information is now verified by the presence of your father and sister, for whose safe arrival I pray, and that they may convey that satisfaction to your soul that most naturally flows from the sight of absent friends in health; and shall for news this way, refer you to them.

"As to what you say, respecting your soon having the happiness of seeing us all, I wish for an accomplishment of your hopes, provided they are concomitant with your welfare, otherwise not; though doubt whether I shall be present or not, for, to confess my weakness, Ned, my ambition is prevalent, so that I condemn the groveling condition of a clerk, or the like, to which my fortune condemns me, and would willingly risk my life, though not my character, to exalt my station. I am confident, Ned, that my youth excludes me from any hopes of immediate preferment, nor do I desire it; but I mean to prepare the way for futurity. I'm no philosopher, you see, and may be justly said to build castles in the air; my folly makes me ashamed, and beg you'll conceal it; yet, Neddy, we have seen such schemes successful, when the projector is constant. I shall conclude by saying, I wish there was a war.

"I am, Dear Edward,

"Yours,

"ALEX. HAMILTON.

"P. S.—I this moment received yours by William Smith, and pleased to see you give such application to study.

"Addressed to 'Edward Stevens, in New York.'"

Dr. Knox, a Presbyterian divine, was deeply interested in Hamilton, and gladly helped to guide his early studies, and had a great and salutary influence upon the brilliant boy. In the autumn of 1769, young Hamilton was placed in the counting house of Mr. Nicholas Cruger, a merchant, and most worthy man, then residing in Santa Cruz.

We are concerned only with that part of the life of Lord Nelson passed in the West Indies. His great victories won at Copenhagen, Abouker and Trafalgar, were, from the American point of view, "be-

yond seas." It was a long cry to the Baltic and to the shores of Egypt and Spain. Nelson's visits to the tropical islands of the American hemisphere were educational and he had no chances for the brilliant maneuvers by which he broke the lines of his enemies' fleets; but he was in difficulty with the hereditary incompetents of England, and popular with the men in whom England confided the doing of duty. The message attempted at Trafalgar to signal to the fleet was "England confides in every man to do his duty," but the code did not contain the word "confides," and "expects" was substituted.

Nelson would do his duty in the Indies, but no great opportunity came to him there, and the most distinguished act of his career in the American tropics was going to the Island of Nevis to get married, and he did not marry his first love in the tropics, either. When he had been on a long cruise, he wrote:

"The whole ship's company offered, if I could get a ship, to enter for her immediately; but I have no thought of going to sea, for I cannot afford to live on board ship in such a manner as is going on at present."

There was an intermission in war between France and England, and he proceeded to fall in love in France.

He took up his residence at St. Omer, and while studying French, fell in love with a Miss Andrews, a daughter of an English clergyman there. In January, 1784, he consulted his uncle, William Suckling, who consented to allow him £100 a year so as to enable him to marry; and on the strength of that increase to his income, he seems to have proposed to Miss Andrews and to have been refused.

January 19, 1784, he was in London, and appointed to command the *Boreas*, a 28-gun frigate, superseding Captain Thomas Wells, who had commissioned her five or six months before. She was under orders for the Leeward Islands; but it was the middle of May before she sailed from Spithead, Lady Hughes, the wife of the commander-in-chief, and her daughter, taking passage in her, and Nelson's brother Wilson going as her chaplain.

Nelson did not like Lady Hughes, the wife of the Admiral, and soon grew weary of him, saying he was a "fiddler." Laughton, the historian, says Nelson was in difficulty with his superior officer and while refusing to accept Moutray's authority, and sternly and resolutely ordering Moutray's broad pennant to be struck, he was really on very friendly terms with Moutray himself, and was devotedly attached to Moutray's wife, who would seem, though we have no exact information, to have been many years younger than her husband. "Were it not for Mrs. Moutray, who is very, very good to me," Nelson wrote from Antigua, shortly after his arrival on the station, "I should almost hang myself at this infernal hole;" and again, in the middle of the dispute about Moutray's distinguishing pennant, he wrote to his brother: "My dear, sweet friend is going home. I am really an April day; happy on her account, but truly grieved were I only to consider myself. Her equal I never saw in any country, or in any situation." It is in the same letter that, after giving an account of the young ladies on the station and their various little projects, he adds: "A niece of Governor Parry's has come out. She goes to Nevis in the Boreas; they trust any young lady with me, being an old-fashioned fellow."

A few weeks later, toward the middle of March, 1783, he sailed for St. Kitts, in the immediate neighborhood of which he remained several months, and, as a relief from the troubles of the lawsuits with which he was pestered, fell in love with the niece of Mr. Herbert, the President of Nevis. Herbert's niece, Frances, the daughter of his sister and of William Woodward, a judge of the island, who had died in February, 1779, was at this time just twenty-four, having been born in the early part of 1761. In June, 1779, she had married Dr. Josiah Nisbet, who shortly afterward became deranged, and died within eighteen months, leaving her with an infant son dependent on her uncle. During Nelson's former visit to St. Kitts he had not had an opportunity of making her acquaintance; but now, very shortly after his return, he was brought to her notice by a letter from a young friend who wrote to her,

probably from St. Kitts, in the middle or latter end of March: "We have at last seen the captain of the Boreas, of whom so much has been said. He came up just before dinner, much heated, and was very silent, yet seemed, according to the old adage, to think the more. He declined drinking any wine; but after dinner, when the President, as usual, gave the following toasts, 'The King,' 'The Queen and Royal Family,' and 'Lord Hood,' this strange man regularly filled his glass, and observed that those were always bumper toasts with him; which having drunk, he uniformly passed the bottle and relapsed into his former taciturnity. It was impossible for any of us to make out his real character; there was such a reserve and sternness in his behavior, with occasional sallies, though very transient, of a superior mind. Being placed by him, I endeavored to rouse his attention by showing him all the civilities in my power; but I drew out little more than 'Yes,' and 'No.' If you, Fanny, had been there, we think you would have made something of him; for you have been in the habit of attending to these odd sort of people."

On May 12th, Nelson, writing to his brother, says incidentally that he had been visiting a young widow at Nevis; and on June 29th, after writing, "The Admiral, Lady, and Miss sailed from here yesterday. Joy go with them; I had rather have their room than their company"—adds a postscript: "Entre nous. Do not be surprised to hear I am a Benedict, for, if at all, it will be before a month. Do not tell." Whether he was already an accepted lover it is impossible to say, probably not, but at any rate he was so within a few weeks; and a letter, written from Antigua on September 11th, begins, "My dear Fanny," ends "Your affectionate," and discusses the prospect of their marriage in a calm, businesslike manner. The whole tone of the letter, the first, apparently, he wrote to her, is rather esteem than passion; it appears to be written by an affectionate friend rather than by an ardent lover. So much interest attached to this point, the marriage has been so often described as a genuine love-match, that it may be well to reproduce this part of it. "I have received a letter from Mr. Herbert, in answer to that which I

left at Nevis for him. My greatest wish is to be united to you; and the foundation of all conjugal happiness, real love, and esteem is, I trust, what you believe I possess in the strongest degree toward you. I think Mr. Herbert loves you too well not to let you marry the man of your choice, although he may not be so rich as many others, provided his character and situation in life render such a union eligible. I declare solemnly that, did I not conceive I had the full possession of your heart, no consideration should make me accept your hand. We know that riches do not always ensure happiness; and the world is convinced that I am superior to pecuniary considerations in my public and private life; as in both instances I might have been rich. But I will have done, leaving my present feelings to operate in your breast; only of this truth be convinced, that I am your affectionate Horatio Nelson. P. S.—Do I ask too much when I venture to hope for a line? or otherwise I may suppose my letters may be looked on as troublesome.”

It was the natural sequel to this letter that he should presently write one to his uncle, whose promised assistance nearly two years before had enabled him to propose to Miss Andrews. Mr. Suckling was equally liberal on the present occasion, and agreed to make him a sufficient allowance. What Nelson asked for was £100 a year for a few years, and this was probably what was given. Nelson thought that Herbert would give his niece two or three hundred a year during his life, and he promised to leave her £20,000 at his death, or the bulk of his property, which was very great, if his own daughter should die before him.

In August Sir Richard Hughes went home, and Nelson was left senior officer on the station, so that when Prince William came out in November as captain of the frigate Pegasus, he was under Nelson's orders and resumed his former friendship with him; and learning that his chief was going to be married, he insisted that he must be present at the ceremony and give the bride away. Of the Prince Nelson formed a most favorable opinion, and most of his letters about this time,

to Mrs. Nisbet, to his brother, or to Locker, are full of his praises. "In his profession he is superior to near two-thirds on the list; in attention to orders and respect to his superior officers I hardly know his equal; I wish that all the navy captains were as attentive to orders as he is." Such are some of the expressions regarding the future king; and though much allowance must be made for Nelson's devoted loyalty and enthusiastic attachment to the Crown, his whole correspondence speaks to his high estimate of the Prince as an officer and a seaman.

On March 12th, 1787, Nelson was married, the Prince, as had been settled, giving the bride away. A month later Nelson wrote to the Admiralty that the *Boreas* was rotten, and would be too bad for the voyage if she did not sail before the hurricane season. The *Boreas* was not an old ship; she had been launched only thirteen years; but the duration of wooden ships, more especially of those built during the ministry of Lord Sandwich, was very capricious. The state of the ship, however, made it necessary to recall her, and she arrived at Spithead on July 4, 1787, Mrs. Nelson coming to England a passenger in a merchant ship.

The way Lord Nelson got acquainted with the lady he married on the Island of Nevis is thus related by Mahan, the historian and biographer:

"It was in the midst of legal warfare with West Indies and of the pre-occupations arising from it, that Nelson first met the lady who became his wife. She was by birth a Miss Frances Woolward, her mother being a sister of the Mr. Herbert already mentioned as President of the Council in Nevis. She was born in the first half of 1758 and was therefore a few months older than Nelson. In 1779 she had married Dr. Josiah Nisbet, of Nevis, and the next year was left a widow with one son, who bore his father's full name. After her husband's death, being apparently portionless, she came to live with Herbert, who looked upon and treated her as his own child, although he also had an only daughter.

"Note.—(Lady Nelson's tombstone in Littleham Churchyard, Ex-

mouth, reads that she died May 6, 1831, 'aged 73.' She would then have been born May 6, 1758. Nicolas says that she died May 4, 1831, aged 68, but does not mention his authority.)

"When Nelson first arrived at Nevis, in January, 1785, she was absent, visiting friends in a neighboring island, so that they did not then meet—a circumstance somewhat fortunate for us, because it led to a description of him being sent to her in a letter from a lady of Herbert's family, not improbably her cousin, Miss Herbert. Note—(Prior to May, 1785, the only stops of the 'Boreas' at Nevis were January 6-8, February 1-4, and March 11-15.) Nelson had then become a somewhat conspicuous factor in the contracted interests of the island society, owing to the stand he had already publicly assumed with reference to the contraband trade. People were talking about him, although he had not as yet enforced the extreme measures which made him so unpopular.

"Mrs. Nisbet very quickly made something of him. Little direct description has been transmitted to us concerning the looks or characteristics of the woman who now, at the time when marriage was possible to him, had the misfortune to appear in the line of succession of Nelson's early fancies, and to attract the too easily aroused admiration and affection of a man whose attachment she had not the inborn power to bind. That Nelson was naturally inconstant, beyond the volatility inherent in youth, is sufficiently disproved by the strength and endurance of his devotion to the one woman, in whom he either found or imagined the qualities that appealed to the heroic side of his character."

Mahan adds the following:

"Note.—The author is satisfied, from casual expressions in Nelson's letters to Lady Hamilton, that his famous two years' confinement to the ship, 1803-1805, and, to a less extent, the similar seclusion practiced in the Baltic and the Downs, proceeded, in large part at least, from a romantic and chivalrous resolve to leave no room for doubt, in the mind of Lady Hamilton or of the world, that he was entirely faithful to her.

"What is noteworthy in Nelson's letters at this time is the utter

absence of any illusions, of any tendency to exaggerate and glorify the qualities of the woman who for the nonce possessed his heart. There is not a sign of the perturbation of feeling, of the stirring of the soul, that was afterward so painfully elicited by another influence. 'The dear object,' he writes to his brother, 'you must like. Her sense, polite manners, and, to you I may say, beauty, you will much admire. She possesses sense far superior to half the people of our acquaintance, and her manners are Mrs. Moutray's.' The same calm, measured tone pervades all his mention of her to others. His letters to herself, on the other hand, are often pleasing in the quiet, simple, and generally unaffected tenderness which inspires them."

CHAPTER XVI.

DESTINY DECIDED OFF THE CARIBBEES.

THE ENGLISH REVENGE FOR YORKTOWN — ADMIRAL GRASSE LEFT FORT DE FRANCE AS THE HURRICANE SEASON WAS COMING ON, AND EFFECTIVELY CO-OPERATED WITH WASHINGTON AND ROCHAMBEAU TO CAPTURE CORNWALLIS—THE FLEETS OF THE ENGLISH AND FRENCH WERE IN FULL FORCE IN CARIB WATERS THE NEXT SPRING, AND IN THE GREAT BATTLE GRASSE WAS BEATEN AND CAPTURED FOR THE LUCK OF FORTUNE WAS AGAINST HIM.

The exchange of courtesies by the Republic of France and the United States, reviving and celebrating the alliance between the English colonies in North America, and the Bourbon Dynasty and flag of the lilies of France, brought a very distinguished mission from the French to our shores at the time the volcanoes of the Lesser Antilles were making themselves memorable by the most destructive display of energies known in the West Indies; and there were with us at this very time the descendants of Rochambeau and Grasse, the commanders of the French fleet and army which came to the aid of our fathers, and gave the allied colonies and kingdom the decisive success at Yorktown. It was Benjamin Franklin's strategy at Paris that caused the French fleet under Grasse to sail from the waters around the isles of the Caribs, to the capes of Virginia, just in time to beat off the Canadian fleet the English sent from New York for the relief of Cornwallis. It was fortunate that we should in this year of marvelous development of the resources and fame of our country have with us in the deputation of eminent French friends, visitors of the blood of La Fayette, Rochambeau and Grasse, all of whom bore distinguished parts in the course of events that led up to the surrender of Cornwallis at Yorktown, inflicting on

the British immense chagrin as well as great loss, and insuring the independence of the Colonies. It will be well remembered in this connection that the part of Alexander Hamilton, born in the Caribbees, in the siege of Yorktown, was a brilliant one, as he was the leader of the storming party of Americans who carried the outer fort, guarding the lines of Cornwallis against conquering approaches.

It is another coincidence that it was in the midst of the Indies, and near Martinique, after the English and French fleets had sailed for months in and out of the passages of the coveted and hotly contested Caribbees, that the English Admiral Rodney crushingly defeated the French, when they were engaged in an expedition designed to take possession of Jamaica.

It was this splendid British victory, in which a French fleet and army were just out of the combat with such destruction, that the destiny of England to win in the conflict with the French for supremacy in the West Indies, and primacy on the oceans. This French defeat, following swiftly for the days of sailing ships, was by the British boastfully described as their "Revenge for Yorktown."

The ancestor of the Grasse who was of the Rochambeau mission during the unparalleled disasters befalling Martinique in 1902 was made prisoner when beaten by Rodney. The surrender of the British army was October 17th, 1781. The defeat of the French armada in the West Indies under Grasse was April 12th, 1782. The winning English Admiral was Rodney, who bitterly criticised the shrinking from close quarters of the British fleet when they encountered Grasse off the Virginian capes and turned back baffled to New York. It was Grasse who surrendered his sword and his splendid flagship, the *Ville de Paris*, then the finest line-of-battle ship in the world; but he did not give up the ship until a most heroic defense had been made.

The situations developed then and distinguished now are among the most dramatic of the decisive engagements that have marked the destined drift of the powers on the seas, so influential in the evolution of nations.



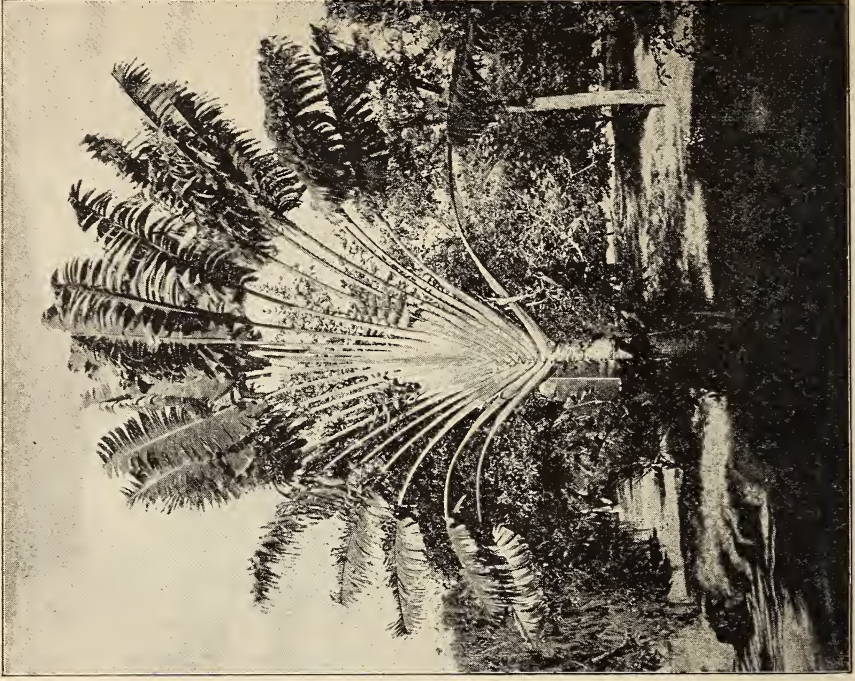
FAMOUS WALK BETWEEN THE ROYAL PALMS IN HONOLULU



NUANU VALLEY PASS AND PALI PEAK, 1,207 FEET HIGH. NEAR HONOLULU.



BANANA PLANT, HAWAII, SHOWING FRUIT ON TREE.



TRAVELER'S TREE, HONOLULU, A PLANT CURIOSITY.

The historian, David Hannay, in his life of Rodney, gives the explanation of the important naval operations in the West Indies during the closing months of our revolutionary war in these words:

“What the hill, the river and the wood were to Napoleon or Wellington, the wind, the current and the lie of the land were to Rodney or Nelson. They were obstacles to be avoided or advantages to be used. Rodney’s field of battle lay in the Lesser Antilles, the long string of small islands stretching over six degrees of latitude from south to north which form the eastern division of the West Indies. The Antilles, great and less, are a vast broken reef which shuts in the gigantic lagoon called the Caribbean Sea. The eastern division, which reaches north to the Virgin Islands, has been broken small by the pressure of the ocean. From the Virgin Islands the reef turns sharp west, and its fragments become few and large—first Porto Rico is big, then San Domingo is bigger, then Cuba is the biggest. South of Cuba and in the Caribbean Sea is Jamaica. In 1780 Cuba and Porto Rico belonged to Spain, as they still do. She shared San Domingo with France, and longed to recover Jamaica from the hands of England. The Lesser Antilles were divided among England, France and Holland. To them considerations, physical and political, limited the area of the war.

“The French held Guadaloupe and Martinique, which had been restored to them at the close of the former war. They had lately captured Dominica, which lies between the two. They had also snapped up Grenada far away to the south, under the very nose of Admiral Byron. On the other hand Barrington had seized Santa Lucia and had held it in defiance of D’Estaing. This was a satisfactory offset to the loss of Dominica and Grenada. Santa Lucia lies to the south of Martinique, and a little to windward of it. At the northwest end it possesses the admirable harbor of Gros Islet Bay. From this place the French naval headquarters at Fort Royal in Martinique could be easily watched.”

In the preliminary movements of the French and British fleets there was a beautiful game of seamanship. Rodney was bothered by the

obstinacy of his captains, and more than once they threw away advantages by stupidly misunderstanding or disobeying his orders. The French ships were extremely well handed, but they were caught with an array of transport ships, carrying an army, and among the burdens was a train of siege artillery and this was a heavy handicap. Admiral Grasse did not mean to fight Rodney when he had an army on his hands, but the accident of a collision between the French flagship and one of her consorts defeated the wise purpose of caution. The fateful incident that forced him to unfortunate battle was this :

An event followed which made the battle on the following day inevitable. The Zele with the others was tacking at the mouth of the passage, endeavoring not to lose if she could not gain ground in the trade wind. In the dark she met the Ville de Paris, Grasse's own splendid flagship. The Zele was on the port, the Ville de Paris on the star-board tack. According to the express orders of the admiral, and according to what is now the universal rule of the road of sea, it was the duty of the Zele to put her helm up and go under the stern of the flagship. But the great gods were weary of Grasse's peddling. They blinded the officer of the watch on the Zele. He luffed, endeavored to cross the bow of the flagship, and ran smash into her. The Zele had her bowsprit snapped short, and her foremast carried away just above the deck. The two vessels were entangled, wind and current swept them to leeward before they could be got clear. Then Grasse ordered the Astree frigate, commanded by the famous and unlucky La Perouse, to take the Zele in tow.

It was two hours before the cable was made fast, and they were on their way to Guadaloupe. By daylight, about five o'clock, Grasse and the ships closest to him had fallen to leeward. When the first rays of the sun showed them to the English fleet, now heading towards them, they were stretching over from nine to fifteen miles of water to westward of the Saints. Sir Charles Douglas, who was already up on board the Formidable, saw that the course of the English would cut right through

them. He hurried down to the Admiral's cabin to report that "God had given him his enemy on the lee bow." From Rodney to the youngest midddy in the fleet, all men saw that the battle was coming now.

There was almost as tedious and angry a controversy, as to the part Sir Charles Douglas played in advising Rodney, as the Santiago affair of Sampson and Schley. Sir Charles is supposed to have been pointing out to Admiral Rodney just what to do, until the despotic Admiral grew weary and irritated, but he certainly took the part of the advice that was good. The British story of the critical turn is this:

"France had to undergo her fate. Grasse bore on to the south, and at about nine the English van had passed the last ships of his rear. On emerging from the rolling masses of smoke the captains looked eagerly back for the signals at the towering mast-head of the Formidable. As they looked they saw a great three-decker heading north out of the cloud and the flames. For a moment they thought the French Admiral had doubled back on them, but as the three-decker cleared the smoke they saw the cross of St. George, and knew the Formidable had burst through the French line to windward."

It must have been at a little before half-past nine that Rodney and Grasse, whose ship was the fifteenth in the French line, saluted each other with the cannon of their three-deckers. Up to now there has been nothing to distinguish this from the ordinary sea-fights of the eighteenth century save the number of the ships engaged and the closeness of the engagement.

A chair had been placed on the quarter-deck of the Formidable for the Admiral, and he rested on it except when he was walking through the cabins under the poop, to the gallery astern, from which he could watch the ships of his line behind him.

It was thirsty work fighting in the thick pall of sulphurous smoke in which the gunpowder soon wrapped the ship. Rodney, in one of his turns through the cabins, called one of the middies and told him to mix a tumbler of lemonade. The midddy went to work, and, having nothing

more handy for the purpose, stirred the brew up with the hilt of his dirk. "Child, child," said the Admiral, "that may do for the midshipmen's mess. Drink that lemonade yourself, and send my steward here"—which order the middy obeyed with alacrity.

The already existing confusion in the French line was immensely increased and a great gap appeared just astern of the *Glorieux*, which was now right on the starboard bow of the *Formidable*, caused probably by the fact that the *Diademe*, the next succeeding Frenchman, was forced across the bows of the English flag-ship.

Sir Charles Douglas was at this moment leaning on the hammocks in the front of the quarter-deck, and he saw the evidence of the existing confusion in the French line. That he realized the whole extent of it we need not believe, but he saw the gap and he saw that by passing through it we might cut the French rear off from the center and put it between two fires. He jumped down from the hammocks and (so Dashwood told the story in later years) asked his little aide, "Dash, where is Sir George?"—"I think he is in the cabin, sir," was the answer. Both turned aft and came face to face with the Admiral, who was just stepping out of the gangway. Sir Charles went up to him, and, taking off his hat, pointed out the gap in the French line to Rodney, urging him to steer through it. For a moment the Admiral hesitated. He did not like to "have things sprung on him" at any time, and now it behooved him to think. It was very well for the captain of the fleet to recommend the manoeuver; he would be covered by the authority of his Admiral. For Rodney, who would have to bear the responsibility for the consequences, it was a very serious step, indeed. He had served under Mathews, and had not forgotten the fate which overtook that officer for departing from the consecrated rules of battle. His first impulse was to say no, and he did. "I will not break my line, Sir Charles," was his answer. In his eager conviction that he was right Douglas pressed the Admiral again, and even so far forgot himself as to actually give the order to port to the quartermasters. A fierce reminder of their respec-

tive positions from Rodney stopped him before the wheel had moved. Then, as we may well suppose, instinctively feeling the indecency of a wrangle, the two men turned from one another for a moment. The break in the dispute calmed both; Rodney consented to the suggestion.

There were more than thirty men of war on each side in the big fight. When, according to Sir Charles Douglas, Admiral Rodney gave in to his advice, "Dashwood was sent flying down with the needful directions to the lieutenants in the batteries. The Formidable swung round to starboard and cut through the French line, pouring her broadside into the *Glorieux* to right and the *Diademe* to left as she went.

"The last of the French prizes to be taken was the *Ville de Paris*. The light winds made our movements slow, and our ships only came up with her when the afternoon was wearing on. They tackled her to port and to starboard, but the Admiral fought as a man fights who wishes to atone by heroism for all faults. His cartridges were used up, and it was necessary to hoist powder-barrels out of the hold, and serve out the powder with the ladle. The solid fog of smoke between the decks choked the lanterns by which the men worked below. Still, until nearly six he had not surrendered. Then, with the feeling which caused Francis I at Pavia to refuse to give up his sword till he could hand it to the Viceroy of Naples, the alter ego of a sovereign and in some sort his equal, he looked about for a flag-officer to whom to surrender. At that moment Samuel Hood bore down on him in the *Barfleur*. She had been long becalmed, and it had been necessary to get the boats out to tow her into the breeze. Now she was pressing on to lay alongside the *Ville de Paris*. *Grasse* turned towards her, firing a gun of salute. Hood concluded that his old friend of the fights off *Martinique* and *St. Kitts* wished to surrender to him. He returned the salute, ranged up alongside, and the two admirals fought a space for honor's sake. There was no want of cartridges on board the *Barfleur*. Her guns were cold. Her men were fresh. Her terrible fire speedily overpowered the languid answer of the *Ville de Paris*, whose crew, diminished by a half, were

fighting hopelessly in the dark of the smoke with guns which they could only slowly feed with powder. After a few minutes Grasse concluded that enough had been done. There were but three unwounded men on his upper deck, of whom he was one. More men had been slain in his ship than in the whole British fleet. There were not two square feet of his upper works unshattered by shot. His rigging was a wreck. At six o'clock he hauled down the Fleur-de-Lis with his own hands. A few minutes later he stepped into the cutter which shot alongside him from the Barfleur, and was taken a prisoner to Hood. By Hood he was taken to Rodney."

Just before the battle the two fleets were equal in the number of fighting ships. They were at anchor until April 8th, the French getting ready at Fort Royal (now so conspicuously before the world in the volcanic eruption history), "the English waiting to start in pursuit from Santa Lucia, some forty miles to the south. All leave was stopped on our ships. Neither officer or man landed except in duty. A line of frigate patrolled the space between the two ports within signaling distance of one another.

"At last, on the 8th, the *Andromache* frigate, commanded by Captain Byron—"an active, brisk, and intelligent officer," according to Rodney—was seen standing in for Santa Lucia with the signal flying which told that the French were getting to sea. Within two hours the English were out, and in pursuit.

"Rodney acted upon the supposition that Grasse would go northward, and through the night of April 8th he steered in that direction past Martinique. On the morning of the 9th the English fleet was off Dominica, and it was seen that Rodney had judged rightly. There to north and east of our ships were the French fleet and convoy.

"Rodney and Grasse were now face to face on their decisive field of battle. This field is the stretch of water which extends along the west side of Dominica to the southern point of Guadaloupe."

The English historian sketched the situation of the war before the "Revenge for Yorktown" in these words:

"Our military forces were ridiculously inadequate to the work they had to do, and were moreover divided as if to make the utmost of their weakness. Clinton was holding on to New York with one-half of the army. Cornwallis and the other half were fighting in the Southern States with a valor, skill, and success which, ungrateful people that we are, we have too much forgotten. United under Cornwallis our army might have done something. Divided it could only stand at bay."

Rodney arrived in the West Indies after a stormy voyage, in the December after the Yorktown surrender. There was a most violent hurricane in the West Indies a week before the Yorktown surrender. This Grasse had avoided by his Northern trip. It was not by greatly superior skill the English won the decisive event. The luck of fortune was against the French.

CHAPTER XVII.

JOSEPHINE IN HER YOUTH.

CHILD OF THE SUN OF THE TROPICS IN THE INDIES OF AMERICA—
BORN BEAUTIFUL UNDER WESTERN PALMS, TRANSPLANTED TO
GRACE PARIS, AND LEAD NAPOLEON CAPTIVE.

The romance of the tragic Isle of Martinique is the life of Josephine, Empress of the French. Her life began in the island when it was beautiful and prosperous, and her grandson, Napoleon III, erected a monument to her in the ancient capital that was once Port Royal. Hearne, who visited the statue, calls it "a white dream," a "creation of master sculptors," something "absolutely lovely," and the effect touching, for the face wears a smile that has a sweetness all its own. It was from the harbor of this spot that Grasse sailed with his fleet and army to meet discomfiture at the hand of Rodney and to become a captive, suffering with his armament one of the defeats of France that gave England her magical sea power that has carried her so far around the world.

Josephine, in spite of her follies, had a dainty grace in her frivolities that has given her sympathy, and her sorrows have won a far warmer place in the heart of the world that knows her well than all the splendors in which she was radiant ever gave her.

Frederick Ober, the poet, historian and pen painter of the West Indies, writes of the Island of Martinique: A tropical morning of the year 1762, as the sun rose from the Atlantic, he found a green and rugged island interposed between himself and the Caribbean Sea; a chain of wrinkled hills, with summits wreathed in vapory clouds. This verdant mountain-mass was Martinique, one of the fairest of those many isles that lie, crescent-like, between the ocean of storms and the sea of calms.

One day far distant, in the age of fire, it had been upheaved from the slimy ocean-depths; its primal rocks for centuries had been beaten upon by tropic sun and washed in torrential rains; slowly, during eons of time it had gathered the garment of verdure now enwrapping it. Heat and moisture, the great alchemists, had combined to prepare its soil for the reception and retention of the seeds and germs of plant-life, brought hither by birds and by the winds that swept its surface. Thus the deep and gloomy valleys, the sloping hillsides, even the mountain summits, were covered with carpets of emerald embossed with flowers and trees.

The tropical sun on this tropical day of 1762 was looking upon the conquest of Martinique by the English, and, upon the summit of a hill, overlooking the deep bay of Fort Royal, stood a fair and delicate woman about twenty-five years of age. She was the center of a group of female slaves, who were regarding, as anxiously as she, the scene spread out before them. The deep valley at their feet was filled with shadows; a peaked *morne* cast its black counterpart across the intervening vale, and aslant the hill on which they stood. The morning air was cool and sweet; it breathed of naught but peace; yet, across the bay, less than four miles away, arose the smoke of conflict. The English fleet had approached the shore; the grim walls of Fort Saint Louis, bristling with guns, were sending forth a storm of shot; boats from the fleet were striving for a landing. At first they were repelled by the gallant islanders, but eventually were successful. Then the great wooden ships, hitherto silent, replied to the cannonade from the fort, and a pall of smoke hid the scene from view.

When the cannonading ended, and the smoke was blown away, the lilies of France no longer waved over the Fort. The watcher was a bride of a little more than a month, Madame Tascher de La-Pagerie, who had been compelled to part from her husband a week previous to the battle, when he was ordered to assist at the defense of the Fort. As a lieutenant of the forces, he could not evade his duty to the gov-

ernment. Madame Tascher could not yield to her desire for seclusion, but was obliged to attend to the affairs of the large plantation, with its dependent slaves. Two days had nearly passed, the second was nearing its close, when the mistress of La-Pagerie saw a negro riding up the palm-bordered avenue from the landing at the bay. Standing in the southern doorway, above the rose-garden, she saw behind this horseman another, coming at a furious rate, and a few minutes later was sobbing on her husband's breast.

Thus the artist introduces the parents of Josephine.

Lieutenant Tascher resigned his commission and devoted himself entirely to agricultural occupations. His principal estate was this on which he and his bride had taken up their abode, and which had come to them as her dower; the beautiful valley of Sannois near the little hamlet of Trois-Ilets.

Two years were spent in the cultivation of billowy fields of sugarcane, and fragrant groves of coffee-trees, M. Tascher passing the time, outwardly tranquil, but inwardly disturbed by the thought that he and his family were the subjects of an alien government. His father, the first of the name in America, had come to this Island of Martinique in the year 1726. He was a personage of rank, as appears from his request, four years later, for the registration of his letters of nobility; a formality which the French noblemen coming to the Antilles never omitted.

His request was granted, but not until 1745, and meanwhile he had been united in marriage to Mlle. de La Chevalerie, the daughter of a wealthy family of the island.

A son was born to them, Joseph Gaspard de La-Pagerie, whom they sent to be educated in France. The young man returned to Martinique in 1755, was appointed first lieutenant of artillery, and actively engaged in the erection of batteries at Fort Royal, and chief port and naval station of the French West Indies.

He formed an alliance with a rich Creole family, in November,

1761, by marriage with Mlle. Rose-Clair des Verges de Sannois. Through her he came into possession of the estate of Sannois. There came a day when a daughter was born to him, and coincident with the announcement, the faint report of cannon across the bay. Fort Royal was rejoicing over the recession of Martinique. Then the cloud lifted from the planter's brow, for his daughter was a child of France!

This daughter of the Creole planter, whose birth was thus auspiciously announced by the salvos of returning peace, was none other than she who subsequently became celebrated as Josephine.

The treaty of peace, by which Martinique, amongst other colonial possessions, had been restored to France, was signed on the 12th of February, 1763. A war ship brought the news to Fort Royal; the final transfer of troops and the installation of the new governor took place in June, on the 23d of which month Josephine was born.

The child was christened Marie-Joseph-Rose, thus combining and perpetuating the baptismal names of her grandfather, grandmother, father and mother—Marie-Joseph-Rose-Tascher de La-Pagerie, which was soon abbreviated to Josephine.

Six years later, on the Island of Corsica, was born one with whom the name of Josephine is inseparably linked—Napoleon.

Napoleon and Josephine; we cannot but pause a moment to note the parallelism in the great events of their lives. Both were island-born; the one in a rock-ribbed isle of the Mediterranean, the other in a tropic segment of the Caribbean crescent. Both first saw the light soon after the accession of their native land to France.

The mother of Josephine wrote to her sister expressions of her gratitude to God for "His gift of a daughter," and hoped the child would possess all the most agreeable traits of both ancestral families. That her desires were gratified, at least in this regard, history has assured us.

A "child of the sun," a creature of love, laughter and careless gaiety, was the youthful Josephine. As soon as she could walk outside

the doors of the "great house," she became the favorite companion of the slave-children, who swarmed about the establishment. Or, rather, they became her devoted adherents, guiding her footsteps. Accustomed to have her lightest fancy taken seriously, to have her orders obeyed as soon as uttered, she was in danger of becoming imperious and selfish. Only her native sweetness saved her.

The planter's house was situated upon a natural terrace, escarped from the side of a steep hill. Behind it rose the hills that swung around the head of the valley that cut off the view in that direction. But in front the ground sloped toward the sea, to which led a broad and straight avenue of magnificent palms, their trunks straight as arrows, and over one hundred feet in height; their verdant crowns interlaced above the road. Between the house and the palm-avenue lay the rose-garden, filled with plants that bloomed perpetually; their fragrance invaded and made delightful the atmosphere of the dwelling. A fruit-garden rambled around the outer edge of this paradise of roses. There was a brook that murmured to the sea through the garden. One of its pools was early selected by Josephine's mother as her bathing-place. It lay beneath a giant *ceiba* tree, a silk-cotton, whose buttressed trunk reached out into it, and above it spread its canopy of verdant foliage. Beneath the *ceiba* grew the mango and guava, the custard apple, sapote, banana, orange, plantain, calabash, and a hundred others. The golden-fruited mango shaded the veranda and dropped its delicious morsels for the little girl to find. The same tree, or one of its descendants, still casts its shade over the ground where Josephine played with her companions. On the hill-slopes gleamed the yellow cane, in the gorges grew the glossy-leaved coffee, with its crimson fruit.

As regards accomplishments, Josephine played, especially on the harp, and sung with exquisite feeling, and with science sufficient to render listening an intellectual pleasure, without exciting the surmise that the cultivation of attainments less showy, but more valuable, had been sacrificed. Her dancing is said to have been perfect. An eye wit-

ness describes her light form, rising scarcely above the middle size, as seeming in its faultless symmetry to float rather than to move—the very personation of grace. She exercised her pencil and her needle and embroidering frame with beautiful address.

The following is the narrative in her own words, as she long afterward related the circumstances to the ladies of her court:

“One day, some time before my first marriage, while taking my usual walk, I observed a number of negro girls assembled round an old woman, engaged in telling their fortunes. I drew near to observe their proceedings. The old sibyl, on beholding me, uttered a loud exclamation, and almost by force seized my hand. She appeared to be under the greatest agitation. Amused at these absurdities, as I thought then, I allowed her to proceed, saying, ‘So you discover something extraordinary in my destiny?’ ‘Yes.’ ‘Is happiness or misfortune to be my lot?’ ‘Misfortune. Ah, stop!—and happiness, too.’ ‘You take care not to commit yourself, my good dame; your oracles are not the most intelligible.’ ‘I am not permitted to render them more clear,’ said the woman, raising her eyes with a mysterious expression toward heaven. ‘But to the point,’ I replied, for my curiosity began to be excited: ‘what read you concerning me in futurity?’ ‘What do I see in the future? You will not believe me if I speak.’ ‘Yes, indeed, I assure you. Come, my good mother, what am I to fear and hope?’ ‘On your own head be it then; listen: You will be married soon; that union will not be happy; you will become a widow, and then—you will be *Queen of France!* Some happy years will be yours; but you will die in a hospital amid civil commotion.’

“On concluding these words,” continued Josephine, “the old woman burst from the crowd and hurried away as fast her limbs, enfeebled by age, would permit. I forbade the bystanders to molest or banter the pretended prophetess on this ridiculous prediction; and took occasion, from the seeming absurdity of the whole proceeding, to caution the young negresses how they gave heed to such matters. Henceforth, I

thought of the affair only to laugh at it with my relatives. But afterward, when my husband had perished on the scaffold, in spite of my better judgment, this prediction forcibly recurred to my mind after a lapse of years; and though I was then myself in prison, the transaction daily assumed a less improbable character, and I ended by regarding the fulfilment as almost a matter of course.

“Such, ladies, is the exact truth respecting this so celebrated prophecy. The end gives me but little inquietude. I live here (at Navarre, at the divorce) peacefully, and in retirement; I have no concern with politics; I endeavor to do all the good in my power; and thus I hope to die in my bed.”

Dr. Memes published, in London in 1831, a work which is valuable chiefly from the circumstance that by copious extracts from her correspondence, the author makes Josephine, to a great extent, her own biographer. “The Memoirs of the Empress Josephine with notices of the Courts of Malmaison and Navarre,” published in London in 1828, has also furnished interesting matter. It was written by a lady who was for a considerable time a resident of the court of Josephine.

Becoming the wife of Vicomte Alexander de Beauharnais, Josephine, on the completion of her sixteenth year, fulfilled the first step in her destined greatness. Various circumstances had brought this young nobleman to the New World, among which the occurrences then taking place in the British American colonies were among the chief. What part he actually assumed in the American war of independence does not appear; but he certainly engaged on the side of the revolted colonists, and, in Josephine’s own words, “had embraced the new ideas with all the ardor of a very lively imagination.”

The immediate cause of this young officer’s arrival in Martinico was the necessity of proving a right to large estates which had fallen by inheritance to him and his brother, the Marquis de Beauharnais. How strangely fortuitous seem frequently the events of human life! It happened that these very domains bordered on the property of M. Renaudin,

and were at the very date in question, held by him on lease. This naturally enough made the young people acquainted; and a mutual attachment ensued between Beauharnais and Josephine.

Circumstances seemed to concur in rendering this a very suitable union, as respected both the interests and the affections of the youthful parties. But unexpected obstacles arose in the opposition of relatives, which Josephine surmounted with a gentleness and address hardly to have been expected in a girl of sixteen.

Soon after her marriage Josephine accompanied her husband to France, where they arrived in 1779. At this period Beauharnais, though many years older than his wife, was still only in the bloom of manhood, and the youthful pair are said to have created a sensation in the circles of the capital. Certain it is the manners and accomplishments of Josephine were admired in a court the gayest and most polished in Europe; while, at the same time, the character and attentions of Marie Antoinette appear to have made on the grateful heart of the fair Creole an impression which subsisted through a life whose successive incidents were in apparent hostility to the royal cause. The succeeding summers were passed in provincial tours, chiefly in the North, or on the patrimonial estates in Brittany. Here, on the 3d of September, 1780, Josephine gave birth to her only son, Eugene, afterward the celebrated viceroy of Italy; and in 1783 the family was completed by the birth of a daughter, Hortense, subsequently Queen of Holland.

Beauharnais, too, had loved his wife ardently, but, unhappily, his notions of conjugal fidelity were formed too much after the fashion of vice in high places, which had, for the two preceding reigns, cast a moral pestilence over the uppermost ranks in France. Madame de Beauharnais endured her wrongs for some time in patient forbearance, or remonstrated only with gentleness; but, seeing that her husband attached himself more and more to another, she infused a bitterness into her reproaches, which ended in estranging the affections she had

hoped to reclaim. Each persisted; and a separation was the consequence. This appears to have been effected by a personal agreement, not a legal process, and Josephine, with her children, returned to Martinico.

After an absence of several years, as is evident from the following simple and effecting narrative, Josephine returned alone to France, and in circumstances far otherwise than affluent. The recital was given to the ladies of her court at Navarre, to whom, at their own request, she had one day shown her jewels—the most magnificent collection, be it remembered, in Europe. Observing the admiration bestowed upon “these dazzling inutilities,” she addressed the junior members of her suite as follows: “Believe me, my young friends, that splendor is not to be envied which does not constitute happiness. I shall doubtless very much surprise you by saying that the gift of a pair of old shoes afforded me at one time greater satisfaction than all these diamonds now before you ever did.”

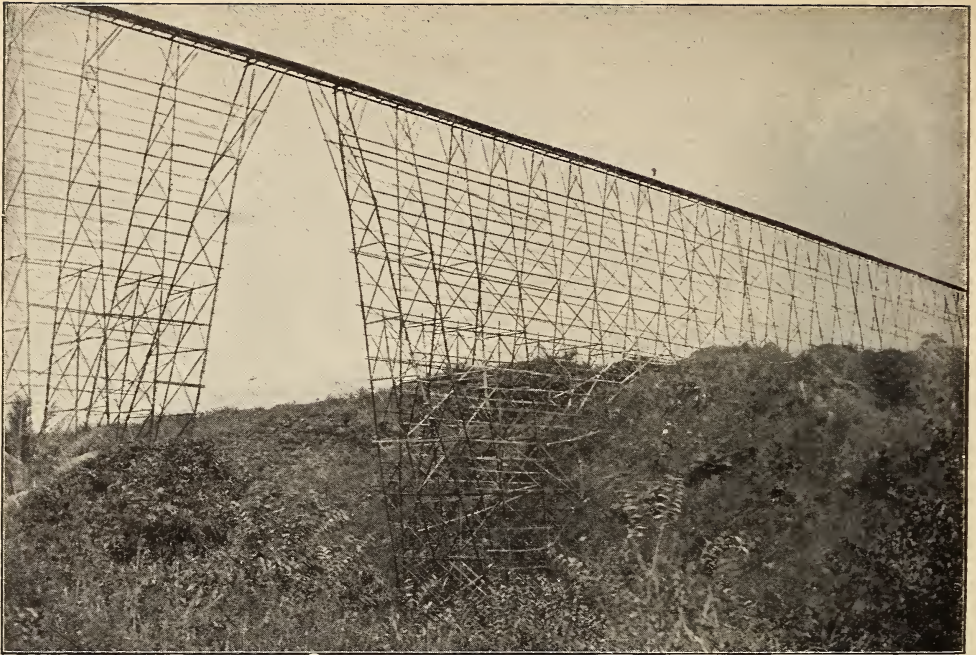
Josephine’s serious air assuring them of their mistake, they began, with one accord, to express their respectful desire of hearing the history of these famous shoes, which, to their imaginations, already promised greater wonders than the marvels of the glass slipper.

“Yes, ladies,” resumed their amiable mistress; “it is certain, that of all the presents I ever in my life received, the one which gave me the greatest pleasure was a pair of old shoes—and these, too, of course, leather! This you will understand in the sequel.

“Quitting Martinico, I had taken a passage on board of a ship, where we were treated with an attention which I shall never forget. Having separated from my first husband, I was far from rich. Obligated to return to France on family affairs, the passage had absorbed the major part of my resources; and indeed, not without much difficulty had I been able to provide the most indispensable requisites for our voyage. Hortense, obliging and lively, performing with much agility the dances of the negroes, and singing their songs with surprising correctness, greatly amused the sailors, who, from being her constant play-



ENTRANCE THROUGH GROVE OF TROPICAL TREES TO QUEEN'S HOSPITAL, HONOLULU.



SECTION OF FLUME TO CONVEY WATER TO SUGAR MILLS IN HAWAII.



LAVA FORMATION AT KILAUEA CRATER, 4,040 FEET HIGH, ISLAND OF HAWAII.

fellows, had become her favorite society. No sooner did she observe me to be engaged, than, mounting upon deck, and there the object of general admiration, she repeated all her little exercises to the satisfaction of every one.

“An old quarter-master was particularly attached to the child; and whenever his duties permitted him a moment’s leisure, he devoted the interval to his young friend, who, in turn, doted upon the old man. What with running, leaping, and dancing, my daughter’s slight shoes were fairly worn out. Knowing she had not another pair, and fearing I would forbid her going upon deck should this defect in her attire be discovered, Hortense carefully concealed the disaster, and one day I experienced the distress of beholding her return, leaving every footmark in blood. Fearing some terrible accident, I asked in affright if she was hurt. ‘No, Mamma.’ ‘But see, the blood is streaming from your feet.’ ‘It is nothing, I assure you.’ Upon examining how matters stood, I found the shoes literally in tatters, and her feet dreadfully torn by a nail. We were not yet more than half way; and before reaching France it seemed impossible to procure another pair of shoes. I felt quite overcome at the idea of the sorrow my poor Hortense would suffer, as also at the danger to which her health might be exposed, by confinement in my miserable little cabin. We began to weep bitterly, and found no solace in our grief. At this moment entered our good friend the quarter-master, and, with honest bluntness, inquired the cause of our tears. Hortense, sobbing all the while, eagerly informed him that she would no more get upon deck, for her shoes were worn out, and mamma had no others to give her. ‘Nonsense,’ said the worthy seaman; ‘is that all?’ I have an old pair somewhere in my chest; I will go and seek them. You, madam, can cut them to the shape, and I’ll splice them up again as well as need be. Shiver my timbers! on board ship you must put up with many things; we are neither landsmen nor fops, provided we have the necessary—that’s the most principal.’ Without giving time for a reply, away hastened the kind quartermaster in search of his old

shoes. These he soon after brought to us with a triumphant air, and they were received by Hortense with demonstrations of the most lively joy. To work we set with all zeal, and before day closed my daughter could resume her delightful duties of supplying their evening's diversion to the crew. I again repeat, never was present accepted with greater thankfulness. It has since often been matter of self-reproach that I did not particularly inquire into the name and history of our benefactor, who was known on board only as Jacques. It would have been gratifying to me to have done something for him when, afterward, means were in my power."

CHAPTER XVIII.

CREOLE AND CORSICAN.

OF CARIBBEAN AND MEDITERRANEAN ISLES—EMPRESS AND EMPEROR
OVER ALL THE GLORIES OF FRANCE.

One who witnessed the crowning of the Creole and Corsican in grand old Notre Dame, and their installation as Emperor and Empress in the Tuilleries, wrote of the leading characters in the splendid function:

“One of the chief beauties of the Empress Josephine was not merely her fine figure, but the elegant turn of her neck, and the way in which she carried her head; indeed, her deportment altogether was conspicuous for dignity and grace. I have had the honor of being presented to many real princesses—to use the phrase of the Faubourg Saint Germain—but I never saw one who, to my eyes, presented so perfect a personification of elegance and majesty.

“In Napoleon’s countenance I could read the conviction of all I have just said. He looked with an air of complacency at the Empress, as she advanced towards him; and when she knelt down, when the tears she could not repress fell upon her clasped hands, as they were raised to heaven, or rather to Napoleon—both then appeared to enjoy one of those fleeting moments of pure felicity which are unique in a lifetime, and serve to fill up a lustrum of years. The Emperor performed with peculiar grace every action required of him during the ceremony; but his manner of crowning Josephine was most remarkable; after receiving the small crown surmounted by a cross, he had first to place it on his own head, and then to transfer it to that of the Empress. When the moment arrived for placing the crown on the head of the woman whom popular superstition regarded as his good genius,

his manner was almost playful. He took great pains to arrange this little crown which was placed over Josephine's tiara of diamonds; he then put it on, took it off, and finally put it on again, as if to promise her she should wear it gracefully and lightly. My position enabled me fortunately to see and observe every minute action and gesture of the principal actors in this magical scene."

After the coronation, "Napoleon then addressing Josephine, said, 'I desire you will be dazzling in jewelry and richly dressed; do you hear?'

"'Yes,' replied Madame Bonaparte, 'and then you will find fault, perhaps fall into a passion; or you will erase my warrants of payment from the margins of my bills.' And she pouted like a little girl."

The Empress was still a good girl and wrote to her mother in Martinique:

"Bonaparte is now visiting Havre, Rouen, in fact all of Normandy, and I am accompanying him on the journey. Judge of my surprise and pleasure this morning to learn that a vessel was about to depart for Martinique. My pleasure was all the greater, as there had already set sail two vessels, before I had learned their intention to depart, and therefore could not profit by the occasion to write you. . . . However, Bonaparte, sailing near to them, hailed the captain and told them to give you news of us. I am much happier, my dear mother, to give you this news myself, and to assure you that your children and grandchildren love you very much, have the greatest desire to see you, and that there is but one thing lacking to my happiness, and that is to have you near me. Give me, my dear mother, this satisfaction, and there will be nothing lacking. Sell your property in Martinique, and come buy some in France. You ought to want to live here now, with your children; you can not stay there in the colonies, after knowing how much they wish you to be with them. * * *

"I send you the particulars of the accouchement of Hortense; three weeks ago she was presented with a beautiful little boy. Bonaparte

will have him baptized, on our return, and will stand as godfather and I as godmother. He will be called Napoleon. Louis Bonaparte wrote you to announce his birth; he is the happiest of men to be a father; and above all, of a big boy. It gives me pleasure to tell you that their marriage is a very happy one, and that they love each other very much."

Josephine also wrote to her aunt at her old home, of the trial of her first husband for being an aristocrat:

"Enclosed I send you an outline of my husband's examination, in which, as you will perceive, the ridiculous contends with the horrible. Such are the two features of our era.

"President. Who are you?

"M. de Beauharnais. A man and a Frenchman.

"President. None of your gibes here! I demand your name.

"M. de B. Eugene-Alexander de Beauharnais.

"A Member. No *de*, if you please; it is too aristocratic.

"M. de B. Feudal, you will say. It is certain a name without the particle would be more rational. The offence, if it be one, comes of time and my ancestors.

"Another Member. Ah! so you have got ancestors? The confession is an honest one; it is well to know as much. Note that, citizens; he has a grandfather, and makes no secret of it. (Here nine of the twelve members composing the committee fell a-laughing.) One of those who, amid the general gayety, had maintained an appearance of seriousness, called out, in a loud tone, 'Fools, who does not know that ancestors are old musty parchments? Is it this man's fault if his credentials have not been burned? Citizen, I advise thee to bestow them here with the committee, and I give thee the assurance that a good bonfire shall soon render us an account of thine ancestors.' Here a ridiculous laughter took possession of the entire of the honorable council, and not without much difficulty could the fat president recall them to a sense of decorum. At the same time, this explosion of hilarity having put him into good humor, he politely requested the accused to be seated. Again he was

interrupted by a member calling him to order, for having used the plural to a suspected citizen. Hereupon the uproar began anew more violently than ever, from the word *Monsieur* having been applied to the president by the member as a joke. Order once more established, my husband embraced the first moment of silence to felicitate the members on the innocent nature of their discussions, and to congratulate himself in having for judges magistrates of such a joyous disposition.

“President, with an important air. Dost take our operations for farces? Thou art prodigiously deceived. The suspected citizen is right, colleagues, in calling us his judges; that title ought to restore us to gravity. Formerly, it was permitted to laugh, now we must be serious.

“M. de B. Such is the distinction between the old and new regime.

“President. Proceed we then seriously, and continue the examination. Citizen Jarbac (to one of the secretaries), be'st thou there? (To M. de B.) Thy titles and qualities?

“M. de B. A French citizen, and a general in the service of the republic.

“A Member. President, he does not declare all; he was formerly a—

“Another Member. A prince or a baron, at least.

“M. de B., smiling. Only a vicomte, if so please you, and quite enough, too.

“President. Enough! it is a great deal too much: so you confess being a noble?

“M. de B. I confess that so men called me, and so, for some time, I believed, under the reign of ignorance, habit and prejudice.

“President. Acknowledge also that you are not yet entirely dis-abused?

“M. de B. The obstinacy of some men who persist in combating a chimera preserves for such things a sort of reality. As for myself, I have long regarded the illusion as dissipated. Reason had taught me that there could exist no distinction save those which result from virtue,

talent, or service; a sound policy has since demonstrated to me that there ought to exist no others.

"Citizen Nevil. That I call reasoning from principle.

"President. Without denying the consequences, whence has the accused derived these principles? From the Constitutional Assembly?

"M. de B. I consider it an honor to have been a member of that assembly.

"President. Did you not even preside there?

"M. de B. Yes, citizen; and at an ever memorable era.

"President. That was—after the flight of the tyrant?

"M. de B. That was on the occasion of the journey of Louis XVI. to Varennes, and on his return.

"A Member. For a bet, the citizen does not consider Louis Capet to have been a tyrant.

"M. de B. History will explain, and posterity will pronounce.

"Citizen Nevil. The question here is not what citizen Beauharnais thinks, but what he has done.

"President. Just—most just: see we, then, what citizen Beauharnais has done.

"M. de B. Nothing; and that in a distempered time, I conceive to have been the best of all proceedings.

"President. Thus you declared for no party?

"M. de B. No—if by party you mean factions which hate each other, rend the state, and impede the reign of the laws, and the strengthening of the republic; but yes—if by party you understand the immense majority of the French people who desire independence and liberty: of that party am I.

"(Josephine to her aunt.)

"Will you believe it, my dear aunt? My children have just undergone a long and minute examination! That wretched old man, member of the committee, and whom I have repeatedly named to you, introduced himself into my house; and under pretence of feeling interested in my

husband, and of entertaining me, set my poor ones a-talking. I confess that at first I was completely thrown off my guard by this stratagem; only I could not help wondering at the affability of such a personage. Innate guile, however, soon betrayed itself when the children replied in terms whence it was impossible to extort the least implication against their unfortunate parents. Thus I speedily detected the deceit.

“When he perceived I had penetrated his craft, he ceased to feign, and declaring that he had been charged with obtaining from my children information so much the more certain as being ingenuous, he proceeded to interrogate them in form. Upon this avowal, I was sensible of an inexpressible revulsion taking place within me; I felt that I grew pale with affright—that I now reddened with anger—now trembled with indignation.

“I was on the point of expression to this hoary revolutionist the loathing with which he inspired me, when the thought arose that I might thus do injury to my husband, against whom this execrable man shows inveterate enmity, then I repressed my resentment in silence. Upon his desiring to be left alone with my little ones, I felt again the spirit of resistance rising within me; but such ferocity appeared in his looks that I was constrained to obey.

“Having locked up Hortense in a closet, he commenced by questioning her brother. When my daughter’s turn came, oh, how I trembled on perceiving the length to which her examination extended! for our inquisitor had not failed to remark in the dear girl an acuteness and penetration far beyond her years.

“I continued plunged in these reflections, when a loud knocking was heard at the outer door of the house. I perceived that my hour was come, and, finding the requisite courage in the very consciousness that the blow was inevitable, I resigned myself to endurance. While the tumult continued increasing, I passed into my children’s apartment; they slept! and their peaceful slumber, contrasted with their mother’s trouble, made me weep. I impressed upon my daughter’s forehead, alas!

perhaps my last kiss; she felt the maternal tears, and, though still asleep, clasped her arms round my neck, whispering, in broken murmurs, 'Come to bed, fear nothing; they shall not take you away this night. I have prayed to God for you.' "

Beauharnais, soon after the interview now described, unheard, untried, and nothing proved against him save the suspicion of the enemies of aristocrats, was ordered for execution. The sentence announced on the 6th Thermidor (24th July, 1794) was carried into effect next morning, only two days before the fate of the tyrant Robespierre himself.

Had vengeance overtaken Robespierre two days sooner, or had the proceedings against her husband been delayed for eight and forty hours, how different the lot of Josephine!

Beauharnais suffered on the morning of the 7th Thermidor, in an obscure spot of Paris, near the barrier of the throne, in the Fauxburg St. Antoine. To this situation the guillotine had previously been removed from its former situation in the Square of the Revolution, and the more civilized region of the capital, upon Robespierre's discovering that blood was becoming less acceptable to the Parisians. With the vicomte there perished in the same morning a number of other victims, most of them knew not wherefore they had been brought to execution. These, both men and women, like the thousands who had preceded them, were drawn to the place of final suffering on a kind of tumbrel, or cart, stigmatized as "enemies of the republic," and in a brief space of time lay undistinguished and headless trunks. Such was the "morning's work" for many a dreary day of suffering to France.

The end of Robespierre during the preceding night saved Madame de Beauharnais, with about seventy others, destined for the usual morning sacrifice to the "deities of Reason and Revolution." Had we not her own confession, it might be deemed altogether incredible that under such circumstances, Josephine's thoughts should involuntarily revert to, and dwell upon, the singular prediction which has already been reported in the commencement of these memoirs.

“In spite of myself,” said the empress, long after, to her ladies, “I incessantly revolved in my mind this prophecy. Accustomed thus to exercise imagination, every thing that had been told me began to appear less absurd, and finally terminated in my almost certain belief. One morning the jailer entered the chamber, which served as bedroom for the Duchess d’Aiguillon, myself, and two other ladies, telling me, that he came to take away my flock-bed, in order to give it to another captive. ‘How give it?’ eagerly interrupted Madame d’Aiguillon; ‘is, then, Madame de Beauharnais to have a better?’ ‘No, no; she will not need one,’ replied the wretch, with an atrocious laugh; ‘she is to be taken to a new lodging and from thence to the guillotine.’ At these words, my companions in misfortune set up a loud lamentation. I consoled them in the best manner I could. At length, wearied by their continued bewailings, I told them that there was not even common sense in their grief; that not only should I not die, but that I should become Queen of France. ‘Why, then, do you not appoint your household?’ asked Madame d’Aiguillon, with something like resentment. ‘Ah! that is true—I had forgotten. Well, my dear, you shall be maid of honor; I promise you the situation.’ Upon this, the tears of these ladies flowed more abundantly; for they thought, on seeing my coolness at such a crisis, that misfortune had affected my reason. ‘I do assure you,’ continued the empress, addressing her auditory, ‘that I did not affect a courage which I felt not; for I was, even then, persuaded that my oracle was about to be realized.’”

A few evenings before this, Josephine had witnessed the weak and almost romantic means by which the tyrant’s overthrow had been at least hastened, and the consummation of her own prophecy accomplished. One of the ladies detained, as above described, in the same chamber was Madame du Fontenay, formerly Mademoiselle Cabaris, and who, subsequently divorced from her first husband, became so celebrated under the name of the second.

Prior to her incarceration, Tallien had declared his passion; but,

unable to save Madame du Fontenay from revolutionary law, came daily to the prison, that he might at least enjoy the satisfaction of seeing her through the grated window. Even for a considerable space previous to the date at which we are now arrived, Tallien was the life and soul of the conspiracy secretly organized by the Mountain party, against the despotism of Robespierre. Circumspection, however, was no less necessary than resolution; for, though the conspirators perceived their own or the dictator's destruction to be inevitable, alternatively distrusting the means of opposition, or catching the fading popularity of their victim, they preferred, for a little, to follow the progress of events to hazarding doubtful conclusions.

In this state of things, Tallien, as usual, appeared one evening at the guarded casement of the Carmelites. Meanwhile, Madame de Fontenay had secretly learned that she was speedily to be called before the Convention. This she knew to be but a prelude to the block: aware also of Tallien's designs, she resolved to urge their execution, and thus to secure at least a chance of escape.

The two ladies Fontenay and Beauharnais appeared in the evening leaning on each other, as if to breathe the fresh air through their prison bars. The former made a sign, to all others imperceptible, soliciting Tallien's attention. It may easily be imagined with what anxiety both watched his motions, as they beheld him lift from the ground a piece of cabbage-stalk, flung from the window by Madame de Fontenay, and in which she had concealed the following note:

"My trial is decreed—the result is certain. If you love me, as you say, urge every means to save France and me."

Tallien, having secured his billet, resolved on immediate action. From agitating in the committees, he proceeded to the Convention, where, as upon an arena, Robespierre had prepared to meet his opponents.

Tallien had pledged himself to mount the breach in the first assault; and bravely did he redeem his word, when—forcing St. Just from the tribune, as the latter pronounced the words, "I lift the veil"—he ex-

claimed, in a voice of terrible emphasis, "I rend it asunder!" and continued, in a speech with the wild but powerful eloquence of the period, turning the execrations and the daggers of the whole assembly against him at whose least nod its chiefest members had trembled.

But, to return to the consequences as they affected Josephine, and as related by herself. "Madame d'Aiguillon, feeling herself ill from the thoughts of my approaching execution, so abruptly communicated, I drew her towards the window, which I opened, in order to admit air. I then perceived a woman of the lower class, who was making many gestures to us, which we could not understand. Every moment she caught and held up her gown, without our finding it possible to comprehend her meaning. Observing her to persevere, I cried out, 'Robe' (a gown), on which she made a sign of affirmation. Then, taking up a stone, she put it in her apron, and again held up her gown to us, raising the stone in the other hand; 'Pierre' (stone), I called out to her in return. Her joy was extreme on perceiving, to a certainty, that we at length understood her. Putting the stone into her gown, she several times, and with great eagerness, made the sign of cutting a throat, and fell a-dancing and shouting. This singular pantomime excited in our minds an emotion which it is impossible to describe, since we dared not to think that the woman thus intimated to us the death of Robespierre. At the very moment, while thus between hope and fear, we heard a great noise in the corridor, and the formidable voice of the turnkey, who was speaking to his dog, and, in the act of kicking him away, cried out, 'Go, you brute of a Robespierre!' It was the 9th Thermidor! My flock-bed was restored to me, and upon this couch I passed the most delightful night of my life. I fell asleep, after saying to my companions, 'You see, I am not guillotined—and I shall yet be Queen of France!'"

CHAPTER XIX.

THE JOSEPHINE LETTERS OF NAPOLEON.

HE WAS A TORRID AND SHE A TEMPERATE CORRESPONDENT—SHE WROTE LOVE LETTERS TO HER MOTHER AND CHILDREN—HER SENIORITY—NAPOLEON'S LAWS UNTO HERSELF.

Josephine was of the type of the women of French, tropical blood who perished so tragically in the horrors of San Domingo, following the slave insurrection, and there is seen something of the savagery of the period in the fact that an attempt upon the life of Josephine's mother by one of her servants, who proposed the use of poison, was punished by burning the black girl at the stake. The atmosphere of the West Indies was tropical, and the marvelous riches of the islands was largely volcanic, though chiefly the accumulation of wonderful vegetation.

Napoleon was an Italian, and his blood was of the race once masterful, and of the tropical conquerors. His imagination was Asiatic and his dreams Oriental. There was a splendid extravagance in his imagery, seen alike in his addresses in Egypt before the Pyramids, and on the way from Elba to Paris with an eagle's flight. His letters to Josephine were imperial in the expression of an infatuation.

Josephine's departure from St. Pierre to Paris was in the month of September, 1790, and her arrival in France, and at Paris, where she was joyfully received by Beauharnais, followed in due course. The story so often related that she returned on board a merchant vessel, and in great straits, not having means with which to pay for her passage, is refuted by the evidence of contemporary letters, which show that she, on the contrary, was the honored guest of the nation, and made her last voyage to France on a ship of the State. As she was there by invitation of its commander, the presumption is that her passage was free;

and that she was not impoverished is shown by the remittance at various times during her stay in Martinique, of the aggregate sum of 17,403 francs, to her aunt, in repayment of loans from that relative.

In her Memoirs, Josephine says: "I had long ago entreated my mother to come and settle in France, and had held out to her the most flattering prospects. Napoleon himself had promised to receive her with the greatest distinction. 'I shall treat her nobly,' he said, 'and I am sure she will better sustain the honors of her rank than a certain lady of my household,' Madame Letitia, who was very parsimonious. But Mme. de La Pagerie would not accede to her daughter's wishes, and even if she did not prefer the quiet abode at Trois-Ilet, had many doubts as to the stability of Josephine's fortunes.

Finally, acting upon the advice of friends at Dunkirk, to which port the Martinique sugars were shipped, she resolved to make a flying visit to Hamburg, where was established the banking-house through which her remittances were received. She arrived towards the last of October, and was cordially received by the banker, M. Mathiessen, through whose advice she was enabled to effect three bills of exchange on Martinique, as appears from a letter to her mother, dated 30th October, 1795, from Hamburg: * * *

"You will receive, then, my dear mamma, three bills of exchange, drawn upon you from Hamburg, the 25th October, at three-months' sight, in my favor, in three sums, as follows: 400, 350 and 250 pounds sterling. * * * I need not remind you how necessary it is to honor these drafts, since they are for the reimbursement of the friends who have so generously assisted me and my children. * * *

"Why do you hesitate to rejoin us, my dear mamma? Think how much trouble and vexation your coming would save your dear Yeyette, who lives only in the expectation of soon seeing you, and of realizing the hopes she has so long and so ardently cherished. It is also the advice of our friends: to convert everything possible into funds, and come to us as soon as agreeable, to rejoin your own children, who love you and

will ever cherish you. Receive this assurance of tenderest regard, my good and well-beloved mamma.

“LA-PAGERIE, *veuve* BEAUHARNAIS.”

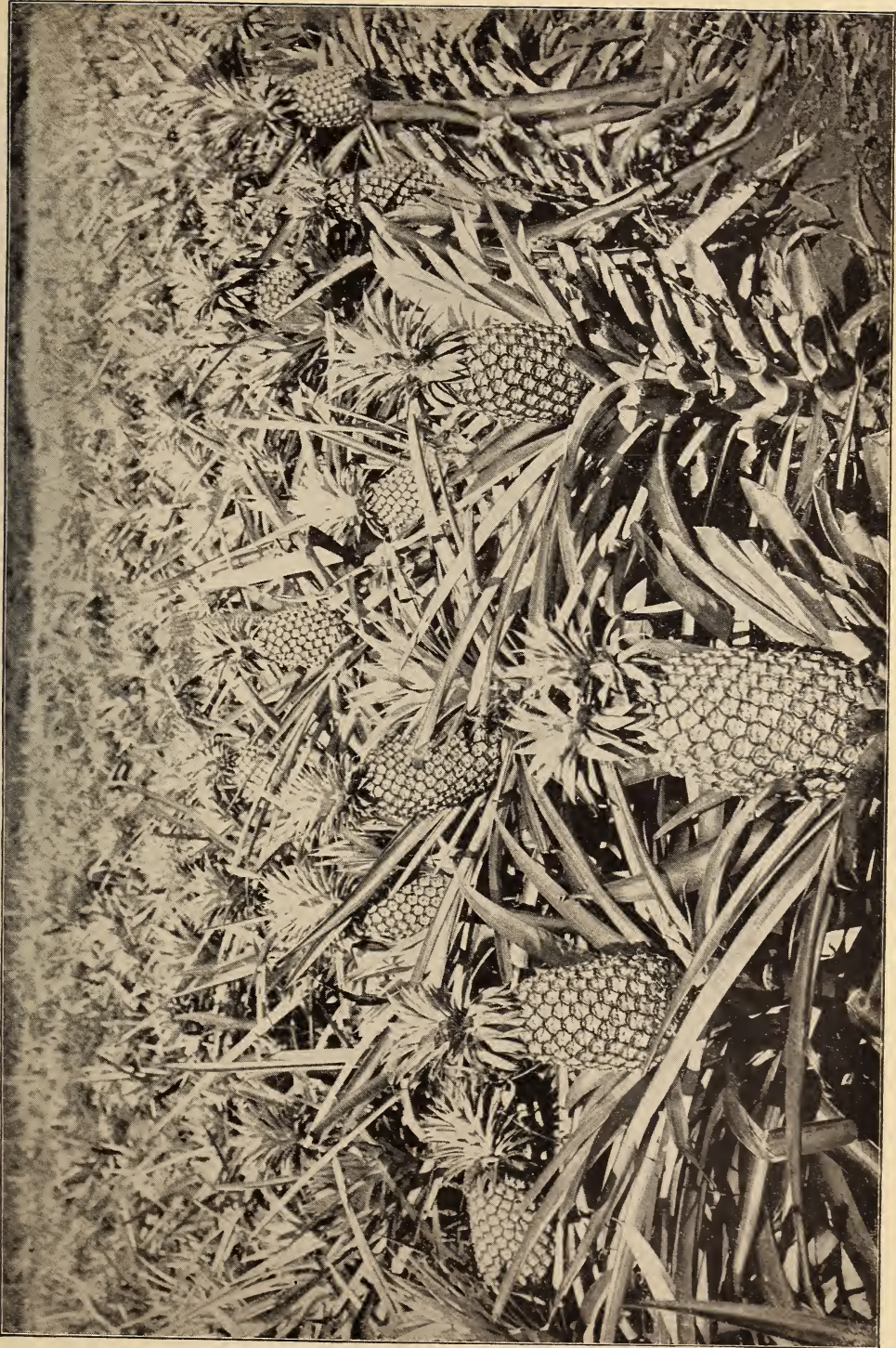
The love-letters of the First Consul have been preserved; they attest the most ardent passion, the tenderest devotion. One of the first depicts his despair in glowing colors: * * * “Every moment takes me farther away from you, and every moment I feel less able to endure the separation. You are ever in my thoughts; my fancy tires itself in trying to imagine your present occupation. If I picture you sad, my heart is wrung and my grief increased. If happy and merry with your friends, I blame you for so soon forgetting the three days’ painful separation; in that case you are frivolous, not capable of deep feeling. So, as you see, I am hard to please. When I am asked if I have rested well, I cannot answer until a messenger brings me word that you have rested well. The illness or anger of men affect me only so far as I imagine they may have affected you.”

And later in the year, after successive victories had perched upon his banners: * * * “At length, my adored Josephine, I live again. Death is no longer before me, and glory and honor are still in my breast. The enemy is beaten at Arcola. To-morrow we will repair the blunder of Vaubois, who abandoned Rivoli. In eight days Mantua will be ours, and then thy husband will fold thee in his arms, and give thee a thousand proofs of his ardent affection. I shall proceed to Milan as soon as I can. I am a little fatigued. I have received letters from Hortense and Eugene. I am delighted with the children. I will send you their letters as soon as I am joined by my household, which is now somewhat dispersed. We have made five thousand prisoners and killed at least six thousand of the enemy. Adieu, my adorable one. Think of me often. When you cease to love your Achilles; when your heart grows cool towards him, you will be very cruel, very unjust. But I am sure you will always continue my faithful mistress, as I shall ever remain your fond lover. Death alone can break the union which sym-

pathy, love and sentiment have formed. Let me have news of your health. * * * A thousand and a thousand kisses."

"O, my adorable wife; I do not know what fate awaits me, but if it keeps me longer from you I shall not be able to endure it; my courage will not hold out to that point. There was a time when I was proud of that courage; and when I thought of the harm that men might do me, of the lot that my destiny might reserve for me, I looked at the most terrible misfortunes without alarm. But now the thought that my Josephine may be in trouble, that she may be ill; and, above all, the cruel, fatal thought that she may love me less, inflicts my soul with torture, stops the beating of my heart, makes me sad and dejected, robs me of even the courage of fury and despair. I often used to say: Man can do no harm to one who is willing to die; but now, to die without being loved by you, without this certainty, is the torture of hell. * * * It seems to me as if I were choking. My only companion, you who have been chosen by fate to make with me the painful journey of life; the day when I shall no longer possess your heart will be that in which for me the world shall have lost all warmth, all attractiveness. * * * But I will stop, my own, my soul is sad. I am tired, my mind is exhausted; I am sick of men; I have good reasons for hating them, for they separate me from my love."

She preferred enjoying her husband's triumphs in Paris to joining him in Italy. * * * One writer has even said: "Josephine found a good deal of amusement in Bonaparte's passion. I can hear her say with her Creole accent: 'How funny Bonaparte is!' This may be an exaggeration, with more or less of malice; but there is no doubt she was less in love with her husband than he was with her. More than this, it is doubtful if she could understand this passion, so blind, so absorbing; it must have wearied, if it did not even annoy and embarrass her. She had not then awakened to its value, could not understand that at her feet was the heart of a man so transcendently superior to the average of men that his love was to be desired above all treasures of earth and heaven. She



PINEAPPLE BANCH NEAR PEARL CITY, ISLAND OF OAHU, HAWAIIAN ISLANDS.



FLUME USED TO CONVEY WATER TO SUGAR MILLS IN HAWAII.



SURF BOAT USED BY THE NATIVES OF HONOLULU.

awoke. too late, to a realization of its worth; of its surpassing preciousness; she lived to regret, with tears and remorse, the passing of this passion." * * * Says Madame de Remusat: "Possibly the cold reception with which his ardent feelings were met had its influence upon, and at last benumbed him."

No wonder that he reproaches her with being cold and unresponsive: * * * "Your letters * * * one would think they had been written after we had been married fifteen years. They are full of friendliness and the feelings of life's winter. * * * What more can you do to distress me? Stop loving me? That you have already done. Hate me? Well, I wish you would. Everything degrades me except hatred; but indifference—still, a thousand kisses, tender, like my heart.

"Tortona, Midi, le 27 Prairial, An IV.,
de la Republique, 15th June, 1796.

"To Josephine:

"My life is a perpetual nightmare—a black presentiment makes even breathing difficult. I am no longer alive; I have lost more than life; more than happiness, more than peace; I am almost without hope. I am sending you a courier. He will stay only four hours in Paris and then will bring me your answer. Write me at least ten pages; that is the only thing that can console me in the least. You are ill? You love me; I have distressed you; you are with child, and I do not see you. This thought reproaches me. I have treated you so ill that I do not know how to set myself right again in your eyes. * * * I have been blaming you for staying in Paris, and all the time you have been ill. Forgive me, my sweet; the love with which you have filled me has deprived me of my reason, and I fear I shall never recover it. For it is a malady from which there is no recovery. My forebodings are so gloomy that all I ask is to see you, to press you to my heart for two hours, and that we may die together. * * * Who is taking care of you? I suppose that you have sent for Hortense. I love the child

a thousand times better, since I think that she may be able to console you a little. As for me, I am without consolation, rest, hope, until I see again the courier whom I am sending to you, and until you explain to me in a long letter just what is the matter with you and how serious it is. If there were any danger, I assure you that I should at once leave for Paris. * * * Josephine, how could you allow so long a time to go by without writing me? Your last brief letter was dated the third of the month (22d May; doubtless she had written, but her letters had gone astray). However, I carry it with me always in my pocket. Your letters and your portrait are ever before my eyes. I am nothing without you. Ah, Josephine, if you could have known my heart, would you have allowed so long a time to go by before leaving, or if you had not lent ear to those who would detain you? I suspect all the world; everybody about you. * * * I calculate that you will leave about the fifth and arrive at Milan on the fifteenth (4th of May and 3d of June).

“Josephine, if you love me, if you believe that everything depends upon your preservation, upon your safe arrival, be very careful of yourself. Travel by short stages; write me at every stopping-place, and send the letters on in advance. * * * I think upon your illness night and day. Without appetite, without sleep, without interest in anything, friendship, glory, country; it is you, you; and the rest of the world exists no more than if it were annihilated.

“I value honor for your sake, victory because it gives you pleasure; if it were not so I should have left all and cast myself at your feet. Sometimes I say; I alarm myself without cause; she is already on the way. * * * Vain thought; you are still in your bed, still suffering, more beautiful, more interesting, more adorable; you are pale, your eyes more languishing. * * * Truly fate is cruel, she strikes me through you.

“In your letter, my friend, take care to assure me that you are convinced that I love you beyond conception; that you are persuaded that all my time is consecrated to you, that not an hour passes without

thoughts of you; that the idea never occurs to me to think of another woman; that they are without grace, beauty and wit; that you, you alone, have absorbed all the faculties of my soul * * * that my soul is in your body, and the day in which you shall change or cease to love me will be that of my death; that nature, the earth, is only beautiful because you inhabit it. * * * If you believe not all that, if your love is not convinced, affected, then you grieve me, you love me not. There is a magnetic fluid between those who love. (Do not all lovers believe this, and declare that occult influences are exerted for their benefit alone?)

“You know that I could not endure the thought of another lover, still less to suffer one to exist: to tear out his heart and to see him would be one and the same thing. * * *

“But I am sure and proud of your love. * * * A child as adorable as its mother will be born and will pass several years in your arms. Unlucky I must content myself with a single day. A thousand kisses upon your eyes, upon your lips. * * * Adorable woman, what is the secret of your influence? I am very sick on account of your illness; I have already a burning fever. Do not detain the courier more than six hours, that he may promptly return bearing the cherished letter of my queen. B.”

Josephine's mother, like Napoleon's, did not believe in the perpetuity of the imperial splendor of the couple who, from the Caribbean and the Mediterranean, met in Paris, and had the Pope at least as a spectator of their coronation, though Napoleon did the crowning himself. He was hasty when his great fortunes came to assert himself as the maker of the laws by which he was to be governed. Josephine was at least six years older than he, and had children, and Napoleon thought it a matter of state that he should prove the proposition that he could be a father as well as Josephine a mother. When he was in Egypt, Junot was good enough to tell him the stories that Josephine was misbehaving in Paris, and he was almost in convulsions of rage about his wife, though

his irregular personal conduct at Cairo was no secret to the army. Josephine was so gracious as to congratulate him on the birth of the King of Rome. She died while Napoleon was at Elba, and on his return from that episode he grieved over her memory in their old home at Malmaison, and spoke of her with great tenderness, as he disdained that which was said of the conduct of Marie Louise while he was at St. Helena.

Josephine's first appearance at a reception of the First Consul is thus described: "Her dress was muslin; her hair without decoration of any kind, and merely retained by a plain comb d'ecaille, fell in tresses upon her neck, in the most becoming negligence; a collar of pearls, an unobtrusive ornament, but of great value, harmonized with and completed this unpretending costume."

We have the evidence of an eye witness, that "a spontaneous murmur of admiration followed Josephine's entrance, such being the grace and dignity of her deportment that with all this absence of the external attributes of rank a stranger would at once have fixed upon the principal personage in this splendid circle. Madame Bonaparte made the tour of the apartments, the members of the foreign diplomacy being first introduced in succession by the minister. When the introductions had nearly concluded, the First Consul entered, but without being announced, dressed in a plain chasseur uniform, with a sash of tri-colored silk. In this simplicity both good taste and sound policy concurred. The occasion was not a levee; the first magistrate and his wife merely received the congratulations of their fellow-citizens of a free republic.

"The personal appearance and kindly character of Josephine in the first days of Corsican and Creole Empire were touched up with this fine flattery. Her eyes were deep blue, her hair brown, not over luxuriant, her complexion dark, her mouth small, the lips parted in a smile of exceeding sweetness, the nose with arched and sensitive nostrils, and inclined to retrouse. She was not a beauty, although she had more than fulfilled the promise of her youth, as we have seen her at Mar-

tinique, and on her arrival in France. She could not compare in respect to mere personal attractions with Mme. Tallien, nor with Napoleon's sister, Pauline, later a reigning belle; but Josephine completely realized one's ideal of an attractive, fascinating woman, with an air of distinction about her that impressed all who met her, particularly Bonaparte, on his first acquaintance, who had from birth a penchant toward the aristocracy."

Said the observant Talleyrand, when asked about her: * * * "*Avait-elle de l'esprit? Elle s'en passait superieurement bien.*" Says Madame de Ramusat: "Without being precisely pretty, she possessed many personal charms; her features were delicate, her expression was sweet; her mouth was very small and concealed her bad teeth; her complexion was rather dark, but with artificial aids she remedied that defect. Her figure was perfect; her limbs flexible and delicate; her movements easy and elegant. La-Fontaine's lines could never have been more fitly applied than to her: '*Et la grace, plus belle encore que la beaute.*' * * * She dressed with perfect taste, enhancing the elegance of whatever she wore. * * * To all her qualities she added extreme kindness of heart, a remarkably even temper, and great readiness to forget a wrong that had been done her."

In her correspondence with her second husband, she was rather conservative and reserved. A truly tropical woman, she was temperate indeed when she took her pen in hand and Napoleon did not fancy her style. Her most affectionate letters were written to her mother in Martinique. She had been a woman of sorrows; lost her first husband, who was guillotined by the terrors of the Robespierre time; and was herself notified when in prison and expecting the axe, by a woman who executed a pantomime, shaking a robe and hurling a stone (*pierre*), making out the name of the falling tyrant.

The house in which Josephine was born does not present a picture to equal the story of its glories. This is authoritatively explained in Wil-

liam Agnew Patten's Voyage to the Caribbees (Scribner & Sons, 1896), as follows:

"The La-Pagerie family were of aristocratic origin, possessed estates of by no means limited extent, and were considered people of importance, if not, indeed, of high rank. The parents of the future viscountess and empress dwelt for some time after their marriage in the family mansion, which was situated near the little cottagé of the sketch; in fact, the latter was but one of the numerous negro quarters erected on the home estate for the accommodation of the family slaves. Shortly before the birth of Josephine, the *grande maison* was utterly destroyed by fire, and Madame de La-Pagerie was compelled to seek shelter in the outbuilding whereof the Salmagundian has given the readers of this book a faithful illustration. So it fell out that the little Creole Esther, whose fate was to be so unfortunate as to find favor in the sight of a greater than Ahasuerus, was born in a miserable shanty of rough, unhewn stone, thatched with leaves of palm trees and wild plantains."

CHAPTER XX.

EARTHQUAKES OF 1832.

DISTURBANCES IN NEW ENGLAND AND THE ST. LAWRENCE VALLEY—
MANIFESTATIONS IN OTHER PARTS OF THE UNITED STATES—
TREMORS IN ANTIOCH—UNRULY ACTIVITY OF VESUVIUS—A
CLOUD OF WITNESSES.

There is nothing in which the forgetfulness of men of calamities more frequently and conspicuously appear than in regard to the earthquake visitations, so often in all ages distinguished as appalling disasters, taking everybody by surprise, and little matter what happens a generation or two after some memorable catastrophe, that which succeeds is equally surprising. In the year 1832 earthquakes were frequent and calamitous, and the first of the phenomena so disturbing in that year was in New England and the Valley of the St. Lawrence, extending from Portland and Belfast, Me., about two hundred miles northeast, and sixty miles southwest of Quebec, where the greatest mischief was done. The ice bridge over the river was full of fissures, and many walls were cracked. There were two shocks at Lancaster, N. H., and there were tremors at about the same time and the same day, and shocks of similar character were noticed nearly at the same time in Russia, over a hundred persons perishing in the City of Shamaka. This was January 15th. The following month there were shocks in Michigan, and Cairo, Ill. In March there were shocks in Prussia and many parts of Germany. In California there were agitations, affecting the eastern and western slopes of the Sierra Nevadas. The movement extended into Mexico. There were rumbling sounds before and after the shocks, fissures miles in length, some reported to be two hundred feet wide, and the ground was in other places heaped in ridges, springs stopped flowing and new springs

burst forth. Prof. J. D. Whitney contributed a paper to the *Overland Monthly*, and considered that the impulse by which the earthquake originated "was given somewhere nearly in the axis of the Sierras, at a depth of at least fifty miles, and at the same moment along a line of almost one hundred miles north and south. The resulting waves were propagated in both directions from this mountain-axis and nearly parallel with it, and advanced on the surface at a rate of from thirty to thirty-five miles a minute, if measured in a line at right angles to the axis of the Sierras."

The most destructive shock was that on April 30th, which the ancient City of Antioch suffered. Such experiences had not been noted in that region during the Christian era. The shock was felt all over Syria, and from the Mediterranean to the Euphrates. It was estimated that a thousand persons lost their lives in Antioch, and that about half the city was destroyed. Slighter vibrations continued for a month. Aleppo was much injured. The following extracts from letters to English papers give some particulars of the frightful catastrophe. Rev. W. Brown Kerr, late harbor chaplain at Bombay, says :

"A severe shock of earthquake was felt here yesterday, precisely at 8 a. m., English reckoning, or shortly before 2 in the day, Turkish time. The house in which I was was shaken violently to and fro for four or five seconds, or, as one gentleman thinks, even more. A stove weighing nearly a hundred-weight was overturned; the walls of stone and plaster, with wood-work and beams, were cracked, and the plaster fell on all sides. Books were thrown from their cases, and a clock hurled from a bracket on the wall into an arm-chair a few feet distant, without breaking the glass-case or the clock-works. Outside the house-walls fell, the narrow streets (only about twelve or fifteen feet wide, and some less) being literally blocked up for long distances with the ruins of fallen houses, and a dense cloud of dust arose on all sides. Men, women and children ran hither and thither, wailing their own hurts or the loss of relatives. I went down to the bridge, southwest of the city, about two

hours after—at 10 o'clock a. m.—and saw many dead persons brought to the city and laid out for burial. Later, I counted fifteen new graves, all close by each other. Looking toward the town, ruins could be seen in all directions. Several aqueducts were broken, and telegraph-poles were thrown down and the wires broken. The Greek Church, a stone-arched structure, built only a few years ago, and capable of holding 500 or 600 persons, was utterly ruined—one side and the entire roof are gone. The American Protestant Church and premises are also greatly injured, and four persons of their small community were killed, though the mission families are all safe. The number of killed and injured cannot be ascertained with any approach to accuracy, and, of course, flying rumors are abundant, one man saying that he thought there must be 1,000 killed, while another said 500, and a third 250, which is, perhaps, within the truth. The city contains from 12,000 to 15,000 persons, it is said, but no accurate census exists. There was time from the beginning of the first shock to its close for many to escape the falling houses or walls, and during its continuance two or three persons in the house where I write walked across the room and (not very quickly) downstairs while the shock lasted. Several smaller and lighter shocks occurred for an hour or two afterward, but not sufficiently strong to shake down buildings. The shocks have continued at intervals through the night, and another, more distinct and wave-like, was felt to shake the house, with a loud, hollow, rumbling noise, about 6:30 this morning. The first shock yesterday was immediately preceded by a rumbling and creaking of the joints of the window and door frames, to which a louder noise, like thunder, succeeded, and then walls and buildings fell. Several minars are cracked, but all yet stand, though some of the arched caravansaries and baths near them are fallen. The old Roman bridge of four arches is rent in several places until the water can be seen through it from above; a part of the parapet-wall has also been shaken off, and the arch above the city door at its east end has been hurled down, and lies almost whole. Much damage has been done to houses in the lower part

of the town, and many of the inhabitants are now to be seen encamping in the fields or on the plains."

Another letter, dated Alexandretta, April 9th, contains the following:

"I returned to Antioch yesterday, and came to this place, about thirty-five miles, to-day. There is little harm done north of Antioch compared with the south side of the valley. Alexandretta was shaken, but no stones fell. Beylan, in the mountain-pass (*Pylae Syriae*), is also almost injured. The shocks have continued in and around the south of Antioch at irregular intervals at from a few minutes to two or three hours. The wind has been strong to-day, and I have not observed one, but yesterday two or three shocks were strong enough to make the men run from the walls of houses which they were pulling down or excavating for furniture or goods. One man told me he counted forty-four shocks within twenty-four hours after the first one, which I can well believe. They were all accompanied by a noise like distant thunder or artillery, and produced a tremor of the ground; but no fresh ruin has, I believe, been made by any of them except the first great shock, one man describes, not inaptly, as shaking a house just as a horse shakes himself in harness when loosed from a journey, and then came a shower of stones, falling walls, and roofs. Many of the houses—indeed, nearly all around Suadia and around Bitias—have fallen, and large boulders from the mountains knocked down some few trees. The house of Dr. Yates, used as a mission-school in Suadia, is in ruins, but the inmates were all saved. The house of the late Consul Barker is entirely destroyed, the man who kept it narrowly escaping with his life. The Protestant Mission Chapel at Bitias forms a singular exception; not a stone of it has fallen, though the native pastor's house and others around were leveled to the ground. 'We are all safe alhamd-u-lillah' (thanks be to God), said the pastor, when I inquired for his family. Not so, however, in other cases. Some families have lost two or three of their number, and several are dead in every village to the south as far as Seleucia."

At the same time there was a disturbance in Iceland, destroying some houses, and the famous Vesuvius, on the night of April 24th, succeeding an outpouring of flames and smoke which had lasted for several months, poured out a torrent of lava, bursting from the side of the cone, and this happened so suddenly as to destroy several adventurous spectators. Villages were overwhelmed, and a tract of fertile country desolated. The flow lasted several days, and a shower of fine black dust or iron-sand fell all about Naples and the adjacent region, causing great annoyance to people in the open air, who were almost suffocated by it. The grains of sand were quite uniform in size, and would pass through a wire gauze, the apertures of which measured the 16-1000th part of a square inch. A shower of stones, attended by an extraordinary quantity of the iron-sand, closed up the more striking phenomenon of the eruption. The streets of Naples were filled with the dust to the depth of several inches. A correspondent of the London Times writes, May 4th, as follows:

“A short distance before one reaches Resina the road turns sharp off to the left in the direction of St. Ivrio, Sebastino, and Massa, where the greatest amount of damage has been done. The road was still encumbered with ashes, and ton-loads were being swept off the roofs. Looking right and left over this once fertile tract of land I never saw a scene of greater desolation. As far as the eye can search everything is withered, and the budding promise of a rich harvest is reduced to what I might have taken in my hand and crumbled into dust. Tall trees, poplars, and cypresses, and mulberry, instead of quivering in the gentle breeze are rigid and immovable. Rows of festooned vines, giving hopes only last week of an abundant vintage of that delicious wine called *Lachrymæ Christi*, seem as if they had been decorated for the tomb—all are dead; while underneath, just peeping above the bed of ashes, are beans and peas, and all the great variety of vegetables which abound in the Naples market, utterly destroyed. The same scene of desolation extends all around the mountain, and many thousands who are grateful for the preservation of their lives and homes are reduced to absolute

want. We saw many of these on the road or at the doors of their cottages, imploring help and declaring now with more than usual truthfulness that they were dying of hunger. Such is the sad spectacle which this once rich and lovely district presents as far as the bed of lava which cuts off further progress. St. Ivrio, St. Giorgio, and Cremona, through which we passed, have had a narrow escape, indeed. It is a favorite place of villeggiatura for the Neapolitans, who have handsome villas there, and the lava-stream stopped within half a mile of it. Judge what the apprehension of the inhabitants must have been when they saw the river of fire coming down upon them and heard the crackling of the scoriae as they rolled over and over and looked on the shrubs and trees writhing in their agony! On approaching the lava the peasantry flock around us like locusts, each offering his services, and each anxious to earn a sou or two. We take a man from Resina, and under his guidance we cross the first stream, burning hot to the feet, and still emitting sulphurous cloudlets of smoke. 'The hot lava,' says our guide, 'is still running down slowly underneath.' I take up some pieces, shining with all the colors of the rainbow; but they are too hot to hold, and I throw them down. This was the stream which skirted St. Ivrio, and was flowing down toward Barra. Standing in the middle, I look up and down seeing a mighty sheet covering many acres of rich ground from which smoke is still issuing from a hundred—nay, a thousand—fissures. Like huge pieces of coke piled one on the other are the component parts of that river."

Stories of eruptions sympathetic with those of the volcanoes of the Caribbees were remarkably numerous. There was an extensive and fatal outbreak in Guatemala, that was presently toned down by correction of first reports.

A volcano in Mexico, the Colimo, had threatened violence for some weeks, and work on a railroad in the neighborhood was stopped. The news came by the way of Guadalajara.

A dispatch from Omaha reported the week after Pelee blew out

a sea of fire that, Mount Iona, Nebraska's miniature volcano, had been for two days sending up smoke and steam, to the consternation of farmers in that part of the state.

The volcano is situated on the Missouri River, in Cedar county, about 150 miles above Omaha, and had been practically dead for thirty years. The immediate surrounding country is very rocky and hilly, Iona being the highest point in the eastern part of the state. Lewis and Clark, in their voyage up the Missouri in the early part of the last century, found the small mountain belching smoke, and reported it as the only volcano seen on their trip. The Indians still hold the place in awe and will never go near it. It is sacred to them.

Farmers digging for coal have found the ground hot, and there has been evidence of at least an ugly disposition.

There is a volcano included in the purchase of Alaska, and an agent of a commercial company at Unalaska, Aleutian Islands, wrote a letter dated April 10, 1902, giving information of volcanic disturbances in that portion. The letter says:

"Unalaska has been shaken by earthquakes lately and on several occasions the ground was covered with fine ashes from some volcano. Reports reach us from Unimak to the effect that with every westerly wind their village is covered with some kind of ashes, indicating that some western volcano is in action."

In the midst of Unalaska Island is situated the celebrated Makushm volcano, with an altitude of 5,691 feet. This volcano has had numerous periods of activity within the last century, the latest of which was in 1865.

Unalaska is the third island from the eastern extremity of the Aleutian chain. These islands practically form an interrupted extension of the Alaska peninsula. Commencing with Unimak Island, which lies within five miles of the mainland, the chain extends in a graceful curve 1,100 miles westward.

In our Aleutian Archipelago there are 14,610 square miles. The

largest of the groups is that of the Fox Islands. These islands include the famous volcano islands of St. John, the Theologian and the Four Craters. The first of these volcanoes has a most singular history, having been thrown up out of the sea during a violent earthquake during the month of May, 1796. Its height at that time was estimated at barely 100 feet, and the most remarkable feature in connection with its creation was its subsequent gradual growth. This ceased in 1823, by which time it had attained its present height of 1,500 feet. In appearance it resembles a great pyramid, with deep fissures extending vertically along its sides. For a period of four years after its appearance this strange volcano constantly emitted flames, smoke and steam, and in 1806 great volumes of lava gushed from its crater and flowed down its sides into the sea. Adjacent to the Fox Islands, on the west, lies the Andreanofski group, numbering in all about thirty islands. The group is of importance because of its including Burned Island, whereon is situated Goreloi volcano, at present in a state of suppressed activity. It is the loftiest peak of the Aleutian Archipelago, having an altitude of 8,000 feet. It represents an immense smoking cone, eighteen miles in circumference.

On May 31 the Colima volcano in Mexico was greatly increasing in the activity of its eruptions and serious consequences were feared. Owing to the volcano's threatening aspect work on the extension of the Mexican Central Railroad between Guadalajara and Manzanillo was temporarily suspended. The work on the road had been rapidly pushed, and the line had reached within a short distance of Colima, where several difficult engineering obstacles were met, necessitating tunneling and scientific bridge building, which will entail such great expense that it was deemed advisable to take no chances during the threatening attitude of the volcano.

Since the earthquake disturbances felt at Chilpancingo and Guerro the volume of smoke from the crater had increased considerably, and loud subterranean noises were heard. Colima has about 1,500 inhabi-

tants and the people feared that the crater of the volcano might burst and bury the city.

Ever since the eruption of Pelee, Mount Colima had been much affected. In the early part of May the smoke from the crater greatly increased, and for a month almost daily since the mountain convulsions increased in force. Some were so violent as to level trees and houses on the mountain side.

Previous to the eruption of Mont Pelee there was an earthquake in Guatemala.

The shock occurred on the evening of April 18 and lasted forty seconds at San Jose, coming in sections. Buildings rocked and people rushed into the streets. No lives were lost at San Jose, but many buildings were cracked.

At Quesaltanango, fifty miles distant, 500 were reported killed, out of a population of 40,000.

Small earthquakes occurred daily. The city was put under martial law. Death and damage was also reported to have resulted in the cities of San Marcos, San Pedro, San Juan, Ostancalco, Tacana, Mazatanago and Cuyotenango, each having from 10,000 to 15,000 inhabitants.

At Ocos the vibrations were so violent that the river banks were squeezed together, making the stream twenty feet narrower. The loss of life was placed at 200.

In Lachico, a town of 2,000 inhabitants, not a house was left standing.

The way the St. Pierre earthquake appeared in St. Vincent was frightful. The sky suddenly blackened until it was as dark as midnight. The sea line drew back 100 feet and then the water rushed in again. Hot rain began to fall and then came a shower of small stones, some of them as large as walnuts. The stones fell for about fifteen minutes.

The features of the greatest known volcanic eruption in extent, that of the Skapta, in Iceland, were these:

The eruption began in the month of June, having been preceded by violent earthquakes. A torrent of lava welled up into the crater, overflowed it, and ran down the sides of the cone into the channel of the River Skapta, completely drying it up. The river had occupied a rocky gorge, from 400 to 600 feet deep, and averaging 200 feet wide. This gorge was filled, a deep lake was filled, and the rock, still at white heat, flowed on into subterranean caverns. Tremendous explosions followed, throwing bowlders to enormous heights. A week after the first eruption another stream of lava followed the first, debouched over a precipice into the channel of another river, and finally, at the end of two years, the lava had spread over the plains below in great lakes twelve to fifteen miles wide and a hundred feet deep. Twenty villages were destroyed by fire, and out of 50,000 inhabitants nearly 9,000 perished, either from fire or from noxious vapors. The Skapta River branch of this lava stream was fifty miles long and in places twelve to fifteen miles wide; the other stream was forty miles long, seven miles broad, and the range of depth in each stream was from 100 to 600 feet. Professor Bischoff has called this, in quantity, the greatest eruption of the world, the lava, piled, having been estimated as of greater volume than is Mont Blanc.

Iceland, as one of the hotbeds of volcanic energy, presents in marked manner the ills that come upon a district which suffers from volcanic eruptions. Hecla, for instance, has been known to be active for a period of six years at a time. While throwing out its vapors, fumes, and solids, the people of the island contiguous to the volcano have verged upon starvation. Their principal food supply comes from their fisheries and from their cattle. As to the fishing, it is practically destroyed because of the vast amount of hot lava that is discharged into the sea and because of the activity of boiling springs which pour hot water into the neighboring ocean.

As for the cattle, they suffer in a most peculiar manner. The ashes and pumice stone are thrown to great heights and settle in great clouds



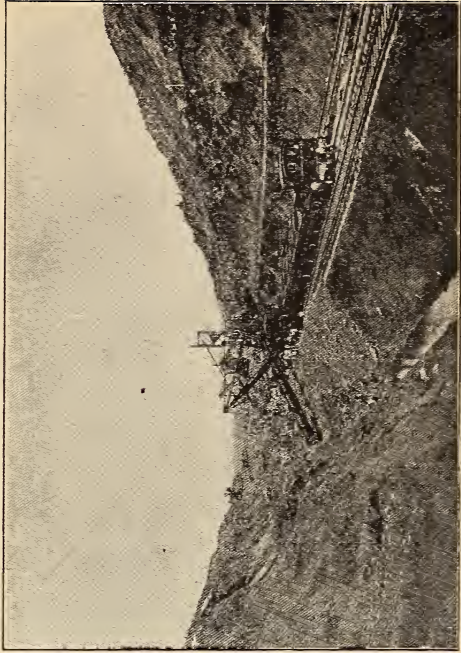
PANAMA CANAL, 14 MILES FROM ATLANTIC.



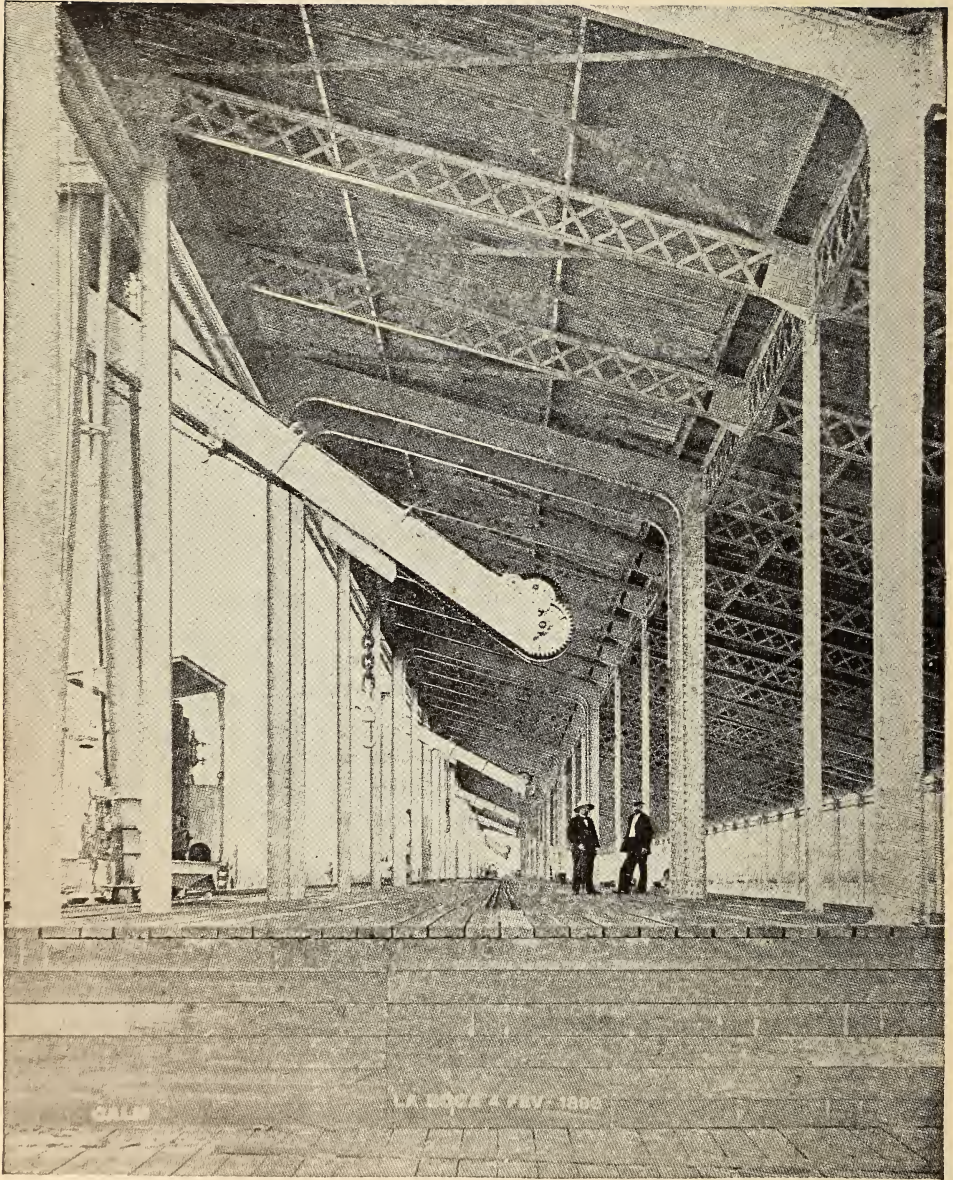
PANAMA CANAL, CUT AT SAN PABLO.



PANAMA CANAL, CULEBRA CUT.



PANAMA CANAL, 32 MILES FROM ATLANTIC.



END OF LA BOCA PIER AT BEGINNING OF PANAMA CANAL.

upon the pastures. Aside from this making the grass tasteless, the cattle, in trying to eat in pasture, take the ashes and fine pumice into their mouths. This cuts the enamel from their teeth, finally leaving the brutes in such misery that they cannot eat the grass that is there for their sustenance, and they die of slow starvation. On many occasions Denmark has been called upon to aid the Icelanders in such emergencies.

CHAPTER XXI.

THE BIBLE AND VOLCANOES.

HOLY WRIT AND BURNING MOUNTAINS—PASSAGES PRE-FIGURING THE
END OF THE WORLD BY FIRE—TREMENDOUS FORESHADOWING
OF REVELATIONS—THE DESTRUCTION OF SODOM AND GOMOR-
RAH.

The events of May, 1902, will probably cause many to regard with increased directness of belief the Revelations that one day "the heavens shall pass away with great noise, and the elements shall melt with fervent heat. The earth also, and all the works that are therein shall be burned up." And the descriptive aptitude of the wonderful revelations of Holy Writ will strike all, and startle many readers of the chapters of St. John.

ST. JOHN, REVELATIONS, CHAPTER VI.

"12. And I beheld when he had opened the sixth seal and lo, there was a great earthquake; and the sun became black as sackcloth of hair, and the moon became as blood.

"14. And the heaven departed as a scroll when it is rolled together; and every mountain and island were moved out of their places.

"15. And the kings of the earth, and the great men and the rich men, and the chief captains, and the mighty men, and every bond man, and every free man hid themselves in the dens and in the rocks of the mountains.

CHAPTER XVI.

"8. And the fourth angel poured out his vial upon the sun, and power was given unto him to scorch men with fire.

"17. And the seventh angel poured out his vial into the air; and

there came a great voice out of the temple of heaven, from the throne saying, It is done.

“18. And there were voices and thunders and lightnings, and there was a great earthquake such as was not since men were upon the earth, so mighty an earthquake and so great.

“20. And every island fled away and the mountains were not found.

“21. And there fell upon men a great hail out of heaven, every stone about the weight of a talent, and men blasphemed God because of the plague of the hail; for the plague thereof was exceeding great.

CHAPTER IX.

“1. And the fifth angel sounded, and I saw a star fall from heaven unto the earth, and to him was given the key of the bottomless pit.

“2. And he opened the bottomless pit; and there arose a smoke out of the pit, as the smoke of a great furnace; and the sun and the air were darkened by reason of the smoke of the pit.

CHAPTER VIII.

“5. And the angel took the censer, and filled it with fire of the altar and cast it into the earth, and there were voices, and thunders, and lightnings and an earthquake.

“7. The first angel sounded, and there followed hail and fire mingled with blood, and they were cast upon the earth and the third part of trees was burnt up and all green grass was burnt up.

“8. And the second angel sounded, and as it were a great mountain burning with fire was cast into the sea—and the third part of the sea became blood.

CHAPTER XVIII.

“16. And saying, Alas, alas! that great city, that was clothed in fine linen, and purple, and scarlet and decked with gold, and precious stones and pearls.

“19. And they cast dust on their heads and cried weeping and wail-

ing, saying, Alas, alas! that great city, wherein were made rich all that had ships in the sea by reason of her costliness! for in one hour is she made desolate.

GENESIS, CHAPTER XIX.

“1. And there came two angels to Sodom at even, and Lot sat in the gate of Sodom, and Lot seeing them rose up to meet them; and he bowed himself with his face toward the ground.

“2. And he said, behold now, my lords, turn in I pray you into your servant’s house, and tarry all night and wash your feet, and ye shall rise up early and go on your ways. And they said: Nay, but we will abide in the street all night.

“3. And he pressed upon them greatly; and they turned in unto him and entered into his house, and he made them a feast and did bake unleavened bread and they did eat.

“4. But before they lay down, the men of the city, even the men of Sodom, compassed the house round, both old and young, all the people from every quarter.

“6. And Lot went out at the door unto them and shut the door after him.

“7. And said, I pray you, brethren, do not so wickedly.

“9. And they said, Stand back. And they said again: This one fellow came in to sojourn and he will needs be a judge. Now will we deal worse with thee than with them. And they pressed sore upon the man, even Lot, and came near to break the door.

“10. But the men put forth their hand and pulled Lot into the house to them, and shut to the door.

“11. And they smote the men that were at the door of the house with blindness, both small and great, so that they wearied themselves to find the door.

“12. And the men said unto Lot, Hast thou here any besides? Son-in-law and thy sons and thy daughters, and whatsoever thou hast in the city bring them out of this place.

"13. For we will destroy this place, because the cry of them is waxen great before the face of the Lord and the Lord hath sent us to destroy it.

"14. And Lot went out, and spake unto his sons-in-law which married his daughters and said: Up, get you out of this place, for the Lord will destroy this city; but he seemed as one that mocked unto his sons-in-law.

"15. And when the morning arose, then the angels hastened Lot, saying: Arise, take thy wife and thy two daughters, which are here lest thou be consumed in the iniquity of the city.

"16. And while he lingered, the men laid hold upon his hand and upon the hand of his wife, and upon the hand of his two daughters, the Lord being merciful unto him, and they brought him forth and set him without the city.

"17. And it came to pass when they had brought them forth abroad that he said: Escape for thy life, look not behind thee neither stay thou in all the plain: escape to the mountain, lest thou be consumed.

"24. Then the Lord rained upon Sodom and upon Gomorrah brimstone and fire from the Lord out of heaven.

"25. And he overthrew those cities, and all the plain, and all the inhabitants of the cities, and that which grew upon the ground.

"26. But his wife looked back from behind him and she became a pillar of salt.

"27. And Abraham got up early in the morning to the place where he stood before the Lord.

"28. And he looked toward Sodom and Gomorrah and toward all the land of the plain, and beheld and lo, the smoke of the country went up as the smoke of a furnace."

The scientists who believe in the literal interpretation of the language of narratives in the Bible, point out that the conversion of Lot's wife into a pillar of salt is a fete of chemistry. Under such circumstances, not without possibility and probability, because the eruption of

volcanoes, as a rule, develop an enormous quantity of salt, so that the phrase is, of the desolation of the earth, that it is "sown with salt." The victims of St. Pierre suffocated by a fiery gas were largely burned, lava following salted and scalding mud. It is very literally true that fire and brimstone and salt go together in volcanic eruptions.

C. B. Pitman, seismologist, says as a scientist:

"The earthquake which destroyed Sodom and Gomorrah is not only one of the oldest upon record, but one of the most remarkable. It was accompanied by a volcanic eruption, it upheaved a district of several hundred square leagues, and caused the subsidence of a tract of land not less extensive, altering the whole water system and the levels of the soil.

"The south of Palestine contained a splendid valley dotted with forest and flourishing cities. This was the valley of Siddim in which reigned the confederate sovereigns of Sodom, Gomorrah, Admah, Zeboiim and Zoar. They had joined forces to resist the attack of the King of the Elamites, and they had just lost the decisive battle of the campaign when the catastrophe which destroyed the five cities and spread desolation in the flourishing valley took place.

"As the sun arose, the ground trembled and opened, red hot stones and burning cinders, which fell like a storm of fire upon the surrounding country, being emitted from the yawning chasm.

"In a few words the Bible relates the dread event: 'The Lord rained upon Sodom and upon Gomorrah brimstone and fire from the Lord out of heaven, and He overthrew those cities, and all the plain, and all the inhabitants of the cities, and that which grew upon the ground. And Abraham gat up early in the morning to the place where he stood before the Lord, and he looked towards Sodom and Gomorrah, and towards all the land of the plain, and behold, and lo, the smoke of the country went up as the smoke of a furnace.'

"Nothing could be more succinct or terse than this description of the catastrophe.

“The episode of Lot’s wife being turned into a pillar of salt quite harmonizes with the event thus described, for of all of the substances generated in the volcanic furnaces none is met with in such large quantities as salt. The moist and burning cinders which shoot forth like a shower of fire from the burning craters are strongly impregnated with this substance, which, after the water in the cinders has evaporated, forms a thick deposit around the volcanoes.”

CHAPTER XXII.

QUAKES IN THE MEDITERRANEAN.

NUMEROUS PEAKS IN THE FORM OF ISLANDS THAT HAVE QUAKED IN Imitation of the Giant Vesuvius—SHOCKS THAT WERE DESTRUCTIVE, AND OTHERS THAT HAD IN THEM THE FLAVOR OF DANGER.

The first Greek colonists which settled in the Island of Ischia were obliged to abandon it, so frequent were the earthquakes which overthrew their temples and their towns and kept the population in a constant state of alarm. But the island is so beautiful and attractive that fresh colonies took the place of those which had migrated to Cumae. In short, Ischia, which so many poets have celebrated, is one of the most charming and seductive spots in Europe. The dormant volcano, which formerly lit up the whole island with its fires, and which now, during its sleep, and, like a man dreaming, occasionally shakes it violently, gives a wonderful activity to vegetation. There is a profusion of vines, rose, lemon, orange trees, mulberry trees, cotton plants, myrtles, and laurel. Milk, herbs, and fruit are all of the best quality. The whole country is one vast garden spread out at the foot and along the slopes of the giant which warns it, and makes Ischia more fertile than any other island in the Mediterranean. The underground fire also imparts special value to the thermal springs, and raises their temperature to 178 degrees Fahrenheit. The sky of Ischia is nearly always blue, and the air as pure in summer as in winter. All this makes the island a delightful place of sojourn, and there is not a spa in Europe where the time passes more agreeably.

Since the last eruption of Mount Epomeo, in 1302, earthquakes become more and more rare, though in 1827 a shock destroyed part of

Casamicciola and Lacco-Ameno, while again in 1881 and 1883 part of the island was severely shaken.

The earthquake of March 4, 1881, had some very distressing consequences. There were two shocks that day, the first at half-past one, which lasted seven seconds; the second, at two o'clock, which lasted only half that time. A third shock even was felt three days afterward, on Monday, the 7th.

A great part of the town of Casamicciola was destroyed, and there were 126 persons killed and 177 injured, while 700 houses fell in. The catastrophe was at first attributed to an eruption of Vesuvius, which took place the day before; but Professors Palmieri, of Naples, and Orazio Sylvestre, of Catania, gave it as their opinion that the shock must have been caused by some local phenomenon, perhaps by the falling of some underground galleries constantly sapped by the action of the mineral waters, and Palmieri pointed out that a few minutes before the first shock the waters of the thermal springs had been in a state of ebullition.

The shock of July 28, 1883, was far more fatal in its consequences, first, because the season was at its height, and visitors were very numerous; secondly, because the earthquake, which was in the same direction as the previous one (*viz.*, toward the sea), instead of lasting seven seconds, lasted fifteen, or even thirty according to John Lavis; and finally because it occurred, not in the day-time, but at 9:30 o'clock in the evening.

The island was wrapped in dark clouds, the sea was very much agitated all round the island; everything seemed to indicate that Ischia was about to collapse into the waters, and a sort of quiver caused the ground to tremble, when a violent shock of earthquake, accompanied by a terrible noise, was felt. The population, in terror, fled from their houses, uttering cries of terror, looking for one another in the dark, and making for the shore as in the last days of Pompeii. There was a general scramble for the fisherman's boats, and a scene of terrible confusion, everyone seeking to save himself.

All parts of the island were disturbed, but while Ischia suffered little, Florio and Lacco-Ameno were almost entirely destroyed. Nowhere, however, was the disaster so terrible as in the charming little town of Casamicciola, situated at the foot of Mount Epomeo, the thermal springs of which are so frequented. This town, with its rows of elegant villas, completely disappeared, only five houses being left standing; and as 1,800 visitors were there in addition to the 4,000 regular inhabitants, some idea may be formed as to the number of victims.

At Lacco-Ameno not a single building emerged from the mass of rafters and stones which, after the shock, marked the site of this once flourishing little place. Out of the 1,593 inhabitants it is believed that only five escaped. The ruin was complete, and many houses had disappeared altogether, the supposition being that they were swallowed up in the yawning earth.

The terrestrial shock appears to have traversed the island from west to east, and all the villages and hamlets in its course seem to have suffered, in addition to those already mentioned.

The first shock was between 9:30 and 10 at night. Several of the survivors state that the approach of the catastrophe was heralded by a gruff, alarming rolling noise, which suddenly gave place to a most terrific sound like the discharges of a large battery of artillery all of whose guns were firing off at once. Immediately afterward the houses oscillated like a sloop rocked by an angry sea, and, under the influence of the shock, crumbled to pieces. A few of the inhabitants, but only a few, had time to get into the street before the houses fell in, but the great majority were buried beneath the ruins.

For a space of fifteen seconds the surface of the ground was agitated in all directions, and many people were flying in terror toward the shore, when they were struck down and buried beneath the mass of falling debris. When the shock was over the only sounds to be heard were the cries of terror and anguish from the injured. Not a single light was left burning, and a dense cloud of dust, which blinded and

suffocated the survivors, overhung the scene of the disaster, while the poignancy of the situation was increased by the fact that the houses which had only partially fallen in continued to collapse and make fresh victims. No relief was forthcoming for several hours, as those who escaped the disaster were in too great a state of terror to be of any service to others, while, when they had regained possession of themselves, the material means of relief were all wanting.

At the time of the catastrophe the small theater of Casamicciola was full, but owing to the lightness of its construction, most of the audience, though more or less injured, were able to extricate themselves from the debris and make their escape when the shock was over. But the panic was a terrible one, and some of the spectators were killed by the fall of beams or suffocated by the violence of the current of outer air. All through the night were heard the cries and groans of the unfortunate victims half buried beneath the ruins; and these issued not only from the vicinity of the theater, but from the houses of the square, which had become tombs for their still living inhabitants.

A visitor who was in the theater at the time of the shock says that he heard a sound like thunder, but it was not until the first oscillations were felt that any symptoms of alarm were shown. "At first," says this eye-witness, "not a cry was uttered, though terror was depicted upon every countenance; but when the first shock was followed by several others, a shriek of despair went up from every lip. The lights went out, pieces of timber were falling all about us, and the cries of terror were succeeded by shrieks of pain from those who had been injured. It was, indeed, a trying moment. When the shocks ceased I crawled, like many others, out of the ruined building in order to reach shore. The dust was literally blinding. Several times I stumbled over heaps of masonry and rubbish from which heartrending groans and shrieks were proceeding. Upon the shore I encountered many others as frightened as myself, and endeavoring to escape in fear of there being more shocks. Seeing that all remained quiet we retraced our steps in order

to relieve the injured. But it was not until the morning, upon the arrival of the authorities and of the troops sent from Naples, that it was possible to take any effective steps for surmounting the difficulties by which we were surrounded. The firemen, assisted by volunteers, then set to work energetically to clear away the rubbish, laying the dead bodies in a row and handing over the injured to the doctors. It was necessary, however, to go to work very carefully, so as not to injure those who were still unhurt; and so the work proceeded very slowly, during which time we felt our heart-strings torn by the piteous appeals for relief. Some people were covered by so much debris that it took hours to reach them, and when we did so, some of them had succumbed to their injuries, while others had gone out of their minds. The dense cloud of dust had choked many of those who had not been killed on the spot. The troops arrived later in the morning, and I then returned to Naples." Commander Enrico Boltini, professor of surgery in the University of Pavia, had a marvelous escape. The professor, who was a widower, had gone for a holiday to Ischia with his child and its governess, and he had arranged to start the day before the catastrophe, but having met one of his friends in the island, he determined to stay a few days more.

On Friday evening, his child, as they passed the theater, asked to be taken in; the professor said that he could not do so that evening, but would the next day. The father and child were seated in the theater, and it so happened that the title of the piece being played was "An Earthquake." Therefore, when Pulchinello exclaimed in terror, "Un terremoto! un terremoto! Alla mare! alla mare!" (An earthquake! an earthquake! To the sea! to the sea!) the spectators of the play thought at first that this was part of the comedy. They were soon undeceived, as the petroleum lamps were upset and all was darkness. At this critical juncture the professor had the sangfroid to take note of the hour (9:32) and to sit perfectly still, clasping the child in his arms, though all the people in the theater were seeking escape.

The shock had been accompanied by an appalling roar like the discharge of several big guns at the same time, and it was followed by a profound silence and a storm of dust raised by the falling buildings. Large crevices appeared, one of them at the place where Professor Boltini was crouching. Soon after he heard in the distance groans, followed by the sound of footsteps, this being probably the march of the carbineers from Ischia. Owing to his ignorance of the locality and the darkness he was obliged to remain where he was till daybreak, and when he prepared to make a move he was thunderstruck. He could not see a sign of the square which he had crossed the evening before on his way to the theater. There was a mass of ruins, and that was all. The first squads of relief from Naples arrived before 6 A. M.

Out of the twenty-seven persons with whom he had dined at the hotel the evening before he could not find one. The actor who had played the part of Pulchinello and given alarm, was taken to Naples, badly injured, in the dress which he had worn upon the stage.

Another survivor, Signor Giovanna Casini, of Arezzo, who also was at the theater when the catastrophe occurred, gives the following description of the scene:

"It was about a quarter after nine when one of my friends suggested that we should go to the theater. The curtain rose at half-past nine, but we had only heard a few words of the comedy when we heard a terrible shock. I was thrown forward several feet and fell down full length. With this there was a deafening noise, such as might be caused by a heavy train passing over an iron bridge at full speed; during the shock the ground upheaved and then subsided, like the waves of the sea during a storm.

"I cannot well describe what followed, for the whole occurrence was like a horrible nightmare. All I remember is that we were a mass of human beings huddled together; that the petroleum lamps in their fall set fire to the seats; and that, trying to extinguish the conflagration we all rushed violently into the open. I also remember that upon looking up

to a tree I saw that the branches were covered with human beings who had climbed up there.

"Pieces of wood were piled upon the seashore and set alight as a signal for help. I saw around me a mass of women and old people of both sexes with nothing on but night-dresses, while many of the children were quite naked. Other women, only half dressed, were rushing about like furies with torches in their hands, looking for their children or husband, and imploring others to aid them in the search."

Nearly all the survivors were stupefied by grief or terror and few were able to give an intelligible reply to the questions put to them. Among the crowd of fugitives was the engineer, Serafino Tarantini, who said that at the Hotel Sauvet, where he was lodging, three rooms had fallen in. He was playing cards at the time, and although the lamps went out he managed to find his way into the garden. The darkness was so intense that he dared not move till daybreak, and then he was a long time making his way to the shore, as there was great danger not only of falling into some crevice, but of stepping upon the unfortunate people buried beneath the ruins. From beneath the ruins extended limbs of human bodies in the convulsions of death, an arm, a leg, or a shoulder sticking here and there all the way.

He endeavored to save a few people, but he could not do much, though he did manage to extricate two children. All night long he had heard, amid the lugubrious cries of the whole town, a persistent groaning, and a woman's voice exclaiming: "My children, my children!" At daybreak he saw her standing upon a fragment of the terrace, which had not been carried away, with nothing but her shift on, and still repeating the piteous cry of "My children, my children!" Signor Tarantini says that he was wondering what he could say to her in the way of consolation when he saw two children playing quietly among the ruins, which might at any moment fall in and crush them, and it so happened that these were hers.

Not less touching, and more tragic in its ending, is another scene

described by him. As he proceeded on his way he saw a woman's broken shoulder, and a gloved hand with many rings on it, emerging from the ruins. This woman was back to back with her husband, who, speaking from the ruins which quite covered him, exclaimed in piteous tones: "Save her, never mind about me." Signor Tarantini, on drawing closer, recognized in her a handsome Egyptian lady who lived opposite his hotel, and he put out his hand to her, and tried to raise the stones which held her prisoner, when a landslip occurred and rendered all his efforts useless. At the Hotel Picciola Sentinella, where the poet Longfellow resided for some time, an English lady, Miss Robertson, was playing Chopin's Funeral March to several friends, and after the disaster the corpse of this lady and her mother, together with those of eight Swiss, all of one family, were found beneath the ruins. Miss Robertson was found seated in front of the piano with her legs crossed, and might, to all appearance, have been playing still. Death must in her case have been instantaneous. It appears, strangely enough, that the playing of Chopin's Funeral March saved the life of one of the residents of the hotel, as Count Capella, when he heard the march being played, went out, exclaiming: "I cannot stand such music!" He had scarcely crossed the threshold when the building fell in behind him.

CHAPTER XXIII.

THE PRECEDENT OF VESUVIUS.

ERUPTIONS BEFORE A. D. 79—THE MOUNTAIN TRANSFORMED BY THE "PLINY ERUPTION"—THE RESURRECTION OF POMPEII AND HERCULANEUM AFTER SEVENTEEN CENTURIES—MACAULAY AND BYRON'S POETRY—PLINY, THE YOUNGER'S, SPECIAL CORRESPONDENCE.

Oh! land to Mem'ry and to freedom dear,
Land of the melting lyre and conquering spear,
Land of the vine-clad hill, the fragrant grove,
Of art and arms, of Genius and Love,
Hear, fairest Italy.

The leaves scarce rustled in the sighing breeze;
In azure dimples curled the sparkling seas,
And, as the golden tide of light they quaff'd,
Campania's sunny meads and vineyards laugh'd,
While gleamed each lichen'd oak and giant pine,
On the far sides of swarthy Apennine.

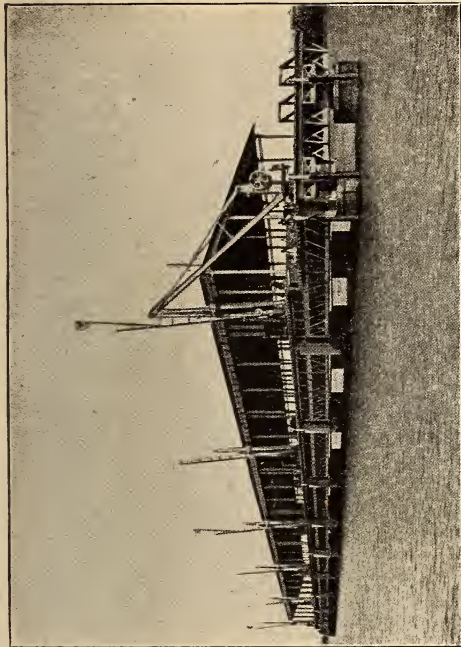
Saw ye how wild, how red, how broad a light
Burst on the darkness of that mid-day night,
As fierce Vesuvius scatter'd o'er the vale,
His drifted flames and sheets of burning hail,
Shook hell's wan lightnings from his blazing cone,
And gilded heaven with meteors not its own?

—*Macaulay's "Pompeii."*

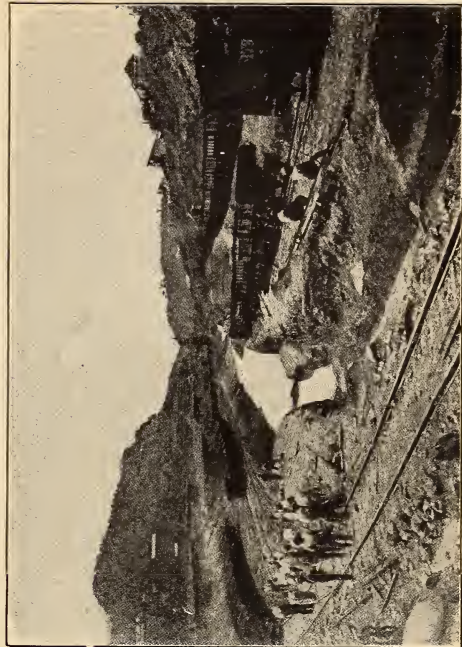
LETTERS OF PLINY THE YOUNGER.

Containing an Account of the Eruption of A. D. 79.

"A friend of my uncle's, who was lately come from Spain on purpose to see him, finding my mother and me sitting thus together, and



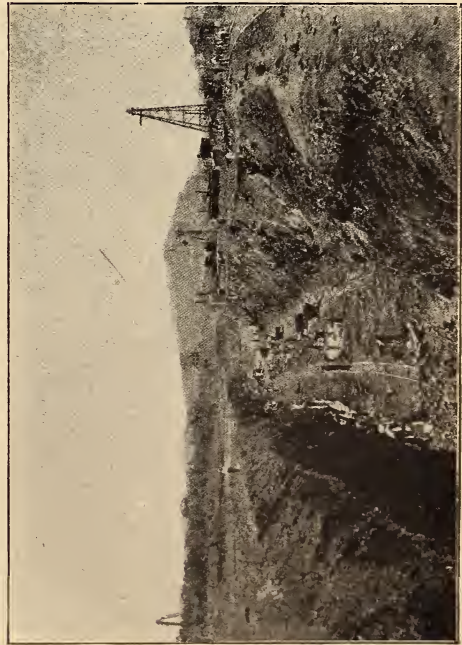
PANAMA CANAL, PIER AT LA BOCA.



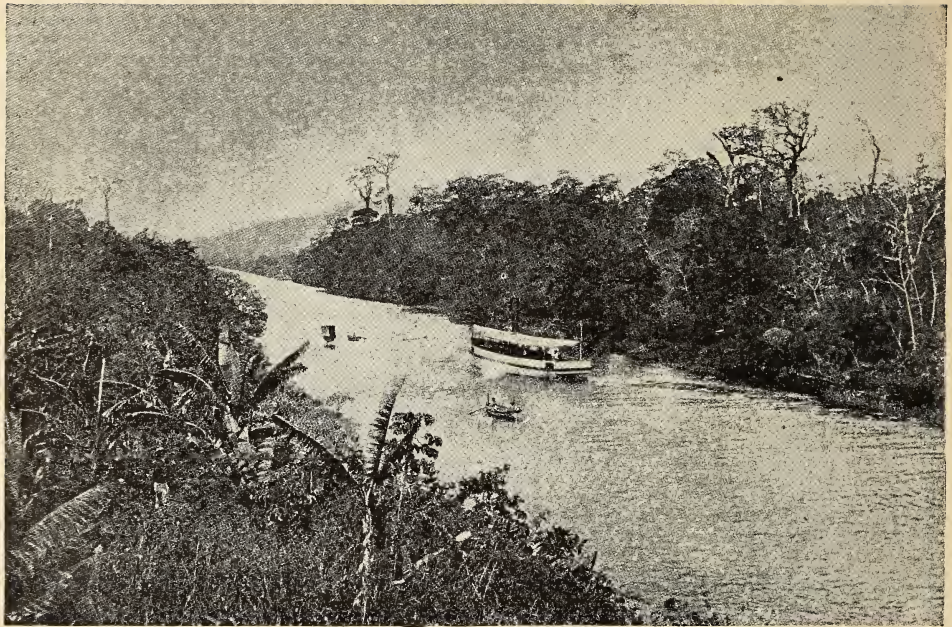
PANAMA CANAL, CULEBRA CUT.



PANAMA CANAL, GREAT CULEBRA CUT.



PANAMA CANAL, 32 MILES FROM ATLANTIC.



PANAMA CANAL, 3 MILES FROM THE ATLANTIC.



PANAMA CANAL. 9 MILES FROM COLCN.

taking notice that I was reading, reproved the patience of her temper and the indifference of mine. It was now 6 o'clock in the morning, yet there was but a faint and glimmering light. The house shook violently; and though we were in an open court, yet, as it was very narrow and built almost all round, we were certainly in great danger. We then thought it expedient to leave the town; the people, distracted with fears, followed us, and (such is the nature of fear which embraces, as most prudential any other dictate in preference to its own) they pressed upon us and drove forward. When we were out of reach of the buildings we stopped; our astonishment was great, nor were our apprehensions less, for the carriages which we had ordered out of the town were so violently shaken from side to side, although upon plain ground, that they could not be kept in their places even when propped by heavy stones. The sea, too, seemed to be forced back upon itself, repelled as it were by the strong concussions of the earth. It is certain that the shore was greatly widened, and many sea-animals were left upon the strand.

“On the land side a dark and horrible cloud, charged with combustible matter, suddenly broke and shot forth a long trail of fire, in the nature of lightning, but in larger flashes. Then, my uncle's friend, the same who came out of Spain, said to us, with great vehemence and eagerness, ‘If your brother and your uncle be still living, his wishes are employed for safety. If he has lost his life, he was desirous yours might be saved. Why then will you not immediately leave this place?’ We answered that we were not so solicitous for our own as for my uncle's preservation. He then hastily withdrew, running with the utmost expedition from danger. Not long after, the cloud descending covered the whole bay, and we could no longer see the Island of Caprea or the promontory of Misenum. My mother now began to beseech, advise, and command me to make my escape in any manner I could. She observed that as I was young I might easily take flight; but that she, who was older in years and less active, could patiently resign herself

to death, in case she was not the occasion of my destruction. My answer was, 'I will never attempt at safety if we are not together.' And then, leading her by the hand, I assisted her to go faster; she yielded with regret, still angry with herself for delaying me.

"The ashes now fell upon us; however, in no great quantities. I looked back. A thick vapor just behind us rolled along the ground like a torrent, and followed us. I then said, 'Let us turn out of this road, whilst we can see our way, lest the people who crowd after us trample us to death.' We had scarce considered what was to be done when we were surrounded with darkness, not like the darkness of a cloudy night or when the moon disappears, but such as it is in a close room when all light is excluded. You might have heard the shrieks of women, the moans of infants, and the outcries of men. Some were calling for their parents, some for their children, some for their wives: their voices only made them known to each other. Some bewailed their own fate, others the fate of their relations. There were some who, even from a fear of death, prayed to die. Many paid their adorations to the gods; but the greater number were of opinion that the gods no longer existed, and that this night was the final and eternal period of the world. There were others who magnified the real dangers by imaginary and false terrors. Some affirmed that Misenum was burnt to the ground. The report, although not true, gained credit.

"A little gleam of light now appeared. It was not daylight, but a forewarning of the approach of some fiery vapor—which, however, discharged itself at a distance from us. Darkness immediately succeeded. Then ashes poured down upon us in large quantities, and heavy, which obliged us frequently to rise and brush them off, otherwise we had been smothered or pressed to death by their weight.

"I might boast that not one sigh or timorous word broke from me through all this distress, had I not fortified myself with one great consolation—a miserable one indeed—that all nature was perishing with me.

“At last this darkness, which now was drawn into the thinness of a cloud or of smoke, went off; true day appeared. The sun shone forth, but pale, as at the time of an eclipse. All objects that offered themselves to our sight (which was yet so weak that we could scarce bear the return of light) were changed, and covered with ashes as thick as snow. At our return to Misenum, after having refreshed ourselves, we remained in that suspense and doubt of mind which hope and fear inspire: fear indeed was most prevalent, for the earthquake still continued, and several enthusiasts, by dreadful prophecies, increased their own fears and the fears of others.

“Though it was now morning, the light was exceedingly faint and languid, the buildings all around us tottered, and though we stood upon open ground, yet, as the place was narrow and confined there was no remaining there without certain and great danger; we therefore resolved to quit the town. The people followed us in the utmost consternation, and, as to a mind distracted with terror, every suggestion seems more prudent than its own, pressed in great crowds about us in our way out. Being both at a convenient distance from the houses, we stood still in the midst of a most dangerous and dreadful scene.”

This description by the younger Pliny of the scenes in which his uncle, the elder, perished, are as accurately descriptive of the terrors of the eruptions in Martinique and St. Vincent, in the May days of 1902, as of the original catastrophe.

Dr. Home is authority that the panic-stricken crowd, as it left the theater, turned to fly. Some, anticipating a second earthquake, hastened to their homes to load themselves with their more costly goods and escape whilst it was yet time; others, dreading the shower of ashes, that now fell fast, torrent upon torrent over the streets, rushed under the roofs of the nearest houses, or temples, or sheds—shelter of any kind—for protection from the terrors of the open air. But darker and larger and mightier spread the cloud above them. It was a sudden and more ghastly Night rushing upon the realm of noon! “Each sex prob-

ably acted in conformity to its character, the men trusting to their own strength to escape, the women waiting with patience the issue of a danger from which their own exertions could not save them."

The best accounts of the calamity are those two well-known letters written by the younger Pliny, the first of which relates to the death of his uncle, the elder Pliny, the great historian and naturalist, whilst the second letter describes the flight of his mother and himself from Pompeii.

RE-DISCOVERY OF POMPEII AND HERCULANEUM.

Temple and tower went down and left a site
 Chaos of ruins! Who shall trace the void,
 Over the dim fragments cast a lunar light,
 And say, "Here was, or is," where all is doubly night?"

Stumbling o'er recollections, now we clap
 Our hands, and say, "Eureka!" it is clear.

—Byron.

Not the silence of solitude and repose, but of death and devastation
 —the silence of a great city without an inhabitant.

I stood within the city disinterred
 And heard the autumnal leaves, like light footfalls
 Of spirits passing through the streets, and heard
 The mountain's slumbering voice at intervals
 Thrill through those roofless halls.

The discovery of Pompeii dates from 1595, when by order of the Count of Sarno an aqueduct was made to convey the waters of the upper Sarno to the town of Torradell Annunciata. The testimony of the character of the Vesuvian devastation remained undisturbed for sixteen centuries. It was in 1728 that the great work of excavation was made and Pompeii was disinterred, "all vivid with its undimmed colors and its exquisite designs, with every line unfaded in the rich mosaic

of its floors—in its gardens the sacrificial tripod; in its halls the chest of treasure; in its baths the stigel; in its saloons the furniture and the lamp; in the triclinia the fragments of the last feast; in its cubicula the perfumes and the rouge of faded beauty: and everywhere the bones and skeletons of those who once moved the springs of that minute, yet gorgeous machine of luxury and life.”

“Beauteous in ruin, in decay sublime,
A splendid trophy o’er the wreck of Time.”

The old question whether the date of the eruption was August 23d or November 5th was settled upon the following evidence:

During the explorations dried grapes were found, and it is certain that they would not be dried so early in August. Walnuts, too, are not gathered so early in the year as August, and many were found during the excavations. But perhaps the most convincing proof is that in many of the gardens the amphoræ, or wine-jars, were found upside down, having evidently been washed out in order to receive the new wine.

It is certain that the eruption of November 5th, 79, wonderfully changed the appearance of Vesuvius, and the transformation was fixed in memory by the monumental character of the mountain. The morning of the day was thus poetically described: “All was bright and joyous. The shops were filled with their usual wares, and crowded by intending purchasers; Campanian peasants stood in the streets with baskets of fruits and flowers; the slaves drew water at the fountains; the gambler rattled his dice; the drunkard quaffed his wine; in the public places gathered the chariots of the wealthy, the priest sacrificed at the altar, the merchant trafficked in the forum, and in the crowded theater men and women gathered with wolfish eyes to watch the struggles of the athlete and the gladiator in the bloody arena.”

The signal that a great eruption of Vesuvius was on was the appearance on the crest of the mountain which resembled a gigantic goblet, a column of thick black smoke that assumed the shape of a pine tree, the

trunk black, the branches fire. When the pine tree cloud and darts of flame reached an enormous height, it became a vast, widespread cloud, and the fall of ashes began and continued until the cities were buried.

Saw ye how wild, how red, how broad a light
 Burst on the darkness of that mid-day night
 As fierce Vesuvius scattered o'er the vale
 His drifted flames and sheets of burning hail,
 Shook hell's wan lightnings from his blazing cone,
 And gilded heaven with meteors not its own?

The eruption of Mont Pelee, 1902, was of remarkable likeness to that of Vesuvius, in 79. The remarkable outbreak of Vesuvius was November 5th—that of Pelee May 8th. It has been said with as great constancy as carelessness that Vesuvius was unknown as a volcano before the destruction by burial in ashes and lava of Pompeii and Herculaneum. Seneca records that an earthquake sixteen years before the famous Vesuvian outbreak, threw down a great part of Pompeii and considerably devastated Herculaneum. John Fletcher Horne, M. D., D. S. C., says of Vesuvius:

“The mountain is a link in the historical chain which binds us to the past, which takes us back to the ‘palmy days’ of the Roman Empire. Before the days of Titus it seems to have been unknown as a volcano, and its summit is supposed to have been crowned by a temple of Jupiter.

“Strapo, eminent historian though he was, was no prophet. The subsequent history of Vesuvius has shown that at varying periods the mountain has burst forth into great eruptive activity. Respecting the volcanic system of Southern Europe, it may be observed that there is a central tract where the most violent earthquakes take place, of which Mount Vesuvius may be considered the center.”

It is the story of Seneca that in the year 63, the whole region about Vesuvius was seriously disturbed, and even in Naples a very great number of houses were shattered. De Horne remarks: “It is not sur-

prising, therefore, that we should find amongst the ruins numerous indications that the cities were undergoing extensive restorations."

This passage from Bulwer's closing chapter of the "Last Days of Pompeii" is so much like some grand passages describing the eruptions of Pelee and the Soufriere, especially the former, that one wonders whether there is some unconscious appropriation from tenacious memories:

"Bright and gigantic through the darkness which closed around it, like the walls of hell, the mountain shone—a pile of fire. The summit seemed riven in two, or above the surface there seemed to rise two monster shapes, each confronting each, as demons contending for a world. These were of one deep blood-red hue of fire, which lighted up the whole atmosphere, far and wide, but below the nether part of the mountain was still dark and shrouded, save in three places, adown which flamed serpentine and irregular rivers of the molten lava.

"Darkly red through the profound gloom of their banks they flowed slowly on as toward the devoted city. Over the broadest there seemed to spring a cragged and stupendous arch, from which, as from the jaws of hell, gushed the source of sudden disasters, and through the stilled air was heard the rattling of the fragments of rock, hurtling one upon another as they were borne down the fiery cataracts—darkening for one instant the spot where they fell, and suffused the next in the burnished hues of the flood along which they floated.

"Glaucus turned in gratitude and caught Ione once more in his arms and fled along the street, that was yet intensely luminous. But suddenly a duller shade fell over the air. Instinctively he turned to the mountain, and, behold! one of the two gigantic crests into which the summit had been divided rocked and wavered to and fro, and then with a sound, the mightiness of which no language can describe, it fell from its burning base and rushed, an avalanche of fire, down the side of the mountain. At the same instant gushed forth a volume of blackest smoke, rolling on over air, sea and earth. Another, and another, and another shower of

ashes, far more profuse than before, scattered fresh desolation along the streets. Darkness once more wrapped them as a veil."

Vesuvius has the reputation of being the most picturesque of mountains, and there is a literature relating to the various eruptions, and no other volcanic displays have been so brilliantly written of. The following relates to a display of more than a century ago:

Aug. 22, 1793.—"There was to-day a most singular appearance in the mountain; on opening the shutters to view it I perceived the crater to be in great agitation, puff after puff impelling each other with the greatest violence. I could perceive thousands of stones and scoriae thrown into the air, and falling in all directions. The clouds from the crater were as white as the purest snow; on a sudden, as I was looking up at these, a column of smoke rushed impetuously out of another mouth behind the crater, as black as the deepest ink; and rising in curling volumes to a vast magnitude, formed a pillar perfectly unconnected with the smoke from the crater, and presented a striking contrast by opposing its jet black to the snowy whiteness of the other. These appearances continued at intervals the whole day. Sometimes the two columns of different colors rose together, as if in emulation of each other, and striving which should rise the highest and display the greatest magnitude, but never mixing or interfering with each other."

Aug. 30.—"The lava which was last night so great, this evening suddenly stopped; hardly a trace of it was visible. But the crater displayed such girandoles of fire, such beautiful columns of light red flame, as I think I never saw before. Millions of red-hot stones were shot into the air, full half of the cone itself, and then bending fell all around in a fine arch. As soon as I got home I fixed the telescope. Sometimes in the middle of the clear flame another and another still more bright and glorious displayed itself, breaking on the eye like the full sun; so that the interior was always the most luminous. The interior and bright attendants upon the principal column seemed to be lava in perfect fusion, which boiled and bubbled up above the crater's edge; and

sometimes falling over it, I could perceive splash upon the cone, and take its course gently down the mountain. Sometimes, and more usually, it fell again into the crater. I write this with the burning mountain now before my eyes. All the top of the cone is covered with red-hot stones and lava. The flame of the crater continues without intervals of darkness, as usual. It is always in flame, or rather the clouds of smoke, tinged with the boiling matter within, are like burnished gold, and as bright as fire."

Sept. 5.—"Vesuvius continues to throw most superbly; the lava flows again; at sunset he shewed that Tyrian hue which he assumes sometimes, and which has a glow beyond description."

CHAPTER XXIV.

THE PHENOMENA OF VESUVIUS.

THE MOST FAMOUS OF FIERY MOUNTAINS—REMARKABLE IN ITS ERUPTIONS—MEMORABLY HISTORIC IN ITS SURROUNDINGS—THE STORY OF THIS MOUNTAIN AS RELATED BY THE MOST DARING, STUDIOUS, INTELLIGENT AND CONSTANT OF ITS OBSERVERS.

The most interesting mountains in the world, in their association with history for thousands of years, are those of southern Italy. Vesuvius is in many ways the most conspicuous of them in its location, the most picturesque in its appearance, and the most venerable in its records. We may speak of it confidently as the most memorable of mountains. Next to Vesuvius is Mount Etna, famous for terrible outbreaks at long intervals, and ranking, aside from its volcanic action, as one of the noblest of all the mountains, strangely interesting in its situation, of enormous bulk, in great part covered with magnificent forests, penetrated by immense caverns, some of which are storehouses of ice and never-melting snows, and it is the loftiest of landmarks in that portion of the world, exceeding in perpendicular height three miles.

Vesuvius surpasses Etna far in the general interest the world takes in it. It is the most historic of volcanoes, and has been the subject of interested and enlightened observation all the time that the memories of man have been recorded. Its eruptions have been closely followed in many respects by those in the West Indies, the startling features of which for many years after the eruptions of May, 1902, will uncommonly concern the people of all nations.

The historian of Vesuvius to whom we are most indebted—unless, possibly, the younger Pliny be an exception—is the Hon. Sir William Hamilton, K. B., F. R. S., British Envoy Extraordinary and Plenipoten-

tiary at the Court of Naples, who, during his long residence in that city in a very influential official capacity, dwelt in sight of Vesuvius and was fascinated by the wonderful picture before his eyes.* The world is indebted to him for "Observations on Mount Vesuvius, Mount Etna and Other Volcanoes, in a Series of Letters Addressed to the Royal Society." He added to his letters as originally written many explanatory notes. Sir William's book was printed for T. Cadell, in the Strand, 1773. Mr. Cadell says, as editor of the letters of Sir William, that having mentioned to Sir William the general desire of all lovers of natural history that his letters upon the subject of volcanoes should be collected in one volume, he secured the approval of the writer, who added explanatory notes and drawings. The first letter of Sir William was dated at Naples, June 10th, 1766, addressed to the Right Honorable, the Earl of Morton, President of the Royal Society.

Sir William's first sentence is: "As I have attended particularly to

*Sir William Hamilton, who was so adventurous and learned in volcanoes, and writes of them with the charm of information and painstaking veracity, was the husband of the Lady Hamilton, with whom Lord Nelson got acquainted at Naples, while in command of the Mediterranean British fleet. Mr. Wyndham, British Minister to Tuscany, arrived from Florence at Naples, and wrote to Lady Minto of the situation at Leghorn, where Sir William Hamilton, Lady Hamilton and Lord Nelson were spending some time. The Queen wanted a ship of the line to serve her as a yacht in the Mediterranean, but Lord Keith would spare her only a frigate, and her Majesty wept and had convulsions. Lord Keith did not seem to stand in awe of Lord Nelson and his associates. The report was that Nelson and Lady Hamilton were so far gone in love and vanity, that they enjoyed flattering each other all the day. Lord Keith was of the opinion Lady Hamilton had commanded the British Mediterranean long enough. The Leghorn gossip was that Nelson was in high spirits and enjoying the situation amazingly; but that Sir William Hamilton, who had climbed Mount Vesuvius twenty-seven times, was looking disheartened, distressed and harassed. Lord Nelson was twice severely wounded, losing his right arm at Tenneriffe, and was struck during the battle of the Nile by a splinter of iron that cut through the skin of his forehead, the flap completely covering his eyes, one of which was blind. He thought himself in a dying condition, and pathetically asked that Lady Nelson should be remembered by his country. When he was dying at Trafalgar, he spoke not of Lady Nelson, but of Lady Hamilton, with his latest breath pleading that she should be cared for, a bequest of good will that was soon forgotten; but she was a difficult lady, as the famous volcano explorer could testify.

the various changes of Mount Vesuvius, from the 17th of November, 1764, the day of my arrival at this capital, I flatter myself that my observations will not be unacceptable to your Lordship, especially as this volcano has lately made a very considerable eruption."

Sir William did not, during the first year of his residence in Naples, perceive any remarkable alteration in the mountain, but observed the smoke from the volcano was much more considerable in bad weather than when it was fair. In reflecting upon this circumstance, Sir William says he believes the weight of the atmosphere in bad weather, preventing the free dissipation of the smoke, gave it the appearance of being more considerable, but it was the commonly received opinion at Naples that when Vesuvius grumbled, bad weather was at hand, and that the Bay of Naples, agitated and swelling before the arrival of a storm, might force itself into crevices, leading to the bowels of the volcano, and by causing a new fermentation, produce those explosions and grumbings. When he had been at the top of Mount Vesuvius in fair weather, he sometimes found so little smoke as to be able to see far down the mouth of the volcano, the sides of which were encrusted with salts and minerals of various colors—white, green, deep and pale yellow—and the smoke that issued from the mouth of the volcano was white, very moist and not so offensive as sulphurous steam.

In the month of September, 1765, the smoke became more considerable, even in fair weather, and in October puffs of black smoke would shoot up to a considerable height in the midst of the white, a symptom of an approaching eruption that grew more frequent, and soon after the puffs of smoke appeared in the night tinged like clouds with the setting sun.

About the beginning of November, Sir William ascended the mountain, then covered with snow, and perceived a little hillock of sulphur thrown up since his last visit. This was about forty yards from the mouth of the volcano and six feet high, with a light blue flame issuing constantly from its top. While examining this phenomenon, Sir Wil-

• liam heard a violent report, saw a column of black smoke, "followed by a reddish flame, shot up with violence from the mouth of the volcano; and presently fell a shower of stones, one of which falling near me made me retire with some precipitation, and also rendered me more cautious of approaching too near in my subsequent journeys to Vesuvius." The great eruption of which these were preliminaries, in November, began on Good Friday, 28th of March. Ashes had been falling and doing damage in the vineyards. A few days before the eruption there was visible what Pliny the younger mentioned before the eruption of Vesuvius that proved fatal to his uncle, the black smoke taking the form of a pine tree. This smoke appeared black in the day time for nearly two months before the eruption, but had the appearance of flame in the night. When the lava was in sight, Sir William and a party of Englishmen passed a night upon the mountain, and "observed that, though the red-hot stones were thrown up in much greater number, and to a more considerable height than before the appearance of the lava, the report was much less considerable." The lava ran nearly a mile in an hour, had the appearance of a river of red-hot and liquid metal. Three days after the beginning of the eruption, "the mouth of the volcano threw up every minute a girandole of red-hot stones to an immense height," some of a ton weight, mounted at least two hundred feet.

After a month, the lava stopped flowing on the side toward Naples and broke out violently in another place, about half a mile from the mouth of the volcano, and threw up inflamed matter to a considerable height. Notwithstanding the consistency of the lava, it ran with amazing velocity, soon divided into three branches, each a river of fire, with the appearance at night of a continued sheet of fire four miles long, and in some places two in breadth. Sir William was surprised that no chemist had ever been at the trouble of analyzing the productions of Vesuvius.

It was counted in the records kept in Naples, of Vesuvius, that the

violent eruption that began October 19th, 1767, was the twenty-sixth since the one that in the time of Titus destroyed Pompeii.

Sir William made an excursion, December, 1766, into the ancient crater, and about twenty-feet deep. "The deep yellow, or orange-color salts, of which there are two bottles, I fetched out of the very crater of the mountain, in a crevice that was indeed very hot. It seems to me to be powerful, as it turns silver black in an instant, but has no effect upon gold. If your Lordship pleases, I will send you by another opportunity specimens of the sulphurs and salts of the solsa terra, which seem to be very different from these.

"Within these three days, the fire has appeared again on the top of Vesuvius, and earthquakes have been felt in the neighborhood of the mountain. I was there on Saturday with my nephew, Lord Greville; we heard most dreadful inward grumblings, rattlings of stones, and hissing and were obliged to leave the crater very soon on account of the emission of stones."

On another occasion Sir William says:

"In all accounts of great eruptions of Mount Etna and Mount Vesuvius, I have found mention of this sort of lightning. Pliny the younger, in his second letter to Tacitus upon the eruption of Vesuvius in the time of Titus, says that a black and horrible cloud covered them at Misenum (which is above fifteen miles from the volcano), and that flashes of zigzag fire, like lightning, but stronger, burst from it; these are his words: 'ab altero latere nubes atra et horrenda ignei spiritus tortis vibratisque discursibus rupta, in longas flammaram figuras dehescebat; fulgoribus illae et fimiles et majores erant.' This was evidently the famed electrical fire, and with which I am convinced the smoke of all volcanoes is pregnant. In several accounts of the great eruption of Vesuvius in 1631, mention is made of damage done by the lightning that issued from the column of smoke. Bulison, in particular, says, that, in the neighborhood of the volcano, people were struck dead in the same manner as if by lightning, without having their clothes singed. Pliny

mentions a like instance which shows that the ancients had observed this phenomenon; for he says that at Pompeii, the day being fair, Marcus Herennius was struck dead by lightning.

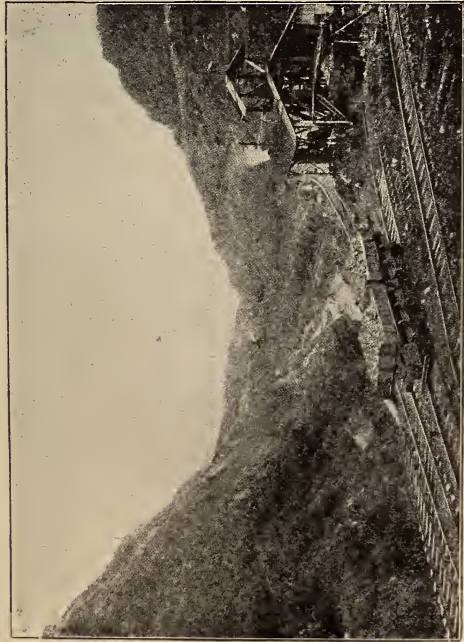
“I was making my observations upon the lava, which had already, from the spot where it first broke out, reached the valley; when, on a sudden, about noon, I heard a violent noise within the mountain, and about a quarter of a mile from the place where I stood, the mountain split, and with much noise from this new mouth, a fountain of liquid fire shot up many feet high, and then, like a torrent, rolled on directly towards us. The earth shook, at the same time that a volley of pumice stones fell thick upon us; in an instant clouds of black smoke and ashes caused almost total darkness; the explosions from the top of the mountain were much louder than any thunder I ever heard, and the smell of sulphur was very offensive. My guide, alarmed, took to his heels; and I must confess that I was not at my ease. I followed close, and we ran near three miles without stopping; as the earth continued to shake under our feet, I was apprehensive of the opening of a fresh mouth, which might cut off our retreat. I also feared that the violent explosions would detach some of the rocks off the mountain of Somma, under which we were obliged to pass; besides, the pumice stones, falling upon us like hail, were of such a size as to cause a disagreeable sensation upon the part where they fell. After having taken breath, as the earth still trembled greatly, I thought it most prudent to leave the mountain and return to the villa, where I found my family in a great alarm at the continual and violent explosions of the volcano, which shook our house to its very foundation, the doors and windows swinging upon their hinges.

“I observed, in my way to Naples, which was in less than two hours after I had left the mountain, that the lava had actually covered three miles of the very road through which we had retreated. It is astonishing that it should have run so fast; as I have since seen that the river of lava, in the Atrio di Cavallo, was sixty and seventy feet deep, and in some places near two miles broad. When his Sicilian Majesty quitted

Portici, the noise was greatly increased; and the concussion of the air from the explosions was so violent, that, in the king's palace, doors and windows were forced open; and even one door there, which was locked, was nevertheless burst open. At Naples, the same night, many windows and doors flew open; in my house, which is not on the side of the town next Vesuvius, I tried the experiment of unbolting my windows, when they flew wide open upon every explosion of the mountain. Besides these explosions, which were very frequent, there was a continued subterranean and violent rumbling noise, which lasted this night about five hours. I have imagined that this extraordinary noise might be owing to the lava in the bowels of the mountain having met with a deposition of rain water; and that the conflict between the fire and water may, in some measure, account for so extraordinary a crackling and hissing noise. Padre Torre, who has written so much and so well upon the subject of Mount Vesuvius, is also of my opinion. And, indeed, it is natural to imagine, that there may be rain water lodged in many of the caverns of the mountain; as, in the great eruption of Mount Vesuvius in 1631, it is well attested, that several towns, among which Portici and Torre del Greco, were destroyed, by a torrent of boiling water having burst out of the mountain with the lava, by which thousands of lives were lost. About four years ago, Mount Etna in Sicily threw up hot water also, during an eruption.

“The Parisian barometer was, as yesterday, at 279, and Fahrenheit's thermometer at 70 degrees; whereas, for some days preceding the eruption, it had been at 65 and 66. During the confusion of this night, the prisoners in the public jail attempted to escape, having wounded the jailer, but were prevented by the troops. The mob also set fire to the Cardinal Archbishop's gate, because he refused to bring out the relics of Saint Januarius.”

Writing near Mount Vesuvius, October 4th, 1763, Sir William says, after a talk with the peasantry as to what had been going on since the last eruption:



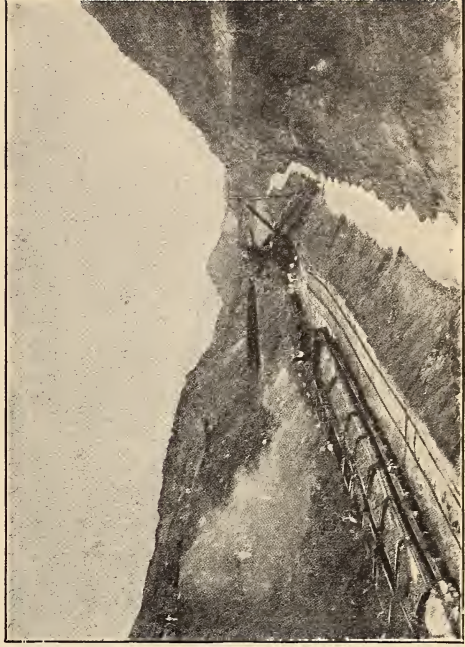
PANAMA CANAL, END OF CULEBRA CUT.



PANAMA CANAL, 27 MILES FROM ATLANTIC.



PANAMA CANAL, 33 MILES FROM ATLANTIC.



PANAMA CANAL, 34 MILES FROM ATLANTIC.



THEATRE AT SAN JOSE, COSTA RICA.



SCHOOL HOUSE IN SAN JOSE, COSTA RICA



VIEW ON SAN JUAN RIVER, COSTA RICA



PIER AT GREYTOWN, NICARAGUA.

“In some accounts of an eruption of Vesuvius in 1660, I find mention made of ashes which fell in the shape of crosses, and were looked upon as highly miraculous; but in one book upon this subject, entitled, Athanasii Kircheri Soc. Fes? De prodigiosis crucibus, etc., Rome MDCLXI, a very philosophical account is given of this phenomenon; he says that, in 1660, from the 16th of August to the 15th of October, Vesuvius cast up ashes, impregnated with nitrous, saline and bituminous sulphur, which upon linen garments took the form of crosses, probably directed by the crossthreads in the linen, and therefore that the salts did not shoot into such a shape when they fell upon garments of woolen; a very particular description of these crosses may be found in page 28, of the above mentioned book.”

Sir William gives the most interesting accounts ever seen of the formation of Vesuvius, and the early discovery in the ruins of Pompeii. He says:

“I am of the same opinion with respect to Mount Vesuvius, and all the high grounds near Naples; as having yet seen, in any one place, what can be called virgin earth. I had the pleasure of seeing a well sunk, a few days ago, near my villa, which is, as you know, at the foot of Vesuvius, and close by the sea-side. At twenty-five feet below the level of the sea, they came to a stratum of lava, and God knows how much deeper they might have still found other lavas. The soil all round the mountain, which is so fertile, consists of stratas of lavas, ashes, pumice and now and then a thin stratum of good earth, which good earth is produced by the surface mouldering, and the rotting of the roots of plants, vines, etc. This is plainly to be seen at Pompeii, where they are now digging into the ruins of that ancient city; the houses are covered about ten or fifteen feet, with pumice and fragments of lava, some of which weigh three pounds (which last circumstance I mention to show, that, in a great eruption, Vesuvius has thrown stones of this weight six miles, which is its distance from Pompeii, in a direct line; upon this stratum of pumice, or rapilli, as they call them here, is a stratum of excellent mould,

about two feet thick, on which grow large trees, and excellent grapes.

“I have since found in this stratum of erupted matter at Pompeii, stones weighing eight pounds; but many accounts of the great eruption of Vesuvius, particularly that of Antonio Bulison, mention that a stone like a bomb was thrown from the crater of Vesuvius in 1631, and fell upon the Marquis of Lauro’s house at Nola, which it set on fire. As Nola is twelve miles from Vesuvius, this circumstance seems rather extraordinary; however, I have seen stones of an enormous size shot up to a very great height by Mount Vesuvius. In May, 1771, having a stop watch in my hand, I observed that one of these stones was eleven seconds falling from its greatest height, into the crater from whence it had been ejected. In 1767, a solid stone, measuring twelve feet in height, and forty-five in circumference, was thrown a quarter of a mile from the crater; the eruption of 1767, though by much the most violent of this century, was, comparatively to those of the year 1679 and 1631, very mild.”

Again Sir William says :

“Vesuvius is quiet at present, though very hot at the top, where there is a deposition of boiling sulphur. The lava that ran in the Fossa Grande during the last eruption, and is at least two hundred feet thick, is not yet cool; a flick, put into crevices, takes fire immediately. On the sides of the crevices are fine crystalline salts; as they are the pure salts, which exhale from the lava that has no communication with the interior of the mountain, they may perhaps indicate the composition of the lava.”

Writing at Naples, October 17, 1769, Sir William says :

“After having examined with much attention the operations of Mount Vesuvius, during the five years that I have had the honor of residing as his Majesty’s Minister at this Court, and after having carefully remarked the nature of the soil for fifteen miles round this capital, I am, in my own mind, well convinced that the whole of it had been formed by explosion. Many of the craters, from whence this matter has issued, are still visible; such as the Solsaterra near Puzzole, the lake of Agnano,

and near this lake a mountain composed of burnt matter, that had a very large crater surrounded with a wall, to inclose the wild boars and deer, that are kept there for the diversion of his Sicilian Majesty; it is called Astruni; the Monte Nuovo, thrown up from the bottom of the Lucrine lake, in the year 1538, which was likewise its crater, and the lake of Averno. The islands of Nisida and Procida are entirely composed of burnt matter; the island of Ischia is likewise composed of lava, pumice, and burnt matter; and there are in that island several visible craters, from one of which, no longer ago than the year 1303, there issued a lava, which ran into the sea."

MOUNT ETNA.

Sir William Hamilton, after his studies of Vesuvius, concluded to visit Etna, and his first observation was this, relating to the carelessness of people in highly volcanic regions. Speaking of Catania, often destroyed by Etna and rebuilt, he says:

"I do not wonder at the seeming security with which these parts are inhabited, having been so long witness to the same near Mount Vesuvius. The operations of nature are slow; great eruptions do not frequently happen; each flatters himself it will not happen in his time, or, if it should, that his tutelar saint will turn away the destructive lava from his grounds; and indeed the great fertility in the neighborhoods of volcanoes tempts people to inhabit them."

In 1693 an earthquake destroyed forty-nine towns and villages, nine hundred and twenty-two churches, colleges and convents and nearly one hundred thousand persons were buried in the ruins. An extraordinarily fascinating account of this fearful and fatal eruption is entitled, "A true and exact relation of the late prodigious earthquake and eruption of Mount Etna, or Monte Gibello, as it came in a letter written to his Majesty from Naples, by the Right Honorable the Earl of Winchelsea, his Majesty's late Ambassador at Constantinople, who in his return from thence, visiting Catania in the island of Sicily, was an eye-witness of that

dreadful spectacle; together with a more particular narrative of the same, as it is collected out of the several relations sent from Catania; published by authority. Printed by T. Newcomb, in the Savoy, 1669."

"I accepted," says the author, "the invitation of the Bishop of Catania, to stay a day with him, that so I might be the better able to inform your Majesty of that extraordinary fire, which comes from Mount Gibel, fifteen miles distant from that city, which, for its horridness in the aspect, for the vast quantity thereof (for it is fifteen miles in length and seven in breadth), for its monstrous devastation and quick progress, may be termed an inundation of fire, a flood of fire, cinders, and burning stones, burning with that rage as to advance into the sea six hundred yards, and that to a mile in breadth, which I saw; and that which did augment my admiration was, to see in the sea this matter like ragged rocks, burning in four fathom water, two fathom higher than the sea itself, some parts liquid, and throwing off, not with great violence, the stones about it, which, like a crust of vast bigness, and red hot, fell into the sea every moment, in some place or other, causing a great and horrible noise, smoke and hissing in the sea; and that more and more coming after it, making a firm foundation in the sea itself. I stayed there from nine o'clock on Saturday morning, to seven next morning;" (this must have been towards the middle or latter end of April;) "and this mountain of fire and stones and cinders had advanced into the sea twenty yards at least, in several places; in the middle of this fire, which burnt in the sea, it had formed like to a river, with its banks on each side very steep and craggy; and in this channel moves the greatest quantity of this fire, which is the most liquid, with stones of the fine composition, and cinders all red hot, swimming upon the fire of a great magnitude; from this a river of fire doth proceed under the great mass of the stones, which are generally three fathoms high all over the country, where it burns, and in other places much more. There are secret conduits or rivulets of this liquid matter, which communicates fire and heat into all parts more or less, and melts the stones and cinders by fits in those places where it

toucheth them, over and over again; where it meets with rocks or houses of the same matter (as many are), they melt and go away with the fire; where they find other compositions, they turn them to lime or ashes, as I am informed. The composition of this fire, stones and cinders, are sulphur, nitre, quick-silver, sal ammoniac, lead, iron, brass, and all other metals. It moves not regularly, nor constantly down hill; in some places it hath made the valleys hills, and the hills that are not high are now valleys. When it was night, I went upon two towers, in divers places; and could plainly see at ten miles distance, as we judged, the fire to begin to run from the mountain in a direct line, the flame to ascend as high and as big as one of the greatest steeples in your Majesty's kingdoms, and to throw up great stones into the air; I could discern the river of fire to descend the mountain of a terrible fiery or red color, and stones of a paler red to swim thereon, and to be some as big as an ordinary table. We could see this fire to move in several places, and all the country covered with fire, ascending with great flames, in many places, smoking like to a violent furnace of iron melted, making a noise with the great pieces that fell, especially those which fell into the sea. A Cavalier of Malta, who lives there, and attended me, told me, that the river was a liquid where it issues out of the mountain, as water, and came out like a torrent with great violence, and is five or six fathom deep, and as broad, and that no stones sink therein. I assure your Majesty, no pen can express how terrible it is, nor can all the art and industry of the world quench or divert that which is burning in the country. In forty days time, it hath destroyed the habitations of twenty-seven thousand persons; made two hills of one, one thousand paces high apiece, and one is four miles in compass; of twenty thousand persons, which inhabit Catania, three thousand did only remain; all their goods are carried away, the cannons of brass are removed out of the castle, some great bells taken down, the city gates walled up next the fire, and preparations made to abandon the city.

“That night which I lay there, it rained ashes all over the city, and ten miles at sea it troubled my eyes. This fire in its progress met with a

lake of four miles in compass; and it was not only satisfied to fill it up, though it was four fathom deep, but hath made of it a mountain."

Speaking of the caverns of Etna, Sir William says of the astonishing storage of snow and its commercial use:

"At the foot of the mountain, raised by the eruption of the year 1669, there is a hole, through which, by means of a rope, we descended into several subterraneous caverns, branching out and extending much farther and deeper than we chose to venture; the cold there being excessive, and a violent wind frequently extinguishing some of our torches. These caverns undoubtedly contained the lava that issued forth, and extended, as I said before, quite to Catania. There are many of these subterraneous cavities known on other parts of Etna, such as that called by the peasants La Baracca Vecchia, another La Spelonca della Palomba (from the wild pigeons building their nests therein), and the cavern Thalia, mentioned by Boccaccio. Some of them are made use of as magazines for snow; the whole island of Sicily and Malta being supplied with this essential article (in a hot climate) from Mount Etna. Many more would be found, I dare say, if searched for, particularly near and under the craters from whence great lavas have issued, as the immense quantities of such matter we see above ground must necessarily suppose very great hollows underneath."

As to the surroundings of Mount Etna, Sir William remarks that he proceeded through the "second or middle region of Etna, called the Woody," than which nothing can be more beautiful.

"On every side are mountains, or fragments of mountains, that have been thrown up by various ancient explosions; there are some near as high as Mount Vesuvius; one in particular (as the Canon our guide assured me, having measured it) is little less than one mile in perpendicular height, and five in circumference at its basis. They are all more or less covered, even within their craters, as well as the rich valleys between them, with the largest oak, chestnut, and fir trees I ever saw anywhere; and indeed it is from hence chiefly, that his Sicilian Majesty's

dock yards are supplied with timber. As this part of Etna was famous for its timber in the time of the Tyrants of Syracuse, and as it requires the great length of time I have already mentioned before the matter is fit for vegetation, we may conceive the great age of this respectable volcano. The chestnut trees predominated in the parts through which we passed, and, though of a very great size, are not to be compared to some on another part of the Regione Selvosa, called Carpinetto. I have been told by many, and particularly by our guide, who had measured the largest there, called La Castagna di Cento Cavalli, that it is upwards of twenty-eight Neapolitan canes in circumference. Now as a Neapolitan cane is two yards and half a quarter, English measure, you may judge, sir, of the immense size of this famous tree. It is hollow from age, but there is another near it almost as large and sound."

As to Mount Etna itself, Sir William says:

"We pursued our journey towards the great crater. We passed over valleys of snow, that never melts except there is an eruption of lava from the upper crater, which scarcely ever happens; the great eruptions are usually from the middle region, the inflamed matter finding (as I suppose) its passage through some weak part, long before it can rise to the excessive height of the upper region, the great mouth on the summit only serving as a common chimney to the volcano. In many places the snow is covered with a bed of ashes, thrown out of the crater, and the sun melting it in some parts makes this ground treacherous; but as we had with us, besides our guide, a peasant well accustomed to these valleys, we arrived safe at the foot of the little mountain of ashes that crowns Etna, about an hour before the rising of the sun. This mountain is situated in a gently inclining plain, of about nine miles in circumference; it is about a quarter of a mile perpendicular in height, very steep, but not quite so steep as Vesuvius; it has been thrown up within these twenty-five or thirty years, as many people at Catania have told me they remembered when there was only a large chasm or crater in the midst of the above-mentioned plain. Till now, the ascent had been so gradual (for

the top of Etna is not less than thirty miles from Catania, from whence the ascent begins) as not to have been the least fatiguing; and if it had not been for the snow, we might have rode upon our mules to the very foot of the little mountain."

"Soon after we had seated ourselves on the highest point of Etna, the sun arose, and displayed a scene that indeed passes all description. The horizon lighting up by degrees, we discovered the greatest part of Calabria, and the sea on the other side of it, the Phare of Messina, the Lipari Islands; Stromboli, with its smoking top, though at above seventy miles distance, seemed to be just under our feet; we saw the whole island of Sicily, its rivers, towns, harbors, etc., as if we had been looking on a map. The island of Malta is low ground, and there was a haziness in that part of the horizon, so that we could not discern it; our guide assured us he had seen it distinctly at other times, which I can believe, as in other parts of the horizon, that were not hazy, we saw to a much greater distance; besides, we had a clear view of Etna's top from our ship, as we were going into the mouth of the harbor of Malta some weeks before; in short, as I have since measured on a good chart, we took in at one view a circle of about nine hundred English miles. The pyramidal shadow of the mountain reached across the whole island, and far into the sea on the other side. I counted from hence forty-four little mountains (little I call them in comparison to their mother Etna, though they would appear great anywhere else) in the middle region of the Catania side, and many others on the other side of the mountain, all of a conical form, and each having its crater; many with timber trees flourishing both within and without their craters. The points of those mountains that I imagine to be the most ancient are blunted, and the craters of course more extensive and less deep than those of the mountains formed by explosions of a later date, and which preserve their pyramidal form-entire. Some have been so far mouldered down by time, as to have no other appearance of a crater than a sort of dimple or hollow on their rounded tops, others with only half or a third part of their cone standing; the parts

that are wanting having mouldered down, or perhaps been detached from them by earthquakes, which are here very frequent. All, however, have been evidently raised by explosion; and I believe, upon examination, many of the whimsical shapes of mountains in other parts of the world would prove to have been occasioned by the same natural operations. I observed that these mountains were generally in lines or ridges; they have mostly a fracture on one side, the same as in the little mountains raised by explosion on the sides of Vesuvius, of which there are eight or nine. This fracture is occasioned by the lava's forcing its way out, which operation I have described in my account of the last eruption of Vesuvius. Whenever I shall meet with a mountain, in any part of the world, whose form is regularly conical, with a hollow crater on its top, and one side broken, I shall be apt to decide such a mountain's having been formed by an eruption; as both Etna and Vesuvius the mountains formed by explosion are without exception according to this description."

The crater of Etna is thus vividly sketched, after the remark that the Emperor Adrian ascended the mountain. Sir William found the crater about two miles and a half in circumference, and at the edge "some parts seemed to be very underground." This description is continued:

"The inside of the crater, which is incrustated with salts and sulphurs like that of Vesuvius, is in the form of an inverted hollow cone, and its depth nearly answers to the height of the little mountain that crowns the great volcano. The smoke, issuing abundantly from the sides and bottom, prevented our seeing quite down; but the wind clearing away the smoke from time to time, I saw this inverted cone contracted almost to a point.

"The smoke of Etna, though very sulphurous, did not appear to me so fetid and disagreeable as that of Vesuvius; but our guide told me that its quality varies, as I know that of Vesuvius does, according to the quality of the matter then in motion within. The air was so very pure and keen in the whole upper region of Etna, and particularly in the most

elevated parts of it, that we had a difficulty in respiration, and that, independent of the sulphurous vapor.

“A Mr. Brydone remarked, as he went up in the night, that he could distinguish the stars in the milky way with wonderful clearness, and that the cold was much more intense than he had ever felt upon the highest mountains of the Alps.”

The estimated height of Etna was three perpendicular miles. The lava lands are fifteen to twenty miles in length, six or seven in breadth, and fifty feet and more in depth. The productions of Etna and Vesuvius are much the same.

The sea shore at the foot of Etna, indeed, abounds with amber, of which there is none found at the foot of Vesuvius. At present there is a much greater quantity of sulphur and salts on the top of Vesuvius than on that of Etna; but this circumstance varies according to the degree of fermentation within; and our guide assured me he had seen greater quantities on Etna at other times. In our way back to Catania, the Canon showed me a little hill, covered with vines, which belonged to the Jesuits, and, as is well attested, was undermined by the lava in the year 1669, and transported half a mile from the place where it stood, without having damaged the vines. In great eruptions of Etna, the same sort of lightning, as described in my account of the last eruption of Vesuvius, has been frequently seen to issue.

Till the year 252 of Christ, the chronological accounts of the eruptions of Etna are very imperfect; but as the veil of St. Agatha was in that year first opposed to check the violence of the torrents of lava, and has ever since been produced at the time of great eruptions; the miracles attributed to its influence, having been carefully recorded by the priests, have at least preserved the dates of such eruptions. The relics of St. Januarius have rendered the same service to the lovers of natural history, by recording the great eruptions of Vesuvius. I find, by the dates of the eruptions of Etna, that it is as irregular and uncertain in its operations as Vesuvius. The last eruption was in 1766. The dates of the

eruptions of Mount Etna, recorded by history, are as follows: Before the Christian era four, in the years 3525, 3538, 3554, 3843. After Christ, twenty-seven have been recorded, 1175, 1285, 1321, 1323, 1329, 1408, 1530, 1536, 1537, 1540, 1545, 1554, 1556, 1566, 1579, 1614, 1634, 1636, 1643, 1669, 1682, 1689, 1692, 1702, 1747, 1755, 1766.

The dates of the eruptions of Vesuvius are as follows: After Christ, 79, 203, 472, 512, 685, 993, 1036, 1043, 1048, 1136, 1506, (1538, the eruption at Puzzole), 1631, 1660, 1682, 1694, 1701, 1704, 1712, 1717, 1730, 1737, 1751, 1754, 1760, 1766, 1767, 1770, 1771.

The great intelligence and deep interest declared, in the things well selected as instructive, that appears in Sir William Hamilton's letters, invite us to give express attention to his Vesuvian historical investigations and observations. Sir William says:

"Herculaneum and Pompeii stood once above ground, though now the former is in no part less than seventy feet, and in some parts one hundred and twelve feet, below the present surface of the earth; and the latter is buried ten or twelve feet deep, more or less. As we know by the very accurate account given by Pliny the younger to Tacitus, and from the accounts of other contemporary authors, that these towns were buried by an eruption of Mount Vesuvius in the time of Titus; it must be allowed that whatever matter lies between these cities and the present surface of the earth over them, must have been produced since the year 79 of the Christian era, the date of that formidable eruption.

"Pompeii, which is situated at a much greater distance from the volcano than Herculaneum, has felt the effects of a single eruption only; it is covered with white pumice stones, mixed with fragments of lava and burnt matter, large and small; the pumice is very light, but I have found some of the fragments of lava and cinders there, weighing eight pounds. I have often wondered that such weighty bodies could have been carried to such a distance (for Pompeii can not be less than five miles in a straight line, from the mouth of Vesuvius). Every observation confirms the fall of this horrid flower over the unfortunate city of

Pompeii, and that few of its inhabitants had dared to venture out of their houses; for in many of those which have been already cleared, skeletons have been found, some with gold rings, ear rings and bracelets. I have been present at the discovery of several human skeletons myself; and under a vaulted arch, about two years ago, at Pompeii, I saw the bones of a man and a horse taken up, with the fragments of the horse's furniture, which had been ornamented with false gems set in bronze. The skulls of some of the skeletons found in the streets had been evidently fractured by the fall of the stones. His Sicilian Majesty's excavations are confined to this spot at present, and the curious in antiquity may expect hereafter, from so rich a mine, ample matter for their dissertations; but I will confine myself to such observations only as relate to my present subject.

“Over the stratum of pumice and burnt matter that covers Pompeii there is a stratum of good mould, of the thickness of about two feet, and more in some parts, in which vines flourish, except in some particular spots of this vineyard, where they are subject to be blasted by a foul vapor, or *mosete*, as it is called here, that rises from beneath the burnt matter. The above mentioned shower of pumice stones, according to my observations, extended beyond Castel-a-Mare (near which spot the ancient town of Stabia also lies buried under them), and covered a tract of country not less than thirty miles in circumference. It was at Stabia that Pliny the elder lost his life, and this shower of pumice stones is well described in the younger Pliny's letter. Little of the matter that has issued from Vesuvius since that time had reached these parts; but I must observe, that the pavement of the streets of Pompeii is of lava; nay, under the foundation of the town, there is a deep stratum of lava and burnt matter. These circumstances, with many others that will be related hereafter, prove, beyond a doubt, that there have been eruptions of Vesuvius previous to that of the year 79, which is the first recorded by history.

“The growth of soil by time is easily accounted for; and who, that

has visited ruins of ancient edifices, has not often seen a flourishing shrub, in a good soil, upon the top of an old wall? I have remarked many such on the most considerable ruins at Rome and elsewhere. But from the soil which has grown over the barren pumice that covers Pompeii, I was enabled to make a curious observation. Upon examining the cuts and hollow ways made by currents of water in the neighborhood of Vesuvius and other volcanoes, I had remarked that there lay frequently a stratum of rich soil, of more or less depth, between the matter produced by the explosion of succeeding eruptions, and I was naturally led to think that such a stratum had grown in the same manner as the one above mentioned over the pumice stone of Pompeii. Where the stratum of good soil was thick, it was evident to me that many years had elapsed between one eruption and that which succeeded it. I do not pretend to say that a just estimate can be performed of the great age of volcanoes from this observation, but some sort of calculation might be made; for instance, should an explosion of pumice cover again the spot under which Pompeii is buried, the stratum of rich soil above mentioned would certainly lie between two beds of pumice, and if a like incident had happened a thousand years ago, the stratum of rich soil would as certainly have wanted much of its present thickness, as the rotting of vegetables, manure, etc., is ever increasing a cultivated soil. Whenever I find then a succession of different strata of pumice and burnt matter, like that which covers Pompeii, intermixed with strata of rich soil, of greater or less depth, I hope I may be allowed reasonably to conclude that the whole has been the production of a long series of eruptions, occasioned by subterraneous fire. By the size and weight of the pumice, the fragments of burnt erupted matter in these strata, it is easy to trace them up to their source, which I have done more than once in the neighborhood of Puzzole, where explosions have been frequent. The gradual decrease in the size and quantity of the erupted matter in the stratum above mentioned, from Pompeii to Castel-a-Mare, is very visible; at

Pompeii, as I said before, I have found them of eight pounds weight, when at Castel-a-Mare the largest do not weigh an ounce.

“The matter which covers the ancient town of Herculaneum is not the produce of one eruption only, for there are evident marks that the matter of six eruptions has taken its course over that which lies immediately above the town, and was the cause of its destruction. These strata are either lava or burnt matter, with veins of good soil between them. The stratum of erupted matter that immediately covers the town, and with which the theater and most of the houses were filled, is not of that foul vitrified matter, called lava, but of a sort of soft stone, composed of pumice, ashes, and burnt matter. It is exactly of the same nature with what is called here the Naples stone; the Italians distinguish it by the name of tusa, and it is in general use for building. Its color is usually that of our free stone, but sometimes tinged with grey, green and yellow, and the pumice stones, with which it ever abounds, are sometimes large, and sometimes small; it varies likewise in its degree of solidity.

“I saw the head of an antique statue dug out of this matter within the theater of Herculaneum; the impression of its face remains to this day in the tusa, and might serve as a mould for a cast in plaster-of-Paris, being as perfect as any mould I ever saw. As much may be inferred from the exact resemblance of this matter, or tusa, which immediately covers Herculaneum, to all the tusas of which the high grounds of Naples and its neighborhood are composed. I detached a piece of it sticking to, and incorporated with, the painted stucco of the inside of the theater of Herculaneum.

“If it were allowed to make a comparison between the earth and a human body, one might consider a country replete with combustibles occasioning explosions (which is surely the case here) to be like a body full of humors concenter in one part, and form a great tumor out of which they are discharged freely, the body is less agitated; but when, by any accident, the humors are checked, and do not find free passage through their usual channel, the body is agitated, and tumors appear in

other parts of that body, but soon after the humors return again to their former channel. In a similar manner, one may conceive Vesuvius to be the present great channel, through which nature discharges some of the foul humors of the earth; when these humors are checked by any accident or stoppage in this channel for any considerable time, earthquakes will be frequent in its neighborhood, and explosions may be apprehended even at some distance from it. This was the case in the year 1538, Vesuvius having been quiet for near four hundred years. There was no eruption from its great crater, from the year 1139 to the great eruption of 1631, and the top of the mountain began to lose all signs of fire. As it is not foreign to my purpose and will serve to show how greatly they are mistaken, who place the seat of the fire in the center, or towards the top, of a volcano, I will give you a curious description of the state of the crater of Vesuvius after having been free from eruption four hundred and ninety-two years, as related by Bracini, who descended into it not long before the eruption of 1631. 'The crater was five miles in circumference, and about a thousand paces deep; its sides were covered with brushwood, and at the bottom there was a plain on which cattle grazed. In the woody parts, boars frequently harbored; in the midst of the plain, with the crater, was a narrow passage, through which, by a winding path, you could descend about a mile amongst rocks and stones, till you came to another more spacious plain covered with ashes; in this plain were three little pools, placed in a triangular form, one towards the east, of hot water corrosive and bitter beyond measure, one towards the west, of water salter than that of the sea; the third of hot water, that had no particular taste.'

"The great increase of the cone of Vesuvius, from that time to this, naturally induces one to conclude that the whole of the cone was raised in the like manner; and that the part of Vesuvius, called Somma, which is now considered as a distinct mountain from it, was composed in the same manner. This may plainly be perceived, by examining its interior and exterior form, and the strata of lava and burnt matter of which it

is composed. The ancients, in describing Vesuvius, in their time, showed signs of its having formerly erupted."

This opinion on a vexed question is of much value:

"The mountain now called Somma was, I believe, that which the ancients called Vesuvius; its outside form is conical; its inside, instead of amphitheater, is now like a great theater. I suppose the eruption in Pliny's time to have thrown down that part of the cone next the sea, which would naturally have left it in its present state, and that the conical mountain, or existing Vesuvius, has been raised by the succeeding eruptions; all my observations confirm this opinion. I have seen ancient lavas in the plain on the other side of Somma, which could never have proceeded from the present Vesuvius. Serao, a celebrated physician now living at Naples, in the introduction of his account of the eruption of Vesuvius in 1737 (in which account many of the phenomena of the volcano are recorded and very well accounted for), says, that at the convent of Dominican Fryars, called the Madona del Arco, some years ago, in sinking a well, at a hundred feet depth, a lava was discovered, and soon after another, so that, in less than three hundred feet depth, the lavas of four eruptions were found. From the situation of this convent, it is clear beyond a doubt, that these lavas proceeded from the mountain called Somma, as they are quite out of the reach of the existing volcano."

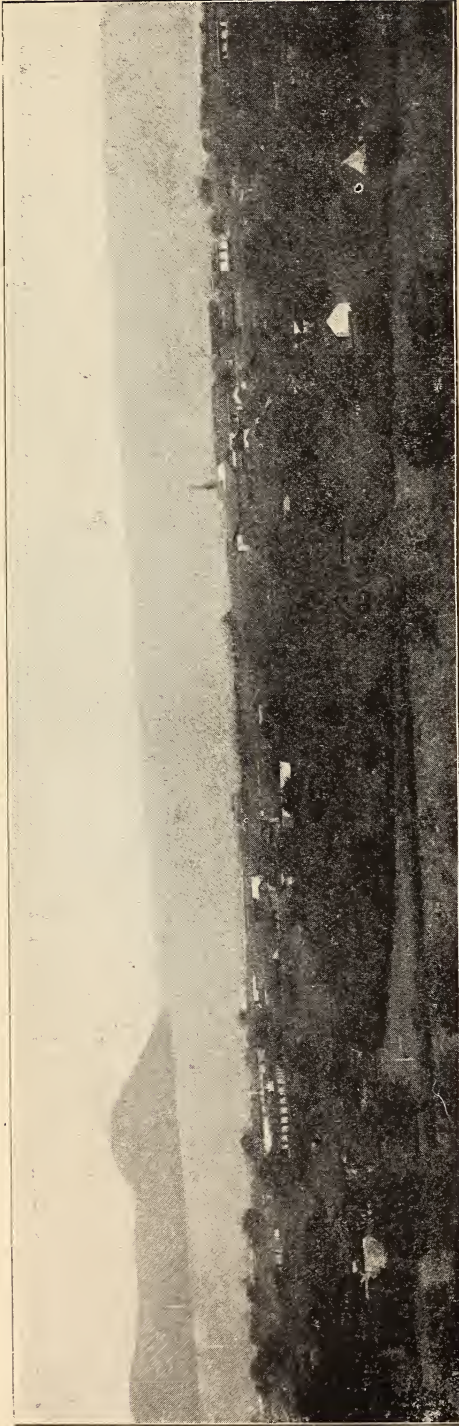
Sir William Hamilton presented to the British Museum a rare volume that touches the matter of the forms of new mountains by explosions. Marco Antonio delli Falconi, relates simply and exactly the operations of nature of which he was either an eye witness, or those related it to him, having themselves been witnesses:

"It is now two years that there have been frequent earthquakes at Pozzuolo, at Naples, and the neighboring ports; on the day and in the night before the appearance of this eruption, above twenty shocks great and small were felt at the above-mentioned places. The eruption made its appearance the 29th of September, 1538, the feast of St. Michael the angel; it was on a Sunday, about an hour in the night; and, as I have

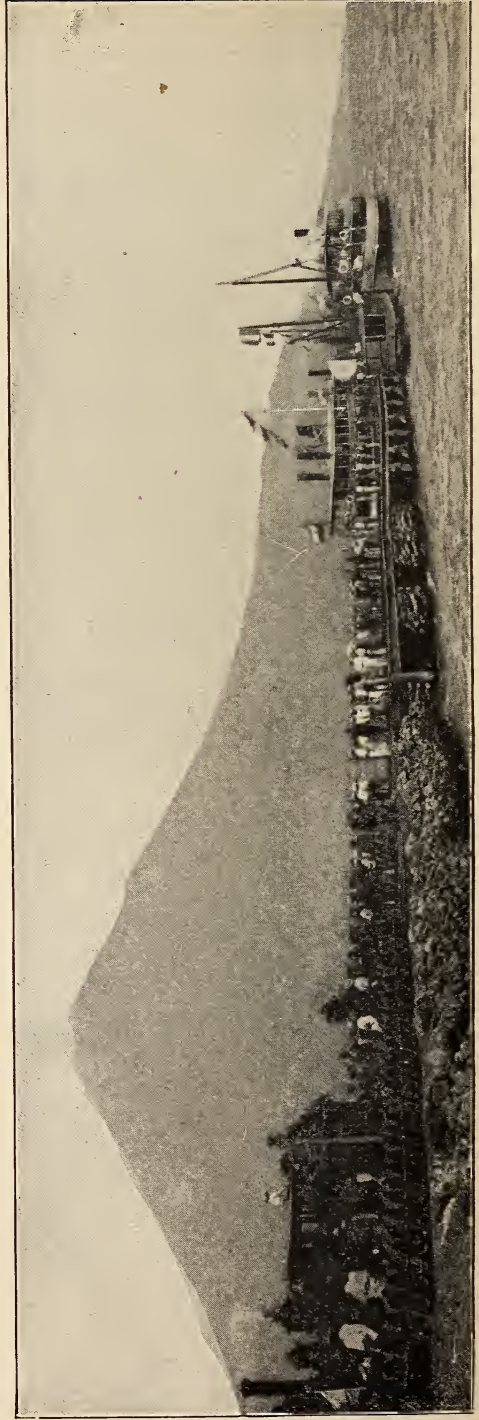


BANANA TRAIN ON LINE FROM PORT LIMON TO SAN JOSE, COSTA RICA.

6. LLENOIS
P. H. B. & C. CO., CHICAGO, ILL.



BIRDSEYE VIEW OF LAKE MANAGUA, FROM MANAGUA, THE CAPITAL OF NICARAGUA.



LANDING AT LAKE MANAGUA. RECEIVING PASSENGERS FROM TRAIN AT CORINTO, NICARAGUA.

been informed, they began to see on that spot, between the hot baths or sweating rooms, the Trepergule, flames of fire, which first made their appearance at the baths, then extended towards Trepergule, and fixing in the little valley that lies between the Monte Barbaro and the hillock called del Pericolo, which was the road to the lake of Avernus and the baths. In a short time the fire increased to such a degree that it burst open the earth in this place, and threw up so great a quantity of ashes and pumice stones mixed with water, as covered the whole country; and in Naples a shower of these ashes and water fell great part of the night. The next morning, which was Monday, and the last of the month, the poor inhabitants of Puzzuolo, struck with so horrible a sight, quitted their habitations, covered with that muddy and black shower, which continued in that country the whole day, flying death, but with faces painted with its colors; some with their children in their arms, some with sacks full of their goods; others leading an ass, loaded with their frightened family, towards Naples; others carrying quantities of birds of various sorts, that had fallen dead at the time the eruption began; others again with fish which they had found, and were to be met with in plenty upon the shore, the sea having been at that time considerably dried up. Don Petro di Toledo, Viceroy of the kingdom, with many gentlemen, went to see so wonderful an appearance; I also having met with the most honorable and incomparable gentleman, Signior Fabritio Moramaldo, on the road, went and saw the eruption and the many wonderful effects of it. The sea towards Baia had retired a considerable way; though, from the quantity of ashes and broken pumice stones thrown up by the eruption, it appeared almost totally dry. I saw likewise two springs in those lately-discovered ruins, one before the house that was the Queen's, of hot and salt water, on the shore, about two hundred and fifty paces nearer to the eruption; some say, that still nearer to the spot where the eruption happened, a stream of fresh water issued forth like a little river. Turning towards the place of the eruption, you saw mountains of smoke, part of which was very black and part very white, rise up to a great

height; and in the midst of the smoke, at times, deep-colored flames burst forth with huge stones and ashes, and you heard a noise like the discharge of a number of great artillery. It appeared to me as if Typhæus and Enceladus from Ischia and Etna with innumerable giants, or those from the Campi Phlegræi (which, according to the opinions of some, were situated in this neighborhood), were come to wage war again with Jupiter. The natural historians may perhaps reasonably say, that the wise poets meant no more by giants, than exhalations, shut up in the bowels of the earth, which, not finding a free passage, open one by their own force and impulse, and form mountains, as those which occasioned this eruption have been seen to do; and methought I saw those torrents of burning smoke that Pindar describes in an eruption of Etna, now called Mon Gibello, in Sicily; in imitation of which, as some say, Virgil wrote these lines:

‘Ipse fed horrificis juxta tonat Aetna ruinis, etc.’

“After the stones and ashes with clouds of thick smoke had been sent up, by the impulse of the fire and windy exhalation (as you see in a great cauldron that boils), into the middle region of the air, overcome by their own natural weight, when from distance the strength that had received from impulse was spent, rejected likewise by the cold and unfriendly region, you saw them fall thick, and, by degrees, the condensed smoke clear away, raining ashes with water and stones of different sizes, according to the distance from the place; then, by degrees, with the same noise and smoke, it threw out stones and ashes again, and so on by fits. This continued two days and nights, when the smoke and force of the fire began to abate. The fourth day, which was Thursday, at 2 o’clock, there was so great an eruption, that, as I was in the gulf of Puzzole, coming from Ischia, and not far from Misenum, I saw, in a short time, many columns of smoke shoot up, with the most terrible noise I ever heard, and, bending over the sea, came near our boat, which was four miles or more from the place of their birth; and the quantity of ashes,

stones and smoke, seemed as if they would cover the whole earth and sea. Stones great and small, and ashes more or less, according to the impulse of the fire and exhalations, began to fall, so that a great part of this country was covered with ashes; and many, that have seen it, say they reached the vale of Diana, and some parts of Calabria, which are more than one hundred and fifty miles from Pozzuolo. The Friday and Saturday nothing but a little smoke appeared; so that many, taking courage, went upon the spot, and say that with the stones and ashes thrown up, a mountain has been formed in that valley, not less than three miles in circumference, and almost as high as the Monte Barbaro, which is near it, covering the Canettaria, the castle of Trepergule, all those buildings and the greatest part of the baths that were about them; extending south towards the sea, north as far as the lake of Avernus, west to the Sudatory, and joining east to the foot of the Monte Barbaro, so that this place has changed its form and face in such a manner as not to be known again, a thing almost incredible, to those who have not seen it, that in so short a time so considerable a mountain could have been formed. On its summit there is a mouth in the form of a copu, which may be a quarter of a mile in circumference, though some say it is as large as our market place at Naples, from which there issues a constant smoke; and though I have seen it only at a distance, it appears very great. The Sunday following, which was the 6th of October, many people going to see this phenomenon, and some having ascended half the mountains, others more, about 2 o'clock there happened so sudden and horrid an eruption, with so great a smoke, that many of these people were stifled, some of which could never be found. I have been told that the number of the dead or lost amounted to twenty-four. From that time to this nothing remarkable happened; it seems as if the eruption returned periodically, like the ague or gout."

The following account of an ancient rain of mud resembles that from Mont Pelee, and there is in ancient observation much that is like the

belching of floods of fire like vast outbursts of lightning, as in the one awful stroke that annihilated St. Pierre. Especially note this :

“In an account of the formation of the Monte Nuovo di Toledo, it is said of an eruption in the province of Campagna that the country about Pozzuolo, was more affected than other parts—that the earthquakes did not cease day or night, and that the plain between the lake of Averno, the Monte Barbaro, and the sea, was raised a little, and that water issued from cracks. At last, in the night, the earth opened near the lake and discovered a horrid mouth, from which were vomited furiously smoke, fire, stones and mud composed of ashes, making, at the time of its opening, a noise like very loud thunder; the fire, that issued from this mouth went towards the walls of the unfortunate city; the smoke was partly black and partly white; the black was darker than darkness itself, and the white was like the whitest cotton; these smokes, rising in the air, seemed as if they would touch the vault of heaven; the stones that followed were, by the devouring flames, converted to pumice, the size of which (of some I say) were much larger than an ox. The stones went about as high as a cross-bow can carry, and then fell down, sometimes on the edge, and sometimes into the mouth itself. It is very true that many of them in going up could not be seen on account of the dark smoke; but when they returned from the smoky heat, they showed plainly where they had been by their strong smell of fetid sulphur, just like stones that have been thrown out of a mortar and have passed through the smoke of inflamed gunpowder. The mud was of the color of ashes, and at first very liquid, then by degrees less so; and in such quantities that in less than twelve hours, with the help of the above mentioned stones, a mountain was raised of a thousand paces in height. Not only Pozzuolo and the neighboring country was full of this mud, but the city of Naples also, the beauty of whose palaces were, in a great measure, spoiled by it. The ashes were carried as far as Calabria by the force of the winds burning up in their passage the grass and high trees, many of which were borne down by the weight of them. An infinity

of birds also, and numberless animals of various kinds, covered with this sulphurous mud, gave themselves up a prey to man. Now this eruption lasted two nights and two days without intermission, though, it is true, not always with the same force, but more or less; when it was at its greatest height, even at Naples you heard a noise or thundering like heavy artillery when two armies are engaged. The third day the eruption ceased, so that the mountain made its appearance uncovered, to the no small astonishment of every one who saw it. On this day, when I went up with many people to the top of this mountain, I saw down into its mouth, which was a round concavity of about a quarter of a mile in circumference, in the middle of which the stones that had fallen were boiling up, just as in a great caldron of water that boils on the fire. The fourth day it began to throw up again, and the seventh much more, but still with less violence than the first night; it was at this time that many people who were unfortunately on the mountain were either suddenly covered with ashes, smothered with smoke or knocked down by stones, burnt by the flame and left dead on the spot."

Sir William makes the shrewd remark that if the matter which proceeds from the volcano comes from so considerable a depth as imagined, that part of the mountain situated above their supposed seat of the fire must necessarily be destroyed or dissipated in a short time; but it is found that an eruption generally adds to the height of a volcano. This, Sir William regarded as a proof that the real seat of the fire of a volcano lies greatly below the general level of the country whence the mountain springs. The lake of Avernus is undoubtedly, according to the observations of Sir William, produced by an explosion, and that part of the basis of the mountain washed by the sea remained very hot though constantly washed by waves, and, "in the cone of the mountain near this hot sand, a narrow of about one hundred paces in length was cut, leading to a fountain of boiling water, which, though brackish, boils fish and flesh without giving them any bad quality. This place is called Nero's Bath, and still made use of as by the ancients. The steam rising

from the hot fountain confined in the narrow subterraneous passage produces a violent perspiration upon patients who sit therein, and this bath is reckoned a great specific in that distemper which is supposed to have made its appearance at Naples before it spread its contagion over other parts of Europe."

As to what Virgil and other ancient authors say, that birds could not fly with safety over the Lake of Avernus, but fell within, Sir William says: "The vapor of the sulphur and other minerals must have been more powerful as we go nearer the time of the explosion of the volcano, but there are still remains of those vapors upon the lake, seldom any water fowl go upon it, and "when they do go there it is but for a short time, while all the other lakes in the neighborhood are completely covered with them in the winter season. Upon Mt. Vesuvius, in the year 1766, during an eruption, when the air was impregnated with noxious vapors, I have myself picked up dead birds frequently."

Sir William found an ample field for curious observation in the island of Ischia. The whole of its soil is like that of Vesuvius. It is full of hot springs, a great bathing place. The patient begins by bathing and then is buried in the hot sand near the sea, but near that part of the island called Lacco, "there is a rock of an ancient lava, forming a small cavern which is shut up with a door." This cavern is made use of to cool liquors and fruit, which it does in a short time as effectually as ice.

In the latest of the letters of Sir William he says, "I am convinced that the smoke of volcanoes contains always a portion of electrical matter, which is manifest at the time of great eruptions, as is mentioned in my account of the great eruption of Vesuvius in 1767."

Sir William says, "Such remarks as I have made on the eruptions of Mt. Vesuvius, during my residence in Naples, have been transmitted to the Royal Society, who have done them more honor than they deserved. Many more observations might be made upon this active volcano, by a person who had leisure, a previous knowledge of the natural history of the earth, and of chemistry, and was practicing physical experiments,

particularly those of electricity. May not the air in countries, replete with sulphur, be more impregnated with electrical matter than the air of other soils, and may not the sort of lightning mentioned by several ancient authors to have fallen in a serene day and was considered an omen, have proceeded from such a cause? The peasants in the neighborhood of my villa, situated at the foot of Vesuvius, assured me that during the eruption they were more alarmed by the lightning and balls of fire that fell about them with a crackling sound than by lava and the usual attendants of an eruption. I find in all accounts of great eruptions mention made of this sort of lightning. Bracini in his account of the great eruption of Vesuvius, in 1631, says, 'The column of smoke which issued from the crater went over near an hundred miles of country, and that several men and beasts were struck dead by lightning issuing from this smoke.'

The noxious vapors are called mofete, and are set in motion by an eruption of Vesuvius, and then are manifest in wells in subterranean parts of the neighborhood.

Sir William says, "Just before the eruption of 1767, a vapor of this kind broke into the King's chapel at Portici, by which a servant opening the door of it, was struck down. About the same time, as his Sicilian Majesty was shooting in a paddock near the palace, a dog dropped down, as was supposed, in a fit; a boy going to take him up dropped likewise; a person present, suspecting the accident to have proceeded from a mofete, immediately dragged them both from the spot where they lay, in doing which he was himself sensible of the vapor; the boy and the dog soon recovered. His Sicilian Majesty did me the honor of informing me himself of this accident soon after it had happened. I have met with these mofetes often, when I have been making my observations on the borders of Mount Vesuvius, particularly in caverns, and on the Solfaterra. The vapor affects the nostrils, throat and stomach, just as the spirit of hartshorn, or any strong volatile salts; and would soon prove fatal, if you did not immediately remove it. Under the ancient city of

Pompeii, the mofetes are very frequent and powerful, so that the excavations that are carrying on there are often interrupted by them; at all times mofetes are to be met with under ancient lavas of Vesuvius, particularly those of the great eruption of 1631."

The electricity in the smoke of a volcano in violent eruption is probably the element that caused the awful stroke of fire that destroyed the city of St. Pierre, with its inhabitants, and there is no question that this cloud of fire, swift, irresistible and fatal, a monstrous sword of flame that devoured the city and the people, was simply a mighty manifestation of electricity.

CHAPTER XXV.

THE CARIBBEES AND THE ISTHMIAN CANALS.

STILL THE ROAD AROUND THE WORLD IS THAT WHICH COLUMBUS SOUGHT—THE TRADE WINDS CARRIED HIM ON BROAD TROPICAL LINES OF CIRCUMNAVIGATION — THERE ARE NO CONTINENTS TO FIND, BUT THERE IS AN ISTHMUS TO CUT TO FIND THE BROAD WAY, AND THE CARIBBEES GUARD THE GATE OF THE CENTRAL SEAS.

In "Camps in the Caribbees," written by an adventurous naturalist, a quarter of a century ago, there is a delightful chapter about "Grenada and the Grenadines." We quote:

"In Bequia, and extending throughout the chain, is a blackbird—a new species named the *Quiscalus luminosus*—which makes the air resound with its joyous cry: 'Bequia sweet, sweet, Bequia sweet.' The Caribs told me of this bird several months before I obtained it, as its peculiar cry had caused it to be marked by them. They had preserved a touching story of its connection with Carib captivity, when the Indians were confined in the small island of Balliceaux.

"The island in which they were prisoners was low and dry, without a tree large enough to shelter them from the sun; a few miles distant, full in sight, was the island of Bequia, six times theirs in size, with high hills covered with green forests. To them it was as paradise; they longed for its breezy hills, sighed for the cool shade of its trees, but sighed in vain. Deprived of their canoes, of houses, of material for constructing more than slight shelter, these poor people lay gasping beneath a tropic sun, gazing at the misty mountains of their native island and the green slopes of Bequia, without a possibility of reaching either. All about them the blackbirds sang praises of the distant island: 'Bequia sweet, sweet, Bequia sweet.' Though St. Vincent is but ten miles dis-

tant, the blackbird is never seen there, affording but one of many peculiarities in the distribution of animals throughout these islands.

“Grenada appears a cloud-line when we are off Union Island, and gradually emerges from the haze as we draw nearer, purple in hue, of course, long, but not so high as St. Vincent and the island north.

“Union Island is black and gloomy from the east, as we coast along, indicating a virgin vegetation and little cultivation. Its sharp, serrated outline reminding one of a line of snow-drifts after a heavy midwinter storm when a fierce wind has swept along, leaving them combed or sharply cut, suggests either immense denuding, eroding floods or upheaval.

“Were these islands once connected with the mainland of either continent? How often this question arises in one’s mind as he gazes on these mountains peering above the sea! Did they, in the language of Humboldt, ‘belong to the southern continent, and form a part of its littoral chain,’ or have they been upheaved from the depths of the sea? The great naturalist thus refers to these islands and the various theories regarding their origin. ‘The supposition of an oceanic irruption has been the source of two other hypotheses on the origin of the smaller West India islands. Some geologists admit that the uninterrupted chain of islands from Trinidad to Florida exhibits the remains of an ancient chain of mountains. I am rather inclined to consider them as islands heaved up by fire, and ranged in that regular line of which we find striking examples in so many volcanic hills in Mexico and in Peru.’

“We would fain connect these mountain-peaks with a submerged continent, a continent that extended over the vast space now occupied by the Caribbean Sea, and into the Atlantic far over toward the coast of Africa. We are ready to believe that the ‘lost Atalantis’ of the ancients is not a myth, that it is not a ‘fabled island,’ but had a real existence, and that the land discovered by those Tyrian navigators who sailed beyond the Pillars of Hercules and were driven by a storm many days sea-

ward, was part of a continent now beneath the waves—the eastern shore of a region which these mountains once traversed; for—

“Who knows the spot where Atalantis sank?
Myths of a lovely drowned continent
Homeless drift over waters blank;
What if these reefs were her monument?
Isthmus and cavernous cape may be
Her mountain summits escaped from the sea.’”

Following the earthquake of 1902 that desolated extensively two islands, destroyed one city totally and damaged others, the question arose whether the bottom of the sea had fallen more than three thousand feet, and it has not been settled. If the sounding for broken cables was truly reported its meaning is very grave, nothing less than the possible disappearance of islands. Such things have happened many times, though not on a large scale.

“The world is on fire” sure enough, and there are stupendous witnesses in burning mountains, and the lesson of the prodigies of our planet is the more deeply impressed by the history of desolation wrought in other days, like that which is written with the lightnings and testified by thunders, the terrors of other times.

There is a call by the people for knowledge of the theories and traditions, the histories and the science, the wonders and appalling majesty of the volcano and earthquake; and there is a serious and far-reaching public feeling, hardly articulate yet, that we are indeed “living and having our being in a grand and awful time.”

Pains have been taken that the surpassing elements of the potentiality the worlds are dealt with cause the stars to be studied with new interest, and interpret the anguish of the earth's trembling agony.

There is brought to the front, and drawn with appropriate colors, the figures of the actors who have made history in the region of the Lesser Antilles. First is the august Columbus on his latest trans-Atlantic voy-

ages. The final destruction of the Caribs is announced. The race of men on the islands when civilization found them had a few thousand representatives until the recent eruptions not only buried a city but extinguished a race.

Frightful as is the desolation wrought in the Caribbean Islands by their volcanoes, we must not forget that they have been important in our national affairs, and in spite of the calamities now so conspicuous, will hereafter prove more significant in the world's developments, which are moving with mighty strides, than they ever have been.

One of the most influential of the founders of our national government, and he the one who gave it the most decisive aid given, with the exception of George Washington and John Marshall, to make it a nation, was Alexander Hamilton. If it had not been for his foresight and genius for organization, there is a question whether we, the people of the United States, would to-day have bordered on the Pacific ocean, possessed the greater archipelagoes of the greater ocean, and the most commanding position held by any nation to control the commerce and the markets westward, from America to Asia. We have been triumphantly spared thus far from the policy of littleness, in which some of our politicians are playing possum and some playing monkey, while the people at large go on and grow in their grand old way, expanding in territory, and yet gaining constantly and consistently in the solidity that is unity at home, and in wholesome reputation and commanding attitude abroad.

There were two men of political faculty of the highest order, who took great part in our revolutionary war, and the formation of our government on principles so broad and free and yet strong, and bound together in States but one people; and, of course, the two men were opposed, and each had abounding capacity for public services of creative power.

Thomas Jefferson, of Virginia, and Alexander Hamilton, from the Caribbean Islands, born on Nevis, are the men. Hamilton's mind, native of a little island as he was, flashed over the continent, and his sagacity

demanded the strength in the Departments of the Government to expand and sustain itself, to annex all we could grasp of the continent and the islands of the sea. Jefferson bought the mouths of the Mississippi and the land west to the Pacific. Even now the New England senators are unanimous for the preservation of the Louisiana purchase, and Senator Hoar employs his customary felicity of expression when he says of Jefferson: "He comes down to us with the Declaration of Independence in one hand and the Louisiana Purchase in the other." Andrew Jackson's personal power achieved what he called the reannexation of Texas, and he settled all questions of doubt about our title to the land at the mouth of the Mississippi, without consulting the alleged people thereabout then or in a subsequent generation. We paid money for it, and burnt powder for it, from Mexico all the way to Florida.

This is the time to say that ultimately the United States should be sovereign over all the West Indies, and no part of that greatest of archipelagoes is of more value to us, and more naturally and inevitably belongs to us, than the whole string of the Caribbean Pearl Islands. There is no application possible of the Monroe Doctrine to the Philippines for they are not in the American hemisphere. But this hemisphere has a Monroe Doctrine, and a Mediterranean ocean, too, as surely as there is one nearly surrounded by Europe, Asia and Africa. We of the North American continent are dominant and paramount here, as Europe is there. Our United States will, in a brief time in the life of a Nation, be equal in population and potency, as Europe would be if one, and there is not a rock with a tree on it that sticks out of the waves of the American (that should be called) the Columbian, Mediterranean, that should not belong to us.

We shall not gather in all these islands immediately. Even after Cuba was conquered by us, we consented that her people might go out of our iron-bound Union until the Cubans would be glad to contract on our terms to be sheltered under our wings. Cuba is more readily subjected to the magnetism of Union with us than any other island we have

not; and that is something that can be felt across the narrow waters. Cuba is ONE, and has ONE people speaking ONE language, and may be dealt with as an organized community. It is different in a thousand islands, between which there is little communication—no communion outside a few scraps of land having special and yet scanty acquaintance, where there are many languages and a hundred dialects. Cuba can express her will to be with us, when she wants to do so, and she and we will listen to reason.

The Windward Islands, the Leeward Islands, the Pearl Islands, the Lesser Antilles, the Caribbees, are the sentinels across the vast mouth of the American Mediterranean, from Porto Rico to South America. It was along that line the fleets of England, France and Spain were accustomed to fight, when the western powers of Europe were contesting their natural, royal and divine rights to grasp that archipelago empire—the West Indies. The Caribbees are now the points of advantage to have and to hold, in view of that which is to be as well as to what has been. It is to this country that the attraction of gravitation draws the American islands, and when we have constructed the canal between the Atlantic and the Pacific—whether the route of it is to be that of Panama or Nicaragua—and in a great matter at least the better road is the shorter distance—there will be a commercial route around the world in the tropics. The golden stream will run both ways, with and against the sun, through the two inter-ocean canals—Suez and Darien.

It was obvious at once to the people aware of what is going on in the world, when the Carib volcanoes boomed, that their formidable explosions and amazing eruptions must and should affect the Isthmian Canal question. That fact alone shows the abiding interest of the insistent situation. The nations of Europe are interested in the extension, organization and cultivation of their colonies. Those who have the largest area of possessions that are not contiguous—the scraps of distant continents and islands remote, especially in the tropics—are the most eager of the expounders and the exemplars of expansion. The only

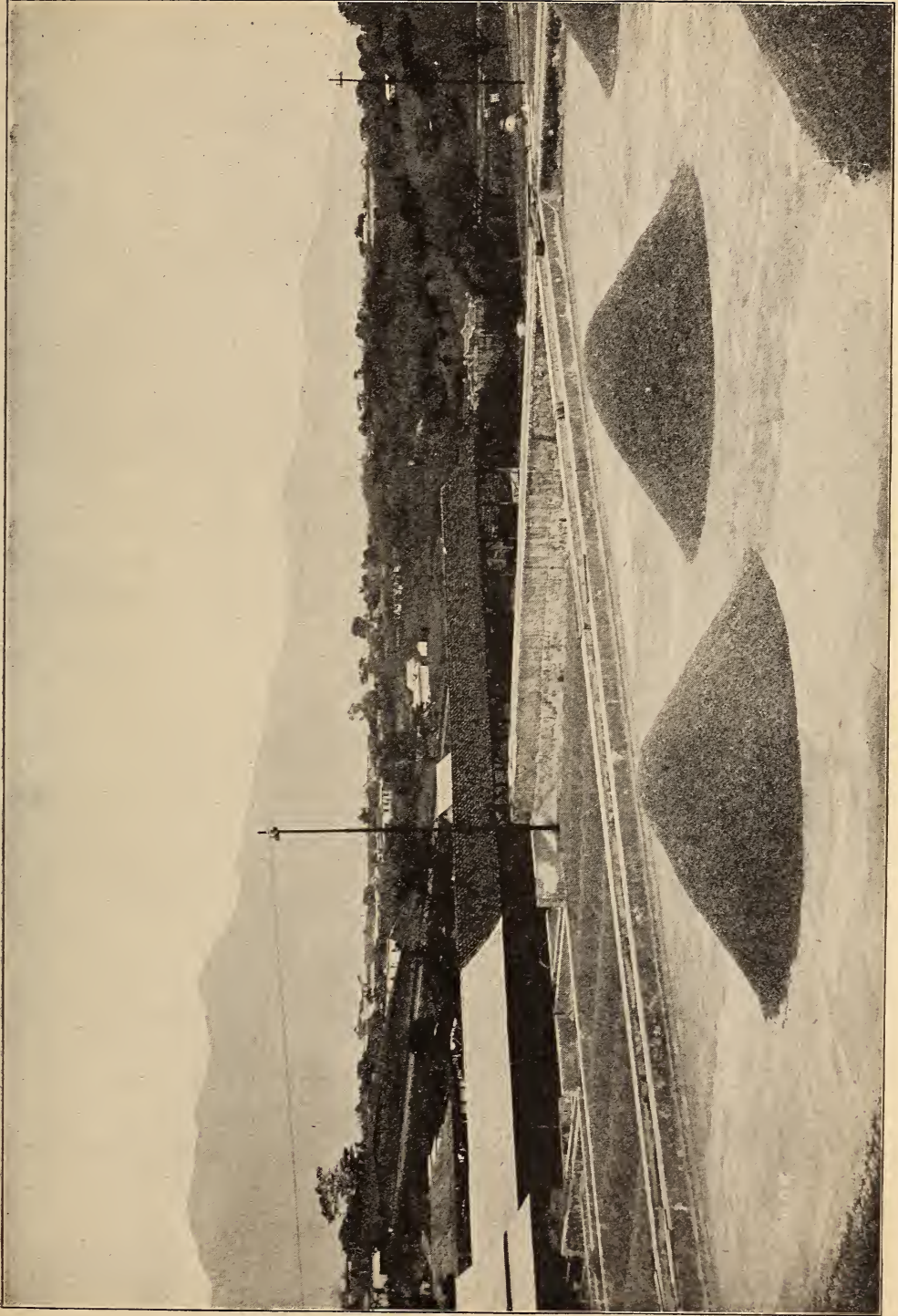
country in which there is any misgiving that appears prominently in public discussion about the pursuit of this policy is our own.

There are two Mediterranean seas—one in the Eastern and one in the Western hemisphere. That situated between Europe and Africa and bounding Central Asia on the west from Egypt to the Hellespont is the ocean of the ancients whose history is most familiar to us—the seat of the sea power of the earlier empires—transpierced in the center by the Italian peninsula, with the Island of Sicily, for which the Greeks, Carthaginians and Romans fought, until Rome became the master of the world that surrounded the sea that was in the middle of the earth. Africa seems to hang to Asia by a narrow neck of land, and swing in the abyss of the Southern Oceans—a vast river, the Nile, flowing north from South Africa to the historic Mediterranean, the other great channels of African drainage pouring their floods into the Atlantic. Through the Isthmus of Suez is excavated the most famous of canals, and it has become the key to the British Empire, committed now to hold Egypt as long as she governs India, and cares for her commerce in Asiatic waters. We, the people of the United States, have a deeper interest in the haunts of the ancients than in other days, when we studied the voyages of our regiments by way of Gibraltar and the Suez Canal en route in our troopships for Manila. The canal between Africa and Asia has become a highroad for our ships and troops from Atlantic shores to our new possessions on the other side of the world. The Gulf of Mexico, with the Caribbean Sea, is the American Mediterranean, North America on the north, and South America on the south, the peninsulas of Florida and Yucutan with the Island of Cuba separating the huge Gulf from the Atlantic Ocean and the Caribbean Sea. The correspondence between the two Mediterranean seas, that of the old world, from which Columbus came and that of the new he discovered, is in many respects remarkable. No map of the world fails to make conspicuous the two seas that are central to the old and the new. South America seems suspended like a prodigious pendulum, as we turn a model of the globe, by the

Isthmus of Darien, to North America, whose gigantic arctic region is fixed in eternal ice; and the construction of a canal uniting the American Mediterranean with the Pacific, as that of Suez with the old Mediterranean by way of the Red Sea with the Indian Ocean, and that, by the Sea of China, with the Pacific, has ceased to be of dreams like those of flying to the moon, and is a colossal enterprise, not only an ultimate hope, but an improvement certain of execution at no very distant day. There is capital and labor to do it, and the first difficulty is the obstinate and momentous one of the choice of routes. There are rival plans, the Panama and the Nicaragua. The latter has absorbed the greater attention in America, the former in Europe. It is probable that sooner than would be readily conjectured, both will be completed and in competition until they find it reasonable and profitable to adopt the railroad trunk-line transcontinental policy, fixing rates to improve the standing of the stock, representing tremendous investments. Once it was a wonder that there should be a railroad across the continent of North America. Now the average citizen does not know the number of lines that bind our dominions in bonds of steel, and span our Rocky Mountains and alkali plains with such ease of transfer that we cease to compute them as elevations or spaces, save as in distance measured by time, the freight rates and car fare.

If the Isthmus of Darien had been a sandy plain like that of Suez, it would have been cut through by a ship canal long ago, and the thoroughfare undoubtedly the property of England, possibly with France for a partner, but the English would have had the majority interest in navigation, the greater weight of capital, the higher appreciation of commerce, and the deeper and keener sense of possession.

The world heard, along with the measurements of the rugged strip of rocks that is the chief obstruction of the circumnavigation of the earth in the tropics, of the peaks of Darien, from which Balboa beheld the broader of the oceans. The discovery of the Pacific was the opening of the most wonderful waste of waters in the world, and the imagination



COFFEE-CURING ESTABLISHMENT AT SAN JOSE, COSTA RICA.



NATIVE HOUSE, SHOWING KITCHEN, IN MASAYA, NICARAGUA.



BARBER SHOP IN ADOBE HOUSE, MASAYA, NICARAGUA.

of adventurers soon peopled this great deep with surpassing visions of splendor, and there have been four centuries of blended history and commerce.

D. C. Rodrigues, LL. B., in a work on the Panama Canal—Chas. Scribner & Sons, 1885—devoted a chapter chiefly to the first centuries of the history of the American isthmus. As Rodrigues wrote, we quote "The Panama Canal," pages 5-17:

"The idea of piercing the isthmus between the two Americas is almost contemporaneous with the first knowledge of the isthmus itself. The early navigators could not help noticing how near to each other were the two oceans, and how comparatively easy would be (they thought) the cutting of a canal through that narrow strip of land between them. The celebrated Portuguese navigator, Antonio Galvao, as early as 1550, wrote an essay on the subject, wherein he suggested four different lines, one of which was through the lake of Nicaragua, and the other by the Isthmus of Panama. Lopez Gomara, the Spanish historian, mentions in 1551 the four routes of which he very likely learned from the monograph of Galvao.

"The idea, however, remained dormant for fully two centuries. One of the earliest exploits of Nelson was the attack on Port San Juan in 1779, with the ulterior purpose, it appears, of controlling the river and lake communications between the two oceans, of which the fort was supposed to be the best debouche. Fever, however, decimated his crew, and he returned to England. In the meantime Charles III. of Spain sent out the really first exploring expedition under Manuel Galistro, in 1780; but the subsequent political complications in the European politics diverted attention from his project. In the beginning of our century, Humboldt, who studied on the spot the problem of piercing the isthmus, strongly endorsed its feasibility, but all Europe was then, and remained for many years, absorbed in her own politics."

It is apparent to the world that the Caribbean Islands maintain their position for the exchange of commerce, in this country, as they did one,

two and three hundred years ago, as points of commanding advantage for conquest. They are as well placed for peace as for war. Once the foes of Spain lurked in them looking for the ships bearing the spoils of the New World. Now they are in the route of steamers circumnavigating the globe, as they were when the trade winds were the motive power for sailing into sunsets.

CHAPTER XXVI.

THE DARIEN ISTHMIAN CANAL HISTORY.

THE MATERIAL QUESTION NOT THE ROUTE, BUT THE ACHIEVEMENT—
SUPREME ADVANTAGES IT WOULD GIVE THE UNITED STATES—IT
WOULD UNITE THE OCEANS—SALIENT POINTS OF A HISTORICAL
DISCUSSION—THE TIME TO ACT IS NOW.

We of the United States do not need to be so very exclusive as to the construction of the Isthmian Canal, that owing to our position must fall under our jurisdiction. The peculiar strength we have in the world, now that we have become a world power and the fact is recognized in some way by all the nations, is, first, we confront Europe across the Atlantic, and have more ocean front in the waters of the north temperate zone looking eastward than all the powers of Europe, more coast line and great cities on the Atlantic than all Europe possesses; that is, we exceed England, France and Spain together. Crossing the continent, we have more Pacific coast line in the waters that are not annually locked with ice than any other nation, with the exception of inert China, and we have three great archipelagoes, the Aleutian in the north, the Philip-pines in the far west, and the Hawaiian in the east center of the great ocean, and no other nation is in such a commanding attitude on the Pacific as ourselves. We have advantages on both our ocean fronts that are incomparable. The earliest very ambitious idea, when we became a nation and the people studied their splendid inheritance, was that we must become possessed of the mouths of the Mississippi, and of both banks of the Mississippi from source to mouth; and as much west to the Rocky Mountains and the Pacific as we could annex by purchase and conquest. Hence the Louisiana purchase. We allowed Texas to get away, but recovered the France of America. We have recently expelled

Spain from the West Indies, taken Porto Rico for our own, assisted in setting Cuba up as independent, that she may educate herself by following our example, so as in good time to form with us a more perfect union. We have also an option on the Danish islands; and the volcanoes of the Lesser Antilles should teach us, so the scientists say, that those islands are barriers that court the sediment of our great rivers that pour into the Gulf, so that we have them surrounded by our rich earth, until there are cracks in the bottom of the sea that turn loose the inner fires.

This would seem to show that it is not westward alone that we have an interest in the course of empire. We have on the coast of the American Mediterranean the immense State of Texas and that of Louisiana, and then come in order the cotton states of Mississippi and Alabama with their tributary streams, and the western section of Florida, after which comes the whole peninsula of Florida and her Keys, and we have added rights and privileges of naval accommodation in Cuba. So that we exceed all nations in our position north and east of the Gulf. We have the land and the islands giving supremacy to our influence over the Atlantic, Pacific, the Mexican and Caribbean Seas and the great northern lakes. If there is a center of the earth more plainly marked on the maps than any other it is the part of North America that is our basis of expansion.

We must bring our oceans and seas together by an Isthmian Canal. That is the great and only thing needful to give expression to our nation as the paramount factor of the hemisphere.

We ought to have personages with the potentiality to overcome the tardiness of negotiations—a congress capable of putting on the finishing touches in fashioning our "Empire of Liberty" (the phrase of the author of the Declaration of Independence). England would have missed her opportunity of a century if Disraeli had not had the courageous statesmanship to buy the shares of stock in the Suez Canal just in time. The splendid stroke of fortune for England that Disraeli made is that described by Mr. Milner, the highest authority on the subject:

“We bought for four million pounds Egypt’s interest in the Suez Canal, which, had she only clung to it, would soon have become so fertile a source of income to her. What we bought for four million pounds will in another year be worth something near twenty million pounds.

“In addition to the shares, England required Egypt to contract a wholly new obligation. A terminable annuity of two hundred thousand pounds a year to be paid by Egypt to England was created in 1876 to expire in 1894. The shares belonged to Egypt, not to Ishmain. They were an asset of the Government, and would never have passed to Tewfik as his private property or that of his brothers had Ismael been succeeded by Prince Halim. The ruler of the day contributed from first to last more than all the sums borrowed or subscribed by share-holders in Europe. These advances were made by the Egyptian treasury, and there can be no doubt that the shares belonged to the Egyptian Government and not to any ruler of Egypt. The shares will be worth in 1894, at present prices, £18,543,210. The transaction of 1876 belongs to a class against which a court of equity has never failed to afford relief.

“On the one side is the British treasury, claiming to have made £18,500,000 without the expenditure of a farthing. On the other side are all those who are interested in Egypt, including British taxpayers who have purchased Egyptian securities. If it is even possible that the opinion might be expressed by the judicial and financial advisers to His Highness the Khedive, or by the international tribunals, that Great Britain never acquired the ownership of the Suez Canal shares in fee simple absolute, because they were the property of the inhabitants of Egypt, created by their labor, subject to the lien of the creditors of Egypt and those of the Ottoman Empire; that they were pledged and not sold by a Khedive dismissed for malversation in office at the instance of England itself; that they had been redeemed by the annual payment of £200,000,000 a year, raised sometimes out of taxes cruelly burdensome, sometimes by new imposts and fresh loans, would it not be more discreet to begin

as speedily as possible to show a disposition to treat this fund as a source out of which mutual benefits might be obtained?"

There is no such speculation awaiting us, but the evidence of current history is all one way, that the situation offers us ample security for the investment, whatever it is. There have been for hundreds of years discussions as to the better route for the Canal that is to give directness to the comparatively easy commercial navigation of the globe. We have no purpose of partisanship in this contention.

Commerce has employed the Panama route for over fifty years. The conditions of traffic are established and well known.

The Panama route constitutes a part of the coast line of the United States, connecting its Atlantic and Pacific coasts. Its terminal cities—Colon, Panama—are ancient and firmly established. Upon the intermediate line thirty railroad stations, serving the neighboring villages and settlements, give character to the route. It is not a marshy jungle. It is a settled country, and the line has been made readily accessible and habitable by fifty years' traffic, development and settlement.

Regular lines of steamers, from Germany, England, France, New York, Belgium, Spain and Italy, on the Atlantic side, and San Francisco and all Central and South American and Mexican ports, on the Pacific side, have for over fifty years regularly employed this route.

CHAPTER XXVII.

THE ISTHMIAN CANAL QUESTIONS.

THE COMPETITION BETWEEN THE PANAMA AND NICARAGUAN ROUTES
—THEIR COMPARATIVE LENGTH AND SITUATION—THE SPLEN-
DID STORY OF THE SUEZ CANAL—ALL THE NATIONS OF THE
EARTH WANT THE AMERICAN ISTHMIAN CANAL.

The Chagres River has been represented for and against the Panama route. The locality of the canal is in considerable part in the valley of the Chagres, which is not a strong stream in dry times, but "subject sometimes to sudden and enormous freshets." The flow of the river cannot be direct into the canal, and must be regulated by dams creating artificial lakes. The dam at Bohio at the last group of locks on the Atlantic side will create a lake extending a distance of 13 miles to Obispo, where the canal will leave the river. The lake formed by the Bohio dam will cover an area of 21.5 square miles. Its lowest level is fixed at 52.5 feet, its normal level at 55.75 feet, and its highest level at 65.5 feet above mean tide. It will be revetted with stone, with a foundation bed of clay and abutting against rock banks. The extreme length of crest will be 1,286 feet; the extreme height above the bed of the river will be 75.5 feet, and above the lowest point of the foundation 93.5 feet.

The other dam is located on the upper Chagres 9 1-3 miles from the canal, and the reservoir will cover 10 square miles. Both dams can accumulate a storage of 66,000,000,000 gallons. It is considered that the Chagres River question is thus disposed of, and that not only is it rendered harmless, but as General Abbott says, "It may safely be affirmed that the Chagres River is no longer an element of danger, but is rather a useful friend, whose assistance will be of great value to the canal in its operation."

The original purpose of the old company was to build a canal without locks, freely open from ocean to ocean, but after several years of work the plan was abandoned; owing to the enormous excavations necessary to cut through the central mass of the mountains (the Culebra) and the difficulty and expense of properly taking care of the occasional torrential flow of the River Chagres.

The total length of the canal contemplated in the work done is 46 2-10 miles, including dredging to deep water in the Pacific. The new company acquired in October, 1894, the canal works, plant, machinery, concessions, stocks and other assets of every description of the old company and realized at the outset that the most judicious way to employ its capital was to enter into an entirely new study of the engineering features of the undertaking, and also to begin, on a substantial scale, such an amount of work as would set at rest beyond question all doubts as to the quality of materials to be encountered (not only on the surface but also in the underground strata which it was expected to reach in all excavations), while at the same time constructing the canal itself.

The conclusions of the new company upon organization were:

First—That the work actually accomplished by the old company in the isthmus was very large, substantial and available.

Second—That notwithstanding an interregnum of four years, the work previously accomplished was in a satisfactory condition.

Third—That the locations occupied, and the plant on the isthmus, had been well cared for by the receiver, and were sufficient for the continuation and accomplishment of the work without extensive and expensive preparation.

Fourth—That the climatic dangers, the difficulties of the undertaking, and the cost necessary for its accomplishment had been grossly exaggerated.

It was therefore resolved to reorganize the old company, under new management and new conditions.

On the one hand the work was to be renewed and continued.

On the other hand to ascertain, by investigation and the widest experience, whether the construction of the canal could be completed under reasonable conditions of time and money.

The conclusion is that the completed surveys and work accomplished in the Isthmus of Panama undeniably demonstrates that Mr. De Lesseps' ideal is now practically susceptible of realization; but Mr. De Lesseps was entirely mistaken concerning the conditions of execution in the first attempt he made.

The Congress of 1879 calculated that the time for the finishing of the canal would be at least twelve years, and it fixed the probable expense of the undertaking at \$214,000,000. Supposing that the interest on capital during construction amounted to \$26,000,000, there would be a total expenditure of \$240,000,000.

Mr. De Lesseps, in the beginning of the year 1880, went to the Isthmus of Panama with a company of engineers for the purpose of completing the surveys which had been submitted the preceding year to the International Congress. The estimate of the construction work proper authorized by this Commission amounted to \$166,800,000.

At the same time this Commission expressed the opinion that with good and judicious organization the work might be concluded in eight years. Mr. De Lesseps believed it to be possible to reduce this estimate of expenditures.

One of the discussions of the people that has accompanied the thoughtful attention of mankind to the various schemes for the practical removal of the barrier between the Atlantic and Pacific oceans unbroken north of the Straits of Magellan—well described as an enormous canal provided by natural causes—is the comparative height of the water in the two oceans that are so near and yet so far, at the isthmus, and this mysterious matter is treated according to the popular taste in "Sport, Travel and Adventure in Newfoundland and the West Indies," by Capt. W. R. Kennedy, R. N.; William Blackwood & Sons, Edinburgh and London, as follows:

"This opens the question as to what effect the Panama Canal will have upon the tides and currents of the Caribbean Sea. One would naturally suppose that the water in the canal would flow continually from east to west, or from the Atlantic to the Pacific Ocean, on account of the constant set of the current and the prevailing winds being from that direction. The difference in the height of the tide at Colon and Panama is very remarkable. At the former place the rise and fall of the tide is only three feet; whereas at Panama the difference between high and low water mark is, as far as I remember, nearly twenty. The tide is nine hours later at Colon than it is at Panama, so that when it is high or low water at Panama it is half-tide at Colon.

● *"As a matter of fact, I am inclined to think that in the event of what is called a tide-level being cut through the isthmus—that is, a canal without locks, open to the ocean at either end—there would be no continuous stream of water flowing through the canal in any one direction, but the result would probably be that the tides would flow in from either end, meet in the middle and flow back again, as may be seen in the Straits of Magellan, which, after all, is but a huge canal of Nature's own construction.*

"It is quite possible that the rush of water may be so great as to seriously interfere with the passage of ships entering the canal, in which case it will be necessary to form a lock at the Panama end. It may even be necessary, in view of the difference in the depth of the harbors at either end, to slope the bottom of the canal from Colon downwards to Panama. This, according to Max Adler's laughable story, would have the effect of causing the water to flow downhill, thereby draining the Atlantic into the Pacific Ocean!

"But, joking apart, the tendency of the water must be to find its own level, and if it can be shown that the mean level of the two oceans is not identical, there must be a constant flow in the direction of the lowest level.

"Now, it is not at all certain that the mean level of the Pacific and

Atlantic oceans is the same; and it is quite possible that, owing to the rotation of the earth on its axis, and the formation of the land in the neighborhood of the isthmus, the water may be piled up on the Atlantic side and drawn away from the Pacific side. A glance at the map will show what I mean. And we all know how a strong breeze will keep a river back, or, if in the same direction as the flow of the river, will drive it out of a lock and thus raise the river; so this theory may not be so absurd after all. I leave it to those learned in such matters.

“There is another view of the case which never struck me till now. Geologists are of the opinion that at one time the Isthmus of Panama was submerged, and South America an island. They are led to this conclusion by the totally different class of animals to be found in South and North America. At that time the Gulf stream which now warms our shores must have flowed westward through this channel, and the British Isles were a frozen zone unsuited for human habitation. Cut through the isthmus, and the warm waters of the Gulf stream may to a very limited extent be deflected in the direction of their former course. The effect would be probably no more than drawing off a kettle of water from the river Tweed, and the immediate effect on our climate be imperceptible. It would be the most gross injustice for the world to forget that Count Ferdinand De Lesseps, though failing in his Panama Canal endeavor, must forever be counted as one of the great men of his generation. He realized one dream. It was beyond mortal strength that one man, however gifted and brave, should win a double immortality in constructing canals through the sands of Suez and the rocks of Darien. He could not accomplish the impossible. That which is wonderful is the gigantic work that was done before it was established that there was a formidable margin between the estimates covered by resources and the remainder. The stupendous proportions of the task are now fully before the world, and the surprise is, turning from the exaggeration of the failure of De Lesseps, to discover the immensity which has been achieved.

These are the points of the Panama Canal:

1. - Length, 46 miles.
2. Time of transit of ships less than one day.
3. Of the 46 miles of length there are 15 miles on the Atlantic side, and $7\frac{1}{2}$ miles on the Pacific (about one-half the entire distance), will be at sea level.

The official accounts and reports of experts, on the files of the Court in France, in the receivership proceedings, show that the expenditures actually made by the old company upon the isthmus amounted to \$156,400,000, and that of this sum the cost of excavation and embankment, proper, amounted to \$88,600,000.

The claim of the Panama company is, that two-fifths of the work is done.

The story of the undertaking of the reopening of the Suez Canal by De Lesseps is as follows:

One morning in the month of August, 1854, a French gentleman was engaged in superintending some masons who were at work adding a story to his house at La Chenaie—a house that had once been occupied by the famous Agnes Sorel.

On that morning of August, 1854, when engaged with the masons, and standing on the roof of Agnes Sorel's house, the post arrived, and the letters were handed up from workman to workman until they reached the proprietor. In one of the newspapers he read the news of the death of Abbas Pasha, and of the accession of Mohammed Said, a patron and friend of the old Egypt days. They had been joined on affectionate and confidential terms. Instantly the scheme was born again in his busy soul, and his teeming brain saw the most momentous result from the change of authority. In a moment he had hurried down the ladder and was writing congratulations and a proposal to hurry to Egypt and renew their acquaintance. In a few weeks came the answer, and the ardent projector had written joyfully to his old friend, the Dutch Consul, that he would be on his way in November. Expressing the delight he would

have in meeting him again, "in our old land in Egypt," but "there was not to be so much as a whisper to anyone of the scheme for piercing the isthmus." On the 7th of November he landed at Alexandria, and was received with the greatest welcome by the new ruler. The Viceroy was on the point of starting on a sort of military promenade to Cairo. It was when they had halted on their march, on a fine evening, the 15th, that he at last saw the opportunity. He felt, as he confessed, that all depended on the way the matter was put before the prince, and that he must succeed in inspiring him with some of his own enthusiasm. He accordingly proceeded to unfold his plan, which he did in a broad fashion, without insisting too much on petty details. The easterner listened calmly to the end, made some difficulties, heard the answers, and then addressed his eager listener in these words:

"I am satisfied, and I accept your scheme. We will settle all the details during our journey. But understand that it is settled, and you may count upon me." This was virtually the "concession" of the great canal. M. de Lesseps started out with the proposition that he could join the two seas at an expense of 200,000,000 francs. The canal cost the subscribers to its stock that amount. In addition it received from the Khedive 457,457,306 francs.

Matters do not appear to have progressed very rapidly. The company had undertaken a great work, and, to perfect it, required a great deal of money. The money was not forthcoming. Subscriptions to the stock were slow. Capitalists were not eager to invest in such an undertaking. As usual, there were many croakers abroad. Every scheme of this sort finds many enemies. In England, particularly, it was looked upon with great disfavor, just as canals in that country were pronounced impracticable when they were first projected; in the United States, just as railroads were, before they were built. Many people believed that the level of the Red Sea was so far below the level of the Mediterranean that, the canal being dug, all the water of the latter would pour through it, leaving its bed dry. On the other hand, there were others who

thought the level of the Mediterranean so far below the level of the Red Sea that all the waters of the Indian Ocean would pour into it and flood a great portion of the continent of Europe. Capitalists were not eager to invest in an undertaking which threatened so great a disaster.

Senator Morgan of Alabama has been the foremost man of the Senate in his devotion to the Isthmian Canal, with a preference for the Nicaragua route. He is convincing in his perpetual urgency for canal work to be done. There is one great point favorable to the Panama Canal. It is but forty-three miles long, not counting the Pacific dredging to deep water. The Nicaragua Canal is 175 miles long. Difference in favor of Panama over 125 miles. Nothing will ever be quite satisfactory but the short line without locks. The modern machinery with the capital and labor of the world behind it will remove mountains. Senator Morgan contends that more tonnage would pass through the Nicaragua than through the Panama Canal. The Senator says:

“London, as the common point of distribution, will therefore be cheaper than the present system. The Nicaragua Canal will thus be given the preference over the Suez Canal by merchants and navigators. When we add to this the traffic that will pass in ships between the eastern and western coasts of the American hemisphere, the amount of tonnage that will pass through the Nicaraguan Canal must be largely in excess of that which will find it way through the Suez Canal.”

“The ship’s journey around the Horn” is a distress to commerce that the civilization of the age requires to be removed, and the route through Nicaragua is the only possible remedy for this universal evil.

“It is not too much to say that this condition, so easy to be remedied, will be a reproach to the men of this age if some active and decided movement is not made to relieve against it. To point out the dangers, hardships, loss of time, and the destruction of life and property incident to this only waterway connecting the Atlantic and Pacific oceans, which must be navigated in the roughest seas and the most inhospitable climate in all the world, is only to repeat the experience of seafaring men for

ages past, and to evoke a prayer for them that the United States will do its obvious duty toward them."

The Senator referred to the posts of the British on the North Pacific and in the Bermudas and at Halifax, and said:

"From these the most powerful ships of war can assail our harbors, and retire to cover in case of necessity, while the United States must double Cape Horn in sending assistance from our eastern to our western coast.

"With the canal at our command we need not have two fleets to protect our coasts, as we are now compelled to do, at a cost already excessive and greatly to be increased. Without the canal we are, relatively, in a situation of deplorable weakness."

The most interesting part of the able and venerable Senator's report is his comparison of the Nicaragua and Suez canals. We quote him on this subject:

"When private enterprise in Southern Europe first addressed itself to the task of opening a sea level through the Isthmus of Suez, there was no lesson of experience to guide the movement or to assure its success. After a time the Khedive of Egypt, without the firman of his suzerian, the Sultan of Turkey, supported the undertaking, and put heavy burdens on his people.

"This wise and heroic decree of the ruler of a government nearly relapsed into barbarism secured the Suez Canal and should have secured the inviolable independence of his country. But the value of the canal to commercial and political aspirations for dominion attracted the cupidity of Great Britain and has drawn that great and costly work and the independence of Egypt into the grasp of that Empire.

"If it shall result, from our indifference or dread of expansion in the direction of national duty and of self-preservation, that Great Britain or any other European power shall get the control of the concession that we have, so far, refused, the result is even now plainly manifest, that the Central American States will repeat the experience of Egypt.

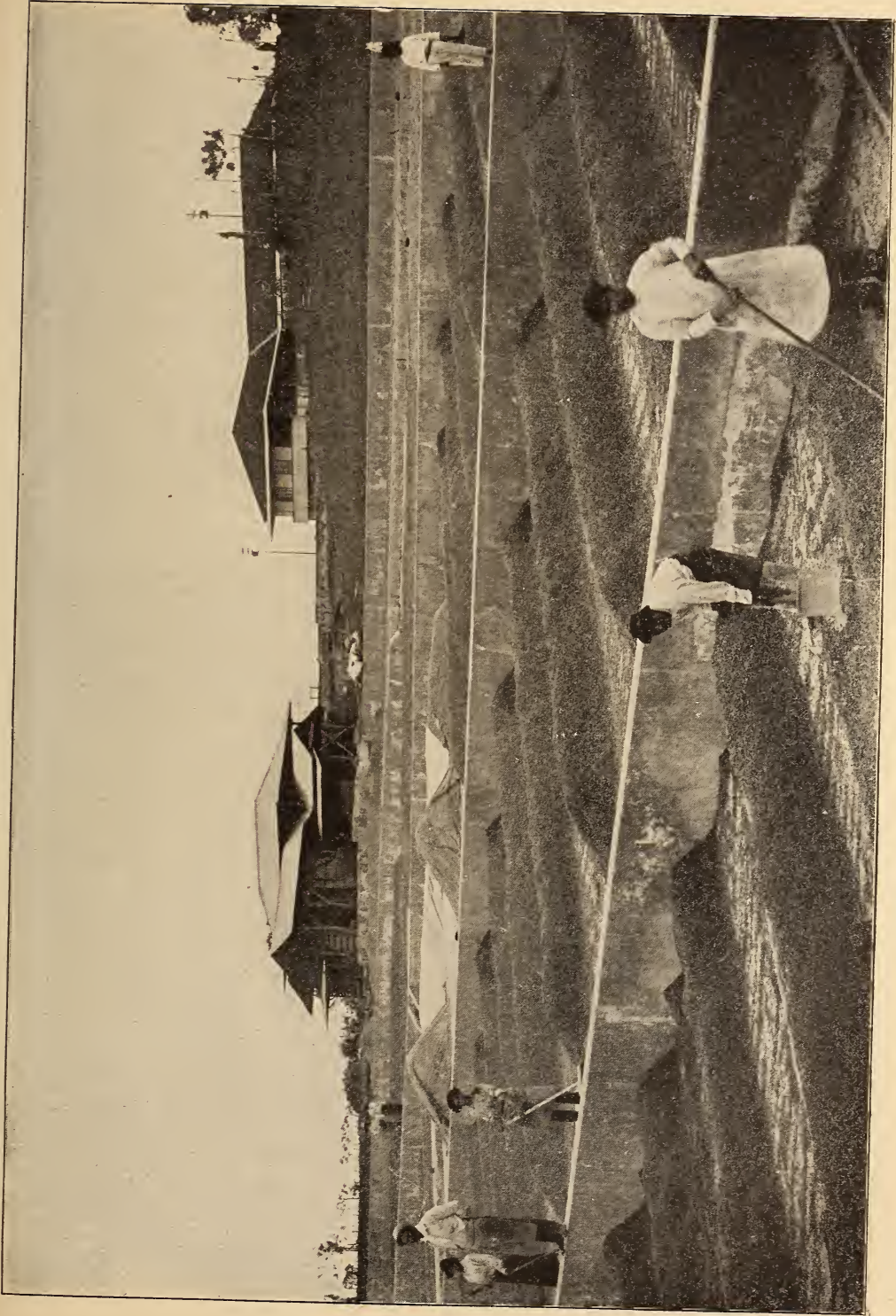
“Then we shall have our country broken in its coast line of trade and defenses, by a European power, not in violation of the Monroe doctrine, but this will be done in the name of these republics on and near the line of the canal.

“The Suez Canal is eighty-seven miles long, sixty-six of which are actual canal, the other twenty-one miles being lake navigation. The canal and its appurtenances were completed on or about the first of January, 1870, and cost about \$91,000,000. Since that time there have been expended for betterments and improvements, including the deepening of the canal, about \$24,000,000 more; bringing the total cost of the canal up to about \$115,000,000. The canal was originally twenty-six feet deep. Its present depth is twenty-eight feet. The canal to-day is capitalized at about \$90,500,000 in stock and obligations. The difference between the cost and its present capitalization in stock and bonds was made up by receipts from various sources applied to construction and improvement. It is commonly reported that the actual cost of construction did not exceed \$50,000,000.”

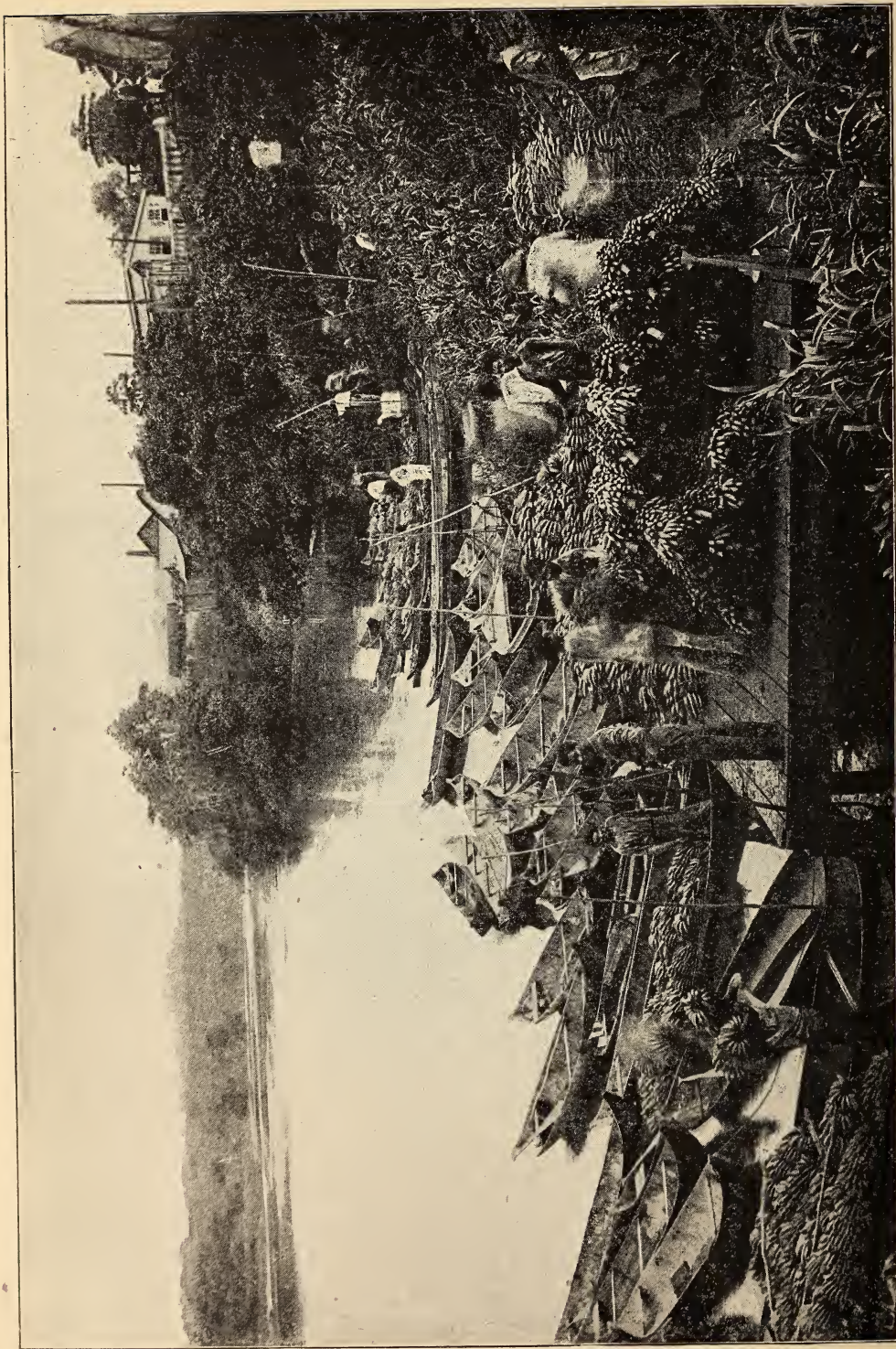
In 1891 the gross receipts of the Suez Canal were \$83,421,504, and the actual net revenues of the company for a series of years past has been upwards of \$12,000,000 annually. The net profits in 1892 were 41,728,543 francs, or about \$8,345,000, and the dividends declared for said year were 19.8 per cent, including the taxes retained for the sinking fund.

The shares of the company, originally issued at 500 francs each, are quoted on the Paris Bourse at 2,692.50 francs. The shares of the Suez Canal held by the English Government and purchased for £4,000,000 are worth to-day over £19,000,000 in the open market.

The business of 1892 and 1893 suffered from the general commercial depression throughout the world, and was lighter than that done in 1891. In the said last mentioned year the net profits were 49,910,892 francs, or about \$9,800,000, and the dividends declared on the stock that year amounted to 22.4 per cent.



COFFEE-CURING ESTABLISHMENT AT SAN JOSE, COSTA RICA.



BANANA DEPOT NEAR BLUE FIELDS, NICARAGUA.

The effect of the Suez Canal upon the commerce of the world is apparent from the fact that whereas in 1870, the first full year of its operation, there passed through the canal 486 vessels, registering 436,600 tons, the number of vessels passing in 1891 was 4,207, registering 8,700,000 tons. The most significant fact in this enormous increase is that the average size of the vessels using the canal in 1870 was but little over 1,300 register, while in 1891 it had increased to over 2,090 tons, and in 1892 to 2,200 tons.

"The outside limit of the cost of the Nicaraguan Canal is \$100,000,000, but the committee assume, in correspondence with the estimates that have been so carefully made and revised, that the cost will not exceed \$70,000,000, and that, if it should, there will be a fund in the treasury of the company from the sales of stock remaining undisposed of equal to \$16,000,000, in all \$86,000,000. This stock will go to par as soon as the construction of the canal is resumed, if not as soon as Congress has provided for the guarantee of the bonds of the company."

The objections to the project that have been so strenuously urged upon Congress are strongly stated by Senator Pettigrew, and we quote him:

"One hundred and fifteen million dollars will not build this canal. In my opinion \$215,000,000 will not build it.

"But when it is built, if constructed by the United States alone, we must either make it a neutral canal, unfortified, to be used by all the nations of the world, or else we must fortify it at an expense of hundreds of millions more, and we must guard this 176 miles of canal in order to prevent its destruction, for its great embankments can be destroyed by a single person in a few hours of time with modern explosives. If it is not guarded, or if it is not fortified, our fleet, having reached Lake Nicaragua, could be imprisoned by the efforts of one man at each end of the canal along these enormous embankments seventy feet in height. Therefore I believe it is wise that we should delay the disposition of this matter until this whole question can be investigated.

“Further than that, I believe it would be wiser for the United States to join with the other nations of the world and complete the canal at Panama. The canal at Panama is two-fifths completed already. The distance across the isthmus at that point is forty-six miles, as against one hundred and seventy-six miles at Nicaragua. It takes fourteen hours to go from ocean to ocean at Panama, and it takes forty-four hours at Nicaragua.

“Therefore, in view of the fact that the Panama Canal is sure to be built—for no great enterprise was ever abandoned where so much money has been expended as has been expended at Panama—the Nicaragua Canal, our private canal, will never be used by the ships of the world. There is no occasion for using it. No vessel will cross at this point. A vessel will have to spend forty-four hours in crossing, when it can cross in fourteen hours at another place; and the commercial value of the canal will be absolutely destroyed if the other canal is completed.

“Four thousand men are at work to-day on the Panama Canal, and only twenty-three miles more of that canal remain to be built. The excavation for the rest of it is nearly done. Immense excavations have already been made along the twenty-three miles yet to be excavated. The money they are expending there is being expended with the most modern means of excavation and with great economy and great skill. Every single engineering problem has been settled. It has been determined beyond question that it is entirely practicable to build an excellent canal at Panama.

“The problems with regard to the Nicaragua Canal have not been settled.

“Now, what is the proposition? To expend a vast sum of money to purchase an old concession which is valueless; to undertake to build a canal which we say shall be our canal.

“The Suez Canal is owned by the nations of Europe. Its neutrality is guaranteed by all the nations of Europe, and if the vessels of two nations at war with each other choose to pass through it, they can do so

under the terms of that guaranty, only the vessel which first enters must first leave, and has twenty-four hours for departure before the vessel of the other nation at war with her can leave the canal, thus guaranteeing it against danger of conflict or destruction; and the canal across the Isthmus of Panama must and will be guided, governed, controlled and guaranteed in the same way.

"It is all nonsense to talk about our building, fortifying and owning a canal of our own so long as it is a commercial canal, but if we wish one simply through which to pass our war ships, through which none of the commerce of the world will go, if the canal is to be our canal, and you are to spend \$400,000,000 or \$500,000,000 upon it, you are undertaking to start a project without that intelligent consideration which it should receive."

Senator Caffery said:

"This canal ought to be built. It is the one great national necessity of the present time, joining the waters of the two oceans together by a great national highway. It will double the commercial power of the United States. It will cut by half the distances from our trade centers to the distant lands that we hope to supply with our manufactures and our products. It will reduce the land transportation rates of the entire United States by a considerable per cent. It will double the power of the American navy. It will greatly assist in the coast defense on both oceans. For every consideration I think this canal ought to be built. I think we should get about it just as speedily as possible.

"Therefore, I shall vote for the bill, and, as I say, in the hope that out of the joint wisdom of the two houses will come a measure that will be the better, more practicable, than the one which is now pending here. I hope the measure when it becomes a law will provide for the construction of the canal by the government of the United States as a government measure."

Senator Teller said of the Nicaragua Canal that it was the merits of the company and not of the canal that were always discussed. There

were between three thousand and four thousand men now employed on the Panama Canal, the length of which was forty-six miles, and that of the shortest Nicaragua route, one hundred and seventy-five miles.

"I know nothing about the Panama Canal except what I have seen in the public press, but it does seem to me before we determine that we will build the Nicaragua Canal we ought to determine whether it may not be to our interest, and whether it may not be money in our pockets to build the Panama Canal. Everybody can see that a canal which is only forty-six miles long must be in many respects very much more valuable than a canal which is one hundred and seventy-five miles long. Public opinion grows in favor of a canal."

Senator Hanna of Ohio, June 5, 1902, opened the debate in the Senate in favor of constructing the isthmian canal on the Panama route. He spoke for an hour and a half in support of the Spooner substitute for the Hepburn bill.

Mr. Hanna said that the time had come for the building of a canal. The American people wanted a canal, and he shared in their views as to the necessity for it. The question before the country was not whether there should be or should not be a canal, but on what route the canal should be built. A short time ago there was but one route in the minds of the people, the Nicaraguan route. An unexpected circumstance had altered the situation so that there was a choice of routes.

The Panama Canal Company had made an offer to the United States which had made a tremendous change. It had put it in the power of the Government to build a canal from the Caribbean Sea to the Pacific Ocean along the best possible route—the route declared to be the best by the experts commissioned by the United States Government to study the question involved in the proper location of the canal.

The commission never had had any other opinion than that the Panama route was the best that could be selected. It so stated in the report, in which it recommended locating the canal on the Nicaraguan route. In that report it favored Nicaragua, not because it considered that the

better route, but because the Panama Canal Company demanded \$109,000,000 for its properties and franchises.

Mr. Hanna showed by the testimony taken before the Committee on Interoceanic Canals that if the French offer to sell at \$40,000,000 had been before the commission when it made its first report it would have recommended the Panama route at that time.

Mr. Hanna promised to show before he was through on what grounds the Panama route was superior to the Nicaragua route. He mentioned briefly some of the reasons.

It was evident from the manner in which Mr. Hanna proceeded in his remarks that he has considered the canal question with great care, and that he has viewed it as a business man. He insisted that the canal question was a business question, and not a sentimental affair. He came to the Senate equipped for its discussion as a business man would go into a meeting of Directors about to consider a work of large importance involving the expenditure of a vast sum of money.

A part of his equipment was a series of maps drawn on a grand scale, showing the rival canal routes and portions of projected work along the Panama route. One of these maps was so large that it reached from the gallery railing to the Senate floor.

It was noticeable that on one of the maps all the volcanoes were marked, the active volcanoes being indicated in red and the extinct in black. It was a very unusual thing for such diagrams to be displayed in the Senate, and they attracted much attention.

Mr. Hanna said he had shared at first in the common belief that the Nicaragua route was the only one to be considered. The United States had been deterred from embarking on that project and in the light of events the fates seemed to him to have interfered to prevent a mistake. The Panama route was only forty-nine miles long, while that of Nicaragua was 183 in length.

"You build your canal," said he, "to provide for the passage of ships from ocean to ocean in the least possible time and at the least expense,

"We are to build this canal for the world," said he. "We are to build a canal for the commerce of the world, and we must take into account the business attracted to it from the world."

By stubborn facts and by the findings of the best engineers in the country he had been compelled to change his views, which originally had been in favor of the Nicaragua route.

Mr. Hanna referred to the seismic disturbances in the canal region, and suggested that those disturbances ought to cause the American Congress to pause and consider the suggested dangers seriously. He referred to the maps arranged around the walls of the chamber, showing the number of active and inactive volcanoes in the canal region, demonstrating that there were more volcanoes in the neighborhood of the Nicaragua route than in that of the Panama route. He maintained that the cost of the Nicaragua Canal would be immensely greater in point of construction and operation than the Panama Canal, and said he could demonstrate that the Nicaragua Canal could not be operated at night.

Discussing the Spooner substitute, he denied that it was intended to delay. He explained that if the President were not satisfied with the Panama Canal Company's title he could proceed to build the canal by the Nicaragua route, provided that all conditions and concessions were satisfactory. By either route, he believed, the canal would be a power for the peace of the world.

The role that Mr. Hanna took was that of business adviser to the Senate, and he made his appearance upon one of the biggest straight business propositions that has come before the Senate in a serious way in many years—that of cutting a ship canal across the neck of land that separates the oceans between North and South America. For fifty years this question has been before the American Congress in an academic way. It is now before the Senate in a practical way, and if the Senate agrees to the Nicaragua Canal bill, already passed by the House at this session, that bill will, with the signature of the President, become a law.

Mr. Hanna opposes the Nicaragua Canal as an impracticable dream

and supports the Panama project, which has been in charge of French dreamers for years, as really practicable. His speech, continued through parts of two days, was a straight business outline of the merits of the two routes. He did not talk of the commerce of the world or indulge in any of the word painting that has characterized former canal debates. He laid down before the Senate the plain business sense of the thing, making his deductions of business facts always in favor of the Panama route.

He told the Senate, for instance, that it will cost \$1,300,000 per year more to operate the Nicaragua Canal on account of its great locks than it will take to operate the Panama Canal, and he inquired if the Senate realized what that meant. The Senate did not know, so Mr. Hanna told it, that this additional operating expense against the Nicaragua route represented the interest, at Government rates, on \$65,000,000.

Then, the Nicaragua men have been talking for years that, on account of the lack of wind at Panama, it was impossible for sailing vessels to navigate there, whereas there are always strong trade winds at Nicaragua. Mr. Hanna said that he, as a practical ship man, doubted whether it would be possible to handle a great steamship in a narrow canal with the high winds that prevail constantly at Nicaragua. The wind, he declared, would swerve the great steamships on to the banks of the canal, and tugs would need to be used to tow all ships through the ditch. Again, Mr. Hanna said that as a practical ship man he did not believe that it would be possible to operate the Nicaragua Canal at all in the night time, and he wanted to know if this was not a consideration worth thinking about in building a water way for the ocean traffic of the world.

When Senator Hanna commenced talking there were seven or eight Senators in the chamber. Within fifteen minutes nearly every Senator who was in the city was in his place, and there he remained until the Ohio Senator had concluded his remarks upon the purely business side of this question. And the Senators who heard him say that he made a deep

impression upon those of their number who are groping in the dark on the whole business.

The canal bill was taken up at 2 o'clock. Mr. Hanna, as a member of the Interoceanic Canal Committee, addressing the Senate in support of the Spooner amendment providing that the President shall have authority to determine upon the Panama route, provided he can get a clear title to the Panama Canal Company's concessions and property, otherwise he shall decide upon the Nicaragua route.

The Senator said the American people having become accustomed to the rapid transit of the railroads, now demanded quicker transportation on the seas.

CHAPTER XXVIII.

WORLD'S WONDER WORK.

STEEL ROADS TO BIND ALL THE CONTINENTS—STEAMERS BELT AROUND THE EARTH IN THE TROPICS, THROUGH TWO ISTHMIAN CANALS AND MEDITERRANEAN SEAS—ISLES OF THE CARIBS' RELATION TO CANALS—THE PATH OF COMMERCIAL PROGRESS THAT OF THE TRADE WINDS FOLLOWING THE WAR FLAGS.

It was hurriedly said of the effect of the Caribbean volcanoes that so urgently called attention to the inner fires and endless forces of the earth, that the testimony of Mont Pelee and the Soufrière was against the Nicaragua Isthmian Canal as against the Panama competitor. It is well known, however, that when great oceans approach each other and are separated by a range of mountains, or where there are great rivers pouring enormous quantities of earth into seas, disturbing the earth's crust by loading it with a burden of weight that may not be measured or computed, there are the conditions of earthquakes; and there are peaks that promise fire and explosive eruptions. It is plain to all students of the shocks, and bursts of fire that disturb that which should be the firm and pacific surface of the earth, that there is no line of perfect safety between the great bulks of the Northern and Southern American continents, for the construction of a canal. It is acknowledged that the Nicaraguan Isthmian Canal survey contemplates a vast enterprise, upon which volcanic peaks look down, and that there can be no guarantee that the rugged old chimneys will not, sooner or later, be heard from again, through flush craters, and some of those precious pools that are so decorative, hollowed as they are upon the tops of ancient mountains alleged to be extinct volcanoes. It is fashionable for groups of islands to contain one of these. The Azores have an "extinct volcano." It is a huge

cup that holds a crystal lake, populous with gold fish. Some time those beautiful fish will be boiled suddenly. We have volcanoes along our Pacific coast. Occasional "shocks" are felt in San Francisco, and a fashion proves that the city is truly American in the character of its people. It is the greater the shocks, the higher they build their business houses, especially the newspaper offices, and it is bad form to remember between trembles that there ever were earthquakes in Pacific states. Perhaps we have had the quakes in Alaska that have never called attention to themselves. Such as exist in Arizona we hear from. The blizzard and the cyclone - are much more respected in the Rough Rider country than the common earthshake. There are deserts in southern California that seem to get heat from above and also from fires under the earth. The Canadian Rockies are so constantly contemplating their own beauties and submitting to have their picturesque features taken by instantaneous photography, that they are not noted as fidgety and subject to trembles. We are in possession of three archipelagoes in the Pacific Ocean, and each has an active volcano. The one situated on the Aleutian Islands never surprises anybody when it offers evidence that whatever may be its deficiencies it makes no claim to extinction. The Philippines have an abundant supply of volcanic soil and peaks, and a good deal of ground that is elevated, but the region most troubled by severe quakes is beside the sea, and an important portion of Luzon, including the city of Manila, is but three to four feet above the level of the ocean; and there are extensive marshes. The volcano that is a source of alarm to Manila, and has more than once rent the loftier buildings, especially the Cathedral, is situated thirty miles away in a shallow lake, and is but eight hundred feet high. It is an awful aperture when the outbursts occur. When in "strenuous life" its bellowings are dreadful. The population of Manila have been enlightened by the experiences of the present generation. The Cathedral was so shattered, tower cracked and partly thrown down, and superb stone pillars broken and overthrown twenty years ago that the wise decision was reached of replacing the stone columns with wood,

The "hard woods" of the Philippines, there are twenty varieties, are durable and beautiful, of exquisite color, firm as a rock, and take a polish that makes it effective as the finest and most carefully wrought marble. Stone is used in the first stories of residences, business houses and public buildings. In the second story, and above, the blocks for stately stairways, and service for which architects, other things being equal, prefer stone, wood is substituted, and the squared timber is massive and beautiful. Some time the woods from the Philippines will add the distinction of splendid decoration to the stairways of the most substantial and costly residences in distant cities, and that not for earthquake reasons.

The most formidable volcano in the world, holding in the deep recesses of her solemn crater perpetually a pool of lava, constantly agitated, literally a lake of fire and brimstone, is Kilauea, on the Island of Hawaii, area 4.14 square miles, 2,650 acres, circumference 41,500 feet, or 7.85 miles. An eruption here consists in an excessive supply of the bubbling and bursting pool, until it breaks through the weaker places of the mountain walls, and flows a fiery river of molten rocks over steep places, until it tumbles with deep mutterings and clouds of steam into the ocean.

The colonization of remote islands, or any lands not under cultivation and government by competent persons organized as a political people, has become of more importance to the great powers of earth than ever before, and in larger part is carried on peaceably. In earlier ages the swarms of Asia moved westward in military expeditions. Immigration took the form of masses of cavalry, nations on horseback, not always as destroyers, but as people, races seeking new lands. Perhaps the latest illustration of this method of immigration, though it was from south northward, was that of the Boers, who trekked, hitched their numerous oxen to their ponderous wagons, and moved not west as has been the rule of movers, but almost due north. They turned their faces toward the scenes of old Testament History, and were happy to believe with each day's drive they got nearer Jerusalem. They were bound for the

promised land, and a burning question was whether they could go in their wagons to the Holy City.

Our American fathers were favored by finding fertile soil, forests that were full of game, rivers and bays stored with fish; and there were not enough savages to make the price of land too high if paid for in blood, powder and steel, and no one bothered with them about the Declaration of Independence. The rifle and axe were the way-makers, and the words of command and cry of hope were "Westward ho!" Mr. Greeley was speaking the wisdom and expressing the instinct of the pioneers when he said, "Go west, young man," and he regarded it superfluous to say, "and take a young woman with you." Ohio gathered the first crop of "westward ho" immigrants after the revolutionary war. It was a labor movement, of course, but it was not slave labor. There were no slaves north of the Ohio. All the thirteen original colonies contributed to Ohio, and in Ohio there came a time and a song for moving on, and the song was, with variations, this substantially, "If good times you would enjoy you must move your family west to the State of Illinois." There was the land not burdened with forests that had to be chopped down and burned, and there was storage of fuel for centuries underground, easily found and handled with facility.

Thomas Jefferson was one of the great men who did not become an immigrant, but he made up for that with the Lewis and Clark expedition that prepared the way to the Pacific Ocean, and Thomas Benton moved west even to far Missouri and finding the center of the states in that state pointed his countrymen toward the setting sun, declaring, "There is the road to India." Daniel Boone and Henry Clay crossed the mountains and twice discovered Kentucky. Andrew Jackson was a pathfinder for himself from the Carolinas. He was born so near the boundary line between the two Carolinas that it was never quite established whether he was a baby, as he was a boy, in both of them. He was keen and heated for the land west of the Mississippi. Jefferson was a philosopher and statesman for making the Louisiana purchase, though

he had to take time to allow his mind to grow rapidly so as to find the power the country and the people who made it had, to interpret the Constitution, to appropriate the money at once and forever defend the Empires of Liberty for the expansion of the American nation over the majestic new possession that was bounded on the south by the Mexican Gulf, east by the Mississippi, and west to the Pacific Ocean.

England, France and Spain, after fighting each other and sending many fleets and armies to the North American continent and the West Indies, sought when the Peace Commission assembled in Paris to draw the boundary lines of our freedom and independence, to divide four-fifths of the land of the continent and all the islands except those along the New England shore, among themselves. The dominating monarchial policy was that England should have the Ohio River for her southern boundary, Spain the northern line of the State of Tennessee for her northern boundary, and take all of Florida and a deep cut of Georgia as a sort of appendage of Cuba. The state, then the County of Kentucky, touched with territory in form like an extended fore-finger, that finger-tip only reaching the Mississippi River, while France and Spain had their own little disputes about all the land west of the great river. There was a party then residing on American soil, as at present there are persons, terrified at the very idea of our country becoming a Great One, and horrified at the thought of a Great West. However, we escaped a policy of littleness under Washington, Adams, Jefferson, Madison, Monroe, Jackson and Polk, and we may include in this list all the Presidents since, with perhaps the exception of the one who rejected the Hawaiian Islands.

The great and expanding nations of the earth, including in their greatest enlightenment, as to human experience, want more land for their people; and it is a proverb among those who have studied the stories of republics that of all forms of government the republican the most requires for the perpetual support of the liberty of the people, a continuing abundance of land.

France, though her population is not rapidly increasing, has been well advised in fixing her grasp on North Africa, and she is vigilant in expanding for good purposes her command over the Sahara Desert, which will some day, there is reason to believe, by canals, wells, of irrigation, by windmills and by artesian and other springs, possibly become a greater France. Russia has Siberia, and enormous spaces beside in Asia, and half of Europe for her foundation. She does not in order to find elbow-room necessarily add greatly to her territorial dominions just now, but she is with prescience preparing for the greater hereafter by being herself comfortably established on four of the oceans, beginning with the (1) Pacific, including the (2) Arctic, and with the Arctic the Baltic opening into the North Sea; (3) the Mediterranean and the (4) Indian Ocean, with the Persian Gulf as an easy approach to Southern Asia. She really needs Constantinople, just as England requires Egypt.

Germany is a nation more than any other abroad, with a call for colonies, and the German Emperor knows the fact, and has the clear-sighted ambition, the physical and intellectual energy, the general and particular intelligence, with the executive aptitude and power to increase the German navy.

If we have more islands anywhere than we want Germany will take all we have to spare and will not whine about our misfortune in "bagging" the Aleutian, the Hawaiian and the Philippine possessions. If we really feel incapable of governing the three archipelagoes of the Pacific just named—all comparatively recent acquisitions of ours—without submitting to the wisdom of the savages of international insolence and treachery, imposition and hypocrisy, that made up the elements we have confronted and crushed in the Philippines; and making submission to Asiatic intrigue, the passion some of our people have for a small country, why, in that case we might please Japan by turning over to that Empire the Hawaiian group. Russia would not hesitate to be obliging if we should offer to restore the Aleutian string of stored resources, the Aleu-

tian group that stretches along the southern coast of Siberia, and that makes for us a giants' causeway from Alaska to Japan. We could dispose of two archipelagoes at once if they troubled us and we need money. More than this, if contiguous territory should be the leading object of our policy of ambition we might give Mexico a chance for competition by swapping to her Mindanao, which is an island as large as the State of Indiana, for Lower California and Sonora. Mexico once through her Supreme Court accepted responsibilities for the government of the Philippines.

If any great number of American citizens wish to enter upon the policy of getting rid of our islands of the sea as uncomfortable assets it might be well to organize and make proclamation of that public policy and see how the American people would take it.

We do not want to make states out of islands far away in the oceans, but there is no reason why we should not hold territories permanently simply under our territorial system, and space cannot be occupied any better on this subject than in commending strongly the wise words the late President Harrison placed in his excellent book, "This Country of Ours," one of the last and best of his literary and political productions:

Of the admission of territories into the Union, he says:

"Out of this habit of dealing with the public domain has come the common thought that all territory that we acquire must, when sufficiently populous, be erected into States. But why may we not take account of the quality of the people as well as of their numbers, if future acquisitions should make it proper to do so? A territorial form of government is not so inadequate that it might not serve for an indefinite time."

This statement is solid and impregnable, and if we cannot make the discrimination needed we are getting into difficulty about ability to govern ourselves, and should be very cautious what we undertake at home or abroad. Territorial government is the true prescription for the Philippines, and the Filipinos would be well content if they were not told all

the time by some of our benevolent Belittlers that they were a dreadfully wronged people.

The movements not of the few but of the many also around the world, across continents and oceans are swifter, surer, cheaper and safer, than ever before. The Atlantic is not as broad now, measured by time and money, as the journey from Mount Vernon to Philadelphia was when Washington was President. The greatness and glory of the United States are known to Europe, and the like knowledge covers Asia, so that we have to restrain the countless millions on the other side of the Pacific from pouring their unwelcome floods upon our shores. We wish them well, but we do not want too many of them. While we may build a Chinese wall against the overflow of the Chinese in our direction, we cannot, should not, must not, stop European immigration! The European races have the same rights to cross the Atlantic that they always had, but we must regulate the terms and conditions carefully and liberally. The Africans were brought over by force as a labor supply. The noble red men wouldn't work for us. Hence black slavery. The European immigration question touches a great labor problem.

The west world movement of the human race was never more active than now. The latest announcement of the numbers landing at our principal ports in one month was equal to the population of a flourishing city, being nearly one hundred thousand. Are we to try to turn back this tide? It is a golden stream of good workers, labor to take hold of great and rude problems of industry. The policy with which we should meet it has for its first item that of the expansion of territory, more land for the people, north, south, east and west, more resources in our mines and fields to be developed, more great roads to build, more colossal improvements to be made. The manufacture of steel on a scale so huge as that of this time prepares us for possibilities of achievement that until a little while ago was absolutely impossible.

The Russians are finishing their Siberian railroad. It was a wonderful undertaking, triumphantly carried out. The English will have a



MONUMENT AT SAN JOSE, COSTA RICA, COMMEMORATING VALOR OF CENTRAL AMERICAN AMAZONS IN DEFEATING SOLDIERS OF WALKER'S FLIBUSTERING EXPEDITION.



STEAMSHIP PASSING A DREDGE AT KANTARA, SUEZ CANAL.



HARBOR AT PORT SAID. ENTRANCE TO SUEZ CANAL.

railroad line right of way, the power, the labor, the capital, the confidence to build a road the theory of which is already familiar, and the enterprise even more important than that which Russia has finished. We speak of a steel road with some steamboat intervals at first, from the cape of South Africa to Cairo. From "Cape to Cairo" is a phrase of euphony. The business statement is "From the Cape of Good Hope to the mouth of the Nile." Stanley, the African explorer, may live to make a railroad journey not only north and south through Africa, but across that continent on a line largely traced by his own footsteps, and incidentally to receive ovations where he saved his life by shooting cannibals with his elephant gun.

The Emperor of Germany has practical use for the Turks, and can handle them for his progressive purposes, even if no other civilized emperor can do so; and he is on the road to India by rail! He was not losing an opportunity when he consented to have his royal friends of the Greeks thrashed by the Turks, and he did not lose any time when he visited Jerusalem and took note of the country and studied its opportunities.

We of the United States have two railroads to construct; that is, we are to take the lead in doing it, find the money and the labor and the talent doubtless, and these two roads are to be world's wonders for a while. One is to be laid down from the most eligible point of our railroad system and go as far north as we can go, and then "merger" with the Canadians and not decline European reinforcements and build a line to the Bering Straits Ferry, to join an extension of the Russo-Siberian line. This to be the all-rail, with the exception of one ferry (and there is no sure thing that the strait might not be bridged with steel) from New York to Paris. The other is a little further along, being a line from Alaska to Patagonia.

Our greater and more immediate work is, however, the canal between the west shore of our Mediterranean Sea and the eastern shore of the Pacific Ocean. That is the tropic way for the steamers round the

world, passing through the Isthmus of Suez and the Isthmus of Darien. It seems the better thing to use the word Darien in this association because it will serve for either Panama or Nicaragua, and we are justified in expanding and expounding the term a little. With our present possessions and sense of dominion in the gulf and the sea that make up the American Mediterranean, we are of necessity profoundly interested; and the history of our hemisphere, if nothing else would point out that interest, in the group of islands extending between the Caribbean Sea and the Atlantic from Porto Rico to South America.

The Isthmian Canal will be ours as an exploit. We are insisting upon having the supervision of it. We have the money and want to spend the money on it for the realization of an immense ambition and the augmentation of the grandeur of the freedom of the commerce on the world's greatest circuit as nigh the equator as practical, taking the short cut through the two Mediterraneans. On this line we hold commanding positions for the Indies east and west.

It was in the waters from which the Caribbean Islands, some of which have volcanic peaks sometimes crowned with fire, that the war that settled the question of the primacy of the European powers in the Indies and on the oceans was settled. The decision of American primacy in American waters is already made by our peaceful expansion and grandeur of growth and elevation of spirit and scope of power and fame, it will be confirmed by the leadership in peace, in honorable competition with other nations. The ends of the earth we shall have at command in our summer seas. The Isles of the Caribs will interest again in peace or war all the great nations and guard the isthmian interests with the union of the two Indies, testifying at last the correction of the visions of Columbus, dreams that were not all dreams. Thus we shall have both the roads of both the Indies and transcontinental roads of steel, and the trans-isthmian canals that shall open as one the South Seas of the world around for the trade winds and the steamers.

As the grander world works progress the gain of our continent and

country will be greater than that possible to any other though all the world shall be freely in it. The increase will be for us in population, wealth and reputation of just rewards for well doing in all walks and works. This is the surest and the strongest of attractions that America has. The mightier currents of trade between the two hemispheres and all the continents and all the islands of the seas, will flow forever by our southern front doors, and we shall go on prospering and to prosper. If the world is at Peace it is ours; if War comes, still the world is ours. We can unite our fleets of the three oceans upon which we look, and if we need to defend the canal we shall have Hawaii in position in the Pacific, and by that time our islands of that ocean will be joined to us by cables so that we can speak to our people wherever they are on the globe. On the east if aggression come, if the drift of war should be from the Atlantic side, it would be our privilege, opportunity and purpose, to meet the foe on the furthest American east line. Looking across the ocean from the American continent and in the European direction we should defend the world's commerce and our own dignity, with the Caribbean Islands for our frontier line.

CHAPTER XXIX.

VOLCANOES OF THE WORLD.

THE LINES OF FIRE LOOP-HOLES THAT BELT THE GLOBE—OBSERVATIONS BY LEADING SCIENTISTS—CHEMICAL ACTION IN VOLCANIC ERUPTIONS—AN INTERESTING STORY WRITTEN IN SCIENCE.

The phenomena of volcanic action have been subjects of close study by scientists. Mungo Ponton, F. R. S. E., says in the XVIIth Chapter of his "American and West Indian Volcanoes:—"

"There are no volcanoes known to exist in any part of North America, except in the promontory of Alaska, in the Russian territories. Several of the West Indian islands, however, are partly, if not wholly, of volcanic origin; and some of them contain active volcanoes. The most remarkable of these is Le Souffrier, in the island of St. Vincent. Its first recorded eruption was in 1718; but the most violent was in 1812, when nearly the whole island was desolated by the great streams of lava and vast quantities of ashes and stones which it threw out. These ashes were projected to so great a height into the atmosphere, that, notwithstanding the trade winds were blowing from Barbados to St. Vincent, they were carried to the former island and fell there. The distance to which they were wafted in this direction was about 200 miles. This eruption was preceded by a succession of disastrous earthquakes on the coasts of the mainland, about Caracas; but these ended when the activity of the volcano began.

"Guadaloupe also contains an active volcano, from which there was an eruption in 1797. In Martinique there is a mountain named Pelee, which was in activity in August, 1851. It threw out no lava, but great quantities of ashes and mud strongly impregnated with sulphur.

“South America is famed for the great number and vast size of its volcanoes. These are found chiefly in the range of the Andes. The most remarkable among them are Cotopaxi, Tunguragua, Pichinca, Antisana and Sangay. The first named is the highest volcano in the world, being upwards of 19,000 feet above the level of the sea. Its cone is remarkable for the regularity of its form; and, being covered with a uniform coating of perpetual snow, it has the appearance of having been turned in a lathe. The snow-line is sharply defined, and the regions underneath it are wooded.

“The eruptions from this mountain are rare; but there are columns of vapor continually rising from the crater on the summit. The last great eruption of this volcano was in 1741, when the column of ashes and vapor from the crater is said to have risen to a height of about 5,000 feet above the cone. The mountain continued in a state of brisk activity for three years, during which immense streams of lava were thrown out, and spread over the adjacent plains.

“The explosions from this volcano when in action are tremendous, and large stones have been ejected from it to vast distances. One huge mass, estimated to weigh 200 tons, is said to have been projected in 1533 to a distance of about ten miles from the crater.

“Although now the highest volcano in the world, Cotopaxi could not always boast of this pre-eminence—at least, if any trust can be placed in native traditions. These relate that the mountain called Capac Urcu was once higher even than Chimborazo, but that, not long before the discovery of America by the Spaniards, there took place a series of dreadful eruptions, which lasted eight years, during which its cone was broken down, and the fragments now lie scattered over the adjacent plains. Similar occurrences elsewhere render this tradition by no means improbable.

“The most picturesque of the volcanoes of the Andes is Pichinca, of which much has been very interestingly written. It consists of several

cones, of which four are conspicuous—the most southerly, named Ruas, being that which contains the active crater.

“It is on a plain formed on the flanks of this mountain that Quito is situated; and to this dangerous neighborhood that beautiful city doubtless owes its recent overthrow by a destructive earthquake. Baron Humboldt ascended to the crater of Pichinca, and nearly lost his life in the adventure. Having approached the edge, in order to obtain a view of the lava boiling at the bottom of the abyss, he became enveloped in a dense fog, and nearly stepped upon the steep incline, which descends so rapidly, that had he once planted his foot on it, he would have slid into the glowing lake of fire beneath.

“The eruptions from the South American volcanoes are quite as frequently of sulphurous mud as of lava. An eruption of this kind from Tunguragua has already been mentioned, in connection with the disastrous earthquake of Riobamba. Another similar took place from the volcano of Imbaburu, in 1691. So great was the quantity of the small fish, previously described, which was on this occasion thrown out along with the mud, that a fever which ensued was attributed to their pestilential effluvia. In like manner, on the 19th of June, 1698, the cone of Carguairazo fell in, and a great eruption of mud containing dead fishes followed.

“Antisana, however, is remarkable for the large streams of lava which it has poured forth. It had frequent fits of activity between 1590 and 1718, since which time it has been quiet. At the height of about 13,600 feet above the sea-level is a plain, formerly the bed of a considerable lake, now reduced to very narrow limits. From the center of this plain rises the snowclad summit, containing a dome-like portion, connected by a group of jagged peaks with a truncated cone of eruption situated on the north side. The ejected lavas have formed numerous walls of basalt at the foot of the mountain, and there are also great beds of very spongy pumice.

“It has been observed that small volcanoes are usually the most active;

and those of the Andes being generally of great height, their fits of activity are correspondingly rare. To this rule, however, Sangay is an exception. Although towering to the height of upwards of 18,000 feet, its activity has ever since 1728 been almost incessant. Its eruptions are accompanied by loud detonations, which are heard at great distances. In 1842 and 1845 its thunderings were heard at Payta, on the Peruvian coast. These explosions sometimes succeed each other with amazing rapidity; but so loose and incoherent are the materials composing the cone, that no concussion is felt. The fumes from the crater are very dense—sometimes gray, sometimes orange, in color. The solid substances thrown out along with these fumes are cinders and dross, occasionally accompanied by round stones of about two feet in diameter. These either fall back again into the crater, or alight on the edge of the cone, to which they impart an incandescent glow. On cooling, the ejected matters become quite black, so that they give the general surface of the cone a most dismal aspect. They are accumulated on the slope and all round the base of the cone in beds, which in some parts attain a thickness of between 300 and 400 feet.”

In Chapter XVI. he says: “Hawaii, or O’whybeem, the principal island of the Sandwich group, contains some of the most stupendous volcanoes in the world. Indeed, the whole island, which is 4,000 square miles in extent, may be regarded as of volcanic origin. It contains four volcanic mountains—Kohola, Haialalai, Mouna Kea and Mouna Loa. The two last named are the chief, the former being about 18,000 feet, the latter about 16,000 feet, above the sea level. Although their height is so vast, the ascent to their summits is so gradual, that their circumference at the base is enormous. The bulk of each of them is reckoned to be equal to two and a half times that of Etna. Some of the streams of lava which have emanated from them are twenty-six miles in length by two miles in breadth.

“Mouna Loa presents the curious feature of having two distinct and seemingly unconnected craters—one on the summit of the mountain, and

another on its planks, at a much lower level. This last is named Kirauea, or Kilauea, and is perhaps the most remarkable volcanic crater in the world. It was visited by Mr. Ellis, a missionary to those parts, who has given an account of it in his missionary tour. The approach to it lies over a vast tract completely covered with old lava; and Mr. Ellis describes his visit to it in the following terms:

“The tract of lava resembles in appearance an inland sea, bounded by distant mountains. Once it had certainly been in a fluid state, but appeared as if it had become suddenly petrified, or turned into a glassy stone, while its agitated billows were rolling to and fro. Not only were the large swells and hollows distinctly marked, but in many places the surface of those billows was covered by a smaller ripple, like that observed on the surface of the sea at the springing up of a breeze, or the passing currents of air, which produce what the sailors call a cat's paw.

“About 2 P. M. the crater of Kirauea suddenly burst upon our view. We expected to have seen a mountain with a broad base and rough indented sides, composed of loose slags or hardened streams of lava, and whose summit would have presented a rugged wall of scoria, forming the rim of a mighty caldron. But instead of this, we found ourselves on the edge of a steep precipice, with a vast plain before us, 15 or 16 miles in circumference, and sunk from 200 to 400 feet below its original level. The surface of this plain was uneven, and strewed with huge stones and volcanic rocks, and in the center of it was the great crater, at the distance of a mile and a half from the place where we were standing. We walked on to the north end of the ridge, where, the precipice being less steep, a descent to the plain below seemed practicable. With all our care, we did not reach the bottom without several falls and slight bruises. After walking some distance over the sunken plain, which in several places sounded hollow under our feet, we at length came to the edge of the great crater, where a spectacle sublime, and even appalling, presented itself before us.

“Immediately before us yawned an immense gulf, in the form of a

crescent, about two miles in length, from northeast to southwest; nearly a mile in width, and apparently 800 feet deep. The bottom was covered with lava, and the southwestern and northern parts of it were one vast flood of burning matter, in a state of terrific ebullition, rolling to and fro its "fiery surges" and flaming billows. Fifty-one conical islands, of varied form and size, containing as many craters, rise either round the edge or from the surface of the burning lake; twenty-two constantly emitted columns of gray smoke, or pyramids of brilliant flame; and several of these at the same time vomited from their ignited mouths streams of lava, which rolled in blazing torrents down their black indented sides into the boiling mass below.

"The existence of these conical craters led us to conclude that the boiling caldron of lava before us did not form the focus of the volcano; that this mass of melted lava was comparatively shallow; and that the basin in which it was contained was separated by a stratum of solid matter from the great volcanic abyss, which constantly poured out its melted contents through these numerous craters into this upper reservoir. The sides of the gulf before us, although composed of different strata of ancient lava, were perpendicular for about 400 feet, and rose from a wide horizontal ledge of solid black lava of irregular breadth, but extending completely round. Beneath this ledge the sides sloped gradually towards the burning lake, which was as nearly as we could judge 300 or 400 feet lower. It was evident that the large crater had been recently filled with liquid lava up to this black ledge, and had, by some subterraneous canal, emptied itself into the sea, or under the low land on the shore. The gray, and in some places apparently calcined sides of the great crater before us—the fissures which intersected the surface of the plain on which we were standing—the long banks of sulphur on the opposite side of the abyss—the vigorous action of the numerous small craters on its borders—the dense columns of vapor and smoke that rose at the north and west end of the plain, together with the ridge of steep rocks by which it was surrounded, rising probably in some places 300 or 400 feet in perpen-

dicular height, presented an immense volcanic panorama, the effect of which was greatly augmented by the constant roaring of the vast furnaces below.'

"This great crater was also visited by Messrs. Dana and Wilkes of the United States exploring expedition, from whose drawing the prefixed woodcut is copied. They describe the light from the glowing lava to be so intense as to form rainbows on the passing rain clouds. The lava appears almost as liquid as water, and its surface is agitated by waves resembling those of the sea, and breaking, like them, upon the shore formed by the bordering terraces of solid lava. Sometimes they rise to the height of the second terrace and then fall back again in small cascades. Occasionally isolated jets of lava rise to the height of between sixty and seventy feet. The lava, thus tossed into the air, cools in its descent, and falls solidified on the surface of the molten lake, like pieces of broken ice.

"Of the mountain Mouna Loa itself there was a tremendous eruption in 1840, and since then it has been frequently in action. There was, in January, 1843, an eruption from a crater at the height of 14,000 feet, not far below the summit. The lava stream, after descending with great rapidity the slope of the mountain, spread itself over the elevated plain between Mouna Loa, and Mouna Kea, traversing it to a distance of between twenty and thirty miles. The current which flowed down the mountain side soon acquired the usual solid crust. But even after it had attained a thickness varying from fifty to one hundred feet, the liquid lava could, through the fissures in the crust, be seen rushing down like a torrent at a very rapid rate through this natural tunnel.

"One peculiarity of this volcano is its tendency to throw out its lava in jets to an enormous height. The lava seems to be first forced up in the interior of the mountain nearly to the top of the great crater; but instead of overflowing its brim, it opens a passage through the sides of the cone at a considerably lower elevation, so that the pressure of the

liquid in the interior forces it from the orifice in a jet, whose height is in proportion to that of the inner column.

“This circumstance proves the absence of any internal communication between the crater proper to Mouna Loa and the lower crater of Kilauea, although the latter is situated on the flank of the same mountain—the distance between the two craters being about sixteen miles. For, were there any such communication, the rise of the lava in the vent of the higher crater would inevitably produce a jet in the lower. There is thus established a strong probability that the crater of Kilauea is on the summit of what was once an independent mountain, entirely separated from Mouna Loa; but that the intervening space has now been filled up by the lava and other ejections from the latter, so that the whole appears to be a continuous slope, and to form a single mountain.

“The lava-jets thrown up from Mouna Loa during a great eruption in 1852 are estimated to have reached a height of 500 feet—those of some later eruptions double that height. The lava, as it ascends, is described as being white hot; but in its descent it acquires a blood-red tint, and it comes down with a fearful noise. The quantity of lava ejected during some of the recent eruptions has been enormous. One stream is described as having traveled fifty miles, with an average breadth of three miles. A great stream, which burst forth from the side of the mountain in August, 1855, had in the beginning of July, 1856, reached a distance of sixty miles from its source—burning its way through the forests, and at that date still advancing at the rate of about a mile in a fortnight. In January, 1859, this volcano was again in vigorous action, throwing up intermitting jets of lava to the estimated height of 800 or 1,000 feet. From this great fiery fountain the lava flowed down in numerous streams, spreading over a width of five or six miles. One stream, probably formed by the junction of several smaller, attained a height of from twenty to twenty-five feet, and a breadth of about an eighth of a mile. Great stones were also thrown up along with the jet of lava, and the

volume of smoke, composed probably of fine volcanic dust, is said to have risen to the height of ten thousand feet.

“An eruption described as having been of still greater violence took place in 1865, characterized by similar phenomena, particularly the throwing up of jets of lava. This fiery fountain is said to have continued to play without intermission for twenty days and nights, varying only as respects the height to which the jet arose, which is said to have ranged between 100 and 1,000 feet, the mean diameter of the jet being about 100 feet. This eruption was accompanied by explosions so loud as to have been heard at a distance of forty miles. A cone of about 300 feet in height and about a mile in circumference was accumulated round the orifice whence the jet ascended. It was composed of solid matters ejected with the lava, and it continued to glow like a furnace, notwithstanding its exposure to the air. The current of lava on this occasion flowed to a distance of thirty-five miles, burning its way through the forests, and filling the air with smoke and flames from the ignited timber. The glare from the glowing lava and the burning trees together was discernible by night at a distance of 200 miles from the island.

“Several of the other islands in the Pacific, particularly the groups of the Friendly Islands and New Hebrides, contain active volcanoes; but little is known of them, except that they have been occasionally seen in a state of eruption by passing mariners.

“Much further south, on the frozen shores of Victoria Land, in the Antarctic regions, Sir James Ross, in 1841, sailing in his discovery ships, the Erebus and Terror, discovered two great volcanic mountains, which he named after these two vessels. The prefixed woodcut taken from his sketch shows the appearance of Mount Erebus, which is continually covered, from top to bottom, with snow and glaciers

“This mountain is about 12,000 feet high, and although the snow reaches to the very edge of the crater, there rise continually from the summit immense volumes of volcanic fumes, illuminated by the glare of

glowing lava beneath them. These vapors ascend to an estimated height of 2,200 feet above the top of the mountain.

“Bounding on the phenomenon of the glacier imprisoned under lava on the sides of the cone of Mount Etna, Sir Charles Lyell has thrown out a conjecture that the cones of these two Antarctic volcanoes may possibly be composed of successive layers of ice, divided from each other by intervening layers of volcanic ashes and hardened lava. Considering that, in such a climate, each new layer of ashes and lava ejected by the mountain must of necessity become speedily covered with snow and ice, this conjecture appears to be far from improbable.”

Also: “Several of the Moluccas, or Spice Islands, are volcanic. In one of them, named Machian, a mountain was, during a violent eruption in 1646, rent from top to bottom, and has remained two distinct mountains ever since. In another of them named Sorea, which consists of little else than a large volcanic mountain, there was an eruption in 1693, during which the cone crumbled bit by bit into a vast crater, that was converted into a fiery lake, and occupied nearly half of the whole island. Successive portions of the mountain continued to fall into this glowing abyss, which was thus continually increased in its dimensions, and the whole population of the island were ultimately compelled to fly.

“The earthquake which shook the islands of Amboyna and Banda, in November, 1835, was connected with an eruption from a volcano in the latter. In Sangir, an island immediately to the north of Celebes, there was a great eruption in March, 1856. It caused immense destruction of property and loss of life—upwards of 2,800 persons having perished. Besides great quantities of stones, ashes and other loose substances, the volcano threw out vast streams of lava; while from the sides of the mountain there burst forth great torrents of water, so that the fertile country around was desolated. A large portion from the side of the mountain fell into the sea, leaving, in place of the former gentle slope, a sheer precipice 300 feet in height.

“The whole of the chain of islands running along the eastern coast of Asia is very volcanic. This chain comprehends the Philippine, the Japanese, the Kurile and the Aleutian groups. Very little, however, is known of the individual volcanoes or of their eruptions, although several of them have been casually mentioned by navigators. In the Japanese group, the most conspicuous volcano is that of Fousi Yama—having a height of upwards of 10,000 feet. Its cone is of a remarkably regular form, and it has on its summit a large oval crater.

“According to the Japanese annals, this cone was raised about B. C. 285 or 284, at the same time that the large tract of country in the province of Oomi was engulfed, as mentioned in our earthquake annals. Another Japanese volcano, named Wunzen, is said to have had its cone thrown down with loud explosions in 1793. A third, named Asama Yama, had a great eruption in 1783, and is still in a subdued state of activity. In one of the Aleutian group of islands, a volcano was observed by the crew of the Russian frigate Dwina to be in violent action during the month of June, 1856, in so much that a large extent of the surface of the sea was covered with pumice.”

In Chapter XIII. he says: “One of the most remarkable of the recorded eruptions of these volcanoes was that of Skaptár-Jokul, which began on the 11th of June, 1783. It was preceded by a long series of earthquakes, which had become exceedingly violent immediately before the eruption. On the 8th, volcanic vapors were emitted from the summit of the mountain, and on the 11th, immense torrents of lava began to be poured forth from numerous mouths. These torrents united to form a large stream, which, flowing down into the river Skaptâ, not only dried it up, but completely filled the vast gorge through which the river had held its course. This gorge 200 feet in breadth, and from 400 to 600 feet in depth, the lava filled so entirely as to overflow to a considerable extent the fields on either side. On issuing from this ravine, the lava flowed into a deep lake which lay in the course of the river. Here it was arrested for a while; but it ultimately filled the bed of the lake alto-

gether—either drying up its waters, or chasing them before it into the lower part of the river's course. Still forced onwards by the accumulation of molten lava from behind, the stream resumed its advance, till it reached some ancient volcanic rocks which were full of caverns. Into these it entered, and where it could not eat its way by melting the old rock, it forced a passage by shivering the solid mass, and throwing its broken fragments into the air, to a height of 150 feet.

“On the 18th of June, there was opened above the first mouth a second of large dimensions, whence there poured another immense torrent of lava, which flowed with great rapidity over the solidified surface of the first stream, and ultimately combined with it to form a more formidable main current. When this fresh stream reached the fiery lake, which had filled the lower portion of the valley of the Skaptâ, a portion of it was forced up the channel of that river, towards the foot of the hills whence it takes its rise. After pursuing its course for several days, the main body of this stream reached the edge of a great waterfall called Stapafoss, which plunged into a deep abyss. Displacing the water, the lava here leaped over the precipice, and formed a great cataract of fire. After this, it filled the channel of the river, but extending itself in breadth far beyond it, until it reached the sea.

“The 3rd of August brought fresh accessions to the flood of lava still pouring from the mountain. There being no room in the channel, now filled by the former stream, which had pursued a northwesterly course, the fresh lava was forced to take a new direction towards the southeast, where it entered the bed of another river with a barbaric name. Here it pursued a course similar to that which flowed through the channel of the Skaptâ—filling up the deep gorges, and then spreading itself in great fiery lakes over the plains.

“The eruptions of lava from the mountain continued, with some short intervals, for two years, and so enormous was the quantity poured forth during this period, that, according to a careful estimate which has been made, the whole together would form a mass equal to that of Mount

Blanc. Of the two streams, the greater was 50, the less 40 miles in length. The Skaptâ branch attained on the plains a breadth varying from 12 to 15 miles—that of the other was only about half as much. Both currents had an average depth of about 100 feet; but in the deep gorges it was no less than 600 feet. Even as late as 1794, vapors continued to rise from these great streams, and the water contained in the numerous fissures formed in their crust was hot.”

The devastation directly wrought by the lava-currents themselves was not the whole of the evils they brought upon unfortunate Iceland and its inhabitants. Partly owing to the sudden melting of the snows and glaciers of the mountain, partly owing to the stoppage of the river-courses, immense floods of water deluged the country in the neighborhood—destroying many villages and a large amount of agricultural and other property. Twenty villages were overwhelmed by the lava-currents; while the ashes thrown out during the eruption covered the whole island, and the surface of the sea for miles around its shores. On several occasions the ashes were drifted by the winds over considerable parts of the European continent—obscuring the sun and giving the sky a gray and gloomy aspect. Out of the 50,000 persons who then inhabited Iceland, 9,336 perished, together with 11,460 head of cattle, 190,480 sheep, and 28,000 horses. This dreadful destruction of life was caused partly by the direct action of the lava-currents, partly by the noxious vapors they emitted, partly by the floods of water, partly also by the destruction of the herbage produced by the ashes, and lastly in consequence of the desertion of the coasts by the fish, which formed a large portion of the food of the people.

Mount Hecla has been the most frequent in its eruptions of any of the Icelandic volcanoes. Previous to 1845, there has been twenty-two recorded eruptions of this mountain, since the discovery of Iceland in the ninth century; while from all the other volcanoes in the island there had been only twenty during the same period. Hecla has more than once



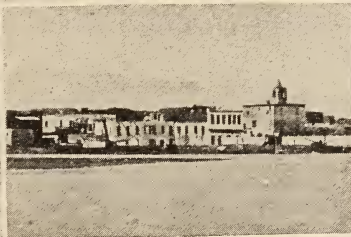
STONE QUARRY AT TIMSAH LAKE



DAM AT ISMAILIA



S.A.
TEWFIK PASHA



VIEW OF SUEZ



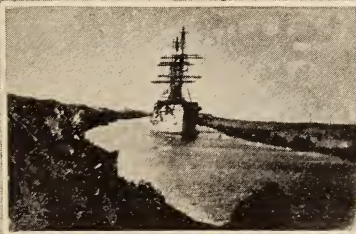
E DE LESSEPS



STEAMERS WAITING AT KANTARA



VIEW OF LANDING AT PORT SAID



ENTRANCE TO SUEZ CANAL



VIEW OF PORT SAID HARBOR

remained in activity for six years at a time—a circumstance that has rendered it the best known of the volcanoes of this region.

After enjoying a long rest of seventy-nine years, this volcano burst again into violent activity in the beginning of September, 1845. The first inkling of this eruption was conveyed to the British Islands by a fall of volcanic ashes in the Orkneys, which occurred on the night of September 2d during a violent storm. This palpable hint was soon confirmed by direct intelligence from Copenhagen. On the 1st of September a severe earthquake, followed the same night by fearful subterranean noises, alarmed the inhabitants and gave warning of what was to come. About noon the next day, with a dreadful crash, there were opened in the sides of the volcano two new mouths, whence two great streams of glowing lava were poured forth. They fortunately flowed down the northern and northwestern sides of the mountain, where the low grounds are mere barren heaths, affording a scanty pasture for a few sheep. These were driven before the fiery stream; but several of them were burnt ere they could escape. The whole mountain was enveloped in clouds of volcanic ashes and vapors. The rivers near the lava-currents became so hot as to kill the fish, and to be impassable even on horseback.

About a fortnight later there was a fresh eruption of greater violence, which lasted twenty-two hours, and was accompanied by detonations so loud as to be heard over the whole island. Two new craters were formed, one on the southern, the other on the eastern slope of the cone. The lava issuing from these craters flowed to a distance of more than twenty-two miles. At about two miles from its source, the fiery stream was a mile wide, and from 40 to 50 feet deep. It destroyed a large extent of fine pasturage and much cattle. Nearly a month later, on the 12th of October, a fresh flood of lava burst from the southern crater, and soon heaped a mass at the foot of the mountain from 40 to 60 feet in height, three great columns, of vapor, dust and ashes, rising at the same time from the three new craters of the volcano. The mountain continued in a state of greater or less activity during most of the next year; and even

as late as the month of October, after a brief pause, it began again with renewed vehemence. The volumes of dust, ashes and vapor, thrown up from the craters, and brightly illuminated by the glowing lava beneath, assumed the appearance of flames, and ascended to an immense height.

Among the stones tossed out of the crater was one large mass of pumice weighing nearly half a ton, which was carried to a distance of between four and five miles. The rivers were flooded by the melting of the ice and snows, which had accumulated on the mountain. The greatest mischief wrought by these successive eruptions was the destruction of the pasturages, which were for the most part covered with volcanic ashes. Even where left exposed, the herbage had acquired a poisonous taint, which proved fatal to the cattle, inducing among them a peculiar murrain. Fortunately, owing to the nature of the district through which the lava passed, there was on this occasion no loss of human life.

The Icelandic volcanoes are remarkable for the electrical phenomena which they produce in the atmosphere. Violent thunder-storms, with showers of rain and hail, are frequent accompaniments of volcanic eruptions everywhere; but owing to the coldness and dryness of the air into which the vapors from the Icelandic volcanoes ascend, their condensation is so sudden and violent that great quantities of electricity are developed. Thunder-storms accompanied by the most vivid lightnings are the result. Humboldt mentions in his "Cosmos," that, during an eruption of Katlagia, one of the southern Icelandic volcanoes, the lightning from the cloud of volcanic vapor killed eleven horses and two men (Cosmos, I. 223). Great displays of the aurora borealis usually accompany the volcanic eruptions of this island.

John Milne, F. B. S. F. G. S., opens his splendid chapter on seismology with these impressive paragraphs:

"In comparison with ourselves our world is large, its mountains and valleys are gigantic excrescences on its surface, whilst the elevations and depressions, representing continental elevations and ocean basins, form

irregularities the magnitude of which we can only appreciate by the aid of figures.

“Directly, however, we compare these deviations from smoothness with the world itself, we are astonished at their insignificance.

“On a model of our globe one hundred feet in diameter, mountains and oceans which take travelers many days to pass only appear as small ridges and gentle depressions, and we are disappointed by their smallness.

“If the diameter of the model is reduced to a foot, features which form the grandest scenery or basins forming the largest oceans may be represented by the almost imperceptible puckerings and depressions produced on a film of varnish which had dried upon its surface. Ocean depressions and continental elevations would be practically invisible, and we might pass our hand round and round the model without noticing any irregularity. It is doubtful whether any molten sphere of metal like such a model would, after cooling, show less deviation from smoothness than those observed upon the surface of our earth.

“If we therefore accept the idea that the excrescences upon the surface of our earth are in relation to its magnitude extremely slight, and add to this the idea that rocks in extended masses are capable of being bent and folded, rather than find difficulty in imagining that the surface irregularities of our sphere are due to a layer of rocks which is unable to support its own weight, accommodating itself to a contracting nucleus, we have much greater difficulty in realizing why these irregularities have not been greater than we find them.”

We continue quotations, showing the earnest effort to account for the changes of the earth:

“One assumption is that in the history of geography there was a period when the globe, whatever its configuration may have been, was nearly, if not completely, surrounded by water.

“If the idea of extended tumefaction in the crust of such a globe is excluded as a physical possibility, any deformation in the crust unac-

accompanied by protrusion above the surface of the liquid envelope could not produce any change in its level. Should, however, protrusion take place, as for example in the formation of a continental area, there would be a sinking in the level of the water, and the volume of the waters which would recede from the shore lines would be exactly equal to the volume of land which appeared above the surface. The newly created land surface would therefore owe its origin, first to the fact that it had been actually elevated, thereby increasing its distance from the center of the globe of which it formed a part, and, secondly, to the fact that the waters had actually receded to fill a depression and had decreased their average distance from the center.

“The only escape from such a conclusion is the assumption that as continents have emerged from oceanic waters equal volumes of land have, at the same time, been subsiding beneath their surface.”

Again: “To gain some idea of the extent to which the retreat of the ocean into growing oceanic depressions has accelerated the exposure of strata, we will suppose a stage in the earth’s history, when it was an uncrumpled sphere covered by a deep ocean. With a mean oceanic depth of 15,000 feet, and a mean height of our continents of 1,000 feet, the total height of the continental protuberances is 16,000 feet, and if this 16,000 feet of material could be spread over a sphere drawn through the present mean depth of the waters, such a layer would be 4,000 feet in thickness. The Rev. O. Fisher in a similar calculation takes his datum line through the greatest depth of the ocean, or about 9,000 feet lower than the one employed here. When this quantity is added to the 4,000 feet of my calculation, the results representing the dimensions of the uncrumpled sphere are in accordance. By such a process we obtain approximate dimensions for a primitive lithosphere, and the present waters distributed over such a surface would have a depth of 11,250 feet.

“After solidification of the crust we cannot imagine changes of any magnitude taking place in this crust due to its own contraction by further loss of heat. The only deformation it has suffered since it hardened has

chiefly been in consequence of accommodating itself to a shrinking nucleus."

As to the causes of earthquakes the learned professor says:

"With our present knowledge respecting changes which are in operation in and beneath the crust on which we live, we have not to go far to find causes which, singly or in conjunction, are amply sufficient to shake the ground. The greatest difficulty which presents itself is to select from the causes which may possibly produce earthquakes those which play the most important part in the creation of seismic sensibility, and at the same time not to confound them with minor influences which may cause a region in a state of seismic stress to suddenly collapse. In the present chapter there is no intention to try and deal with gravitational effects of the sun or moon, or with the effects of barometrical or other loads—the stresses due to which may result in yieldings being more frequent at one season than at another—but only to refer to causes which bring about conditions to which earthquakes are more directly attributable.

"As an introduction to the modern views respecting the causes of earthquakes, it will be not without interest to recapitulate briefly the opinions which have been held in the past. In early times, earthquakes, displays of volcanic activity, the fossils buried in the rocks, and other things which to the savage have always been unintelligible, were by a few philosophers attributed to natural causes. In the middle ages the teachings respecting such phenomena were that their explanation was only to be found by an appeal to the supernatural, and it was not until the eighteenth century that the educated world, armed with the results of observation, returned to the doctrines of the ancients. Aristotle, Pliny, and other philosophers, whose writings testify to the fact that they had observed steam and other exhalations escaping from volcanic vents, held that earthquakes were due to the working of wind or imprisoned vapor beneath the earth's crust—a view which finds its parallel in the early

philosophy of the Chinese. Natural theories of this order are to be met with until late in the middle ages. Shakespeare in his 'Henry IV.' says :

'Diseased nature oftentimes breaks forth
In strange eruptions; oft the teeming earth
Is with a kind of colic pinch'd and vex'd
By the imprisoning of unruly wind
Within her womb; which, for enlargement striving,
Shakes the old beldam earth, and topples down
Steeple and moss-grown towers.'

The question of the weight of sin is thus discussed :

"In a pamphlet about the earthquake at Palermo, in 1706, we read that 'the people seemed to be extremely humble and penitent, scourging themselves and doing penance,' and in conclusion there is the remark that 'it was generally apprehended that this was a mark of God's vengeance for the immorality of the inhabitants.' The ideas then prevalent are summed up in a little poem called 'the Earthquake,' written in 1750. It runs as follows :

'What pow'rful hand with force unknown,
Can these repeated tremblings make?
Or do th' imprison'd vapors groan?
Or do the shores with fabled Tridents shake?
Ah, no! the tread of impious feet,
The conscious earth impatient bears;
And shudd'ring with the guilty weight,
One common grave for her bad race prepares.'

"The views set forth in the last four lines of this poem still find expression from time to time. After the earthquake which in 1883 alarmed the inhabitants in Charleston, the negro preachers told their congregations that the disturbance had visited that city in particular in consequence of its sins."

The tracing of vast efforts to local causes is touched in these terms :

“To produce earthquakes which are felt over areas of five or ten thousand square miles, and which give rise to waves which may be recorded at any point upon our globe, it is difficult to imagine how the primary impulse could have originated at a volcanic focus. Volcanic explosions, as we see them, seem to result from the concentration of subterranean energy at a point, while to shake the whole surface of our globe it would appear necessary that the initial effort should be exerted on a surface very much larger than we can reasonably suppose to exist beneath a volcano.

“A very much more serious objection to the volcanic origin of the majority of earthquakes is the fact that these disturbances are common in the Himalaya, Switzerland, and other non-volcanic regions. The destructive earthquake in 1891 in Mino and Owari occurred in a region of metamorphic and stratified rocks. Again, an analysis of some ten thousand earthquake observations in Japan shows that there have been but comparatively few which had their origin near to the volcanoes in the country. The greater number of this series originated beneath the ocean or along the seaboard, and as they radiated inland they became more and more feeble, until, on reaching the backbone of the country, which is drilled by numerous volcanic vents, they were almost imperceptible. Beyond this central range of mountains, earthquakes are only rarely experienced, and what is true for Japan seems to be generally true for the coasts of North and South America.

“Throughout the world we find that seismic energy is most marked along the steeper flexures in the earth’s crust, in localities where there is evidence of secular movement, and in mountains which are geologically new and where we have no reason for supposing that bradyseismic movements have yet ceased.”

The sinking of areas of the sea has become a matter of business to the cable companies. Prof. Milne states the result of observations:

“Disturbances originating beneath the sea, which are much more numerous than those originating beneath the land, likewise emanate from

a region of strain. Mr. W. G. Forster, who has paid so much attention to the earthquakes of the Mediterranean, tells us that they have been accompanied by great subsidences of the sea bottom. After the Filiatra shock in 1886 it was found, while searching for a broken cable thirty miles off shore, that a depth of 900 fathoms existed where previously there had been only 700 fathoms, and that some four knots of the cable were covered by the 'landslip.' Mr. Forster gives several examples where cables have been broken at the time of earthquakes, and he also shows that soundings taken after shocks have been markedly different from those taken before the shocks, and this even in non-volcanic regions.

"Another remarkable series of alterations in ocean depths are those of the Esmeralda River on the coast of Ecuador. Mr. M. H. Gray, of the telegraph works at Silvertown, tells me that here cables have frequently been broken, and during repairs soundings have been taken. From charts of these soundings it is seen that at places accurately fixed by bearings on the shore, depths have increased from 100 to nearly 200 fathoms. Although it is possible that cables might be interrupted and alterations produced in the configuration of a sea bottom as a result of volcanic action, it is usually supposed that they are due either to submarine landslips or submarine seismic action accompanied by landslips and faulting."

The Professor states a general truth of importance :

"Wherever bending is taking place in the earth's crust we find earthquakes, while if this process is going on in the vicinity of an ocean we find both earthquakes and volcanoes. Although a volcanic explosion or an abortive attempt to establish a volcanic orifice has often caused the ground to shake, the greater number of disturbances are either due to rock fracturing or to equilibrium adjustments of a subterranean quasi-rigid magma. The sudden eruption of a volcano may cause a local shaking or cause an area in seismic strain to yield. In this case the volcano is the parent of the earthquake. On the other hand, by the sudden shaking of the ground a vent which has been dormant for a long period of years

may have its statical equilibrium destroyed; and the relationship is reversed."

One of the earthquake movements is the agitations of the seas noted as tidal waves. The authoritative statements that follow have importance:

"Our knowledge about the dimensions of earthquake waves is extremely scanty and very imperfect. From what we see and feel we should judge the length of an earthquake wave to be measurable in tens of feet, rather in hundreds or thousands of feet, to which we are led by calculations from the velocity of propagation.

"For example, in the Gifu earthquake of 1891 Mr. Omori, in Tokyo, obtained records of small vibrations with a period of one-twentieth of a second. The larger waves had a period of two seconds. The mean velocity of the disturbance between Gifu and Tokyo was about 8,000 feet per second, which leads to the result that there were waves from 400 to 16,000 feet in length.

"By calibration of the seismographs at the university laboratory, it seems that the tilting they experienced at the time of the same earthquake might have been produced by an angular deflexion of one-third of a degree. Assuming that this represented the maximum slopes of symmetrically formed harmonic wave surfaces, and that the actual height of such waves was ten mm., as recorded by seismographs, then the length of the waves which were recorded may have been from eighteen to twenty feet.

"We have here two results so hopelessly discrepant that all confidence in such determinations of wave lengths seems to be destroyed.

"Waves which have traveled extremely long distances—as, for example, from Japan to Europe—have done so at rates varying between 2 and 10 kms. per second.

"The period of these waves as recorded at Rocca di Papa, near Rome, and at Pulkova, is, according to Dr. Adolfo Cancani, twenty-five seconds,

from which with a mean rate of 2.5 kms. (8,250 feet) per second, would give wave lengths of more than 50 kms. (thirty-one miles).

“A sea wave caused by an earthquake traveled 8,778 miles from near Iquique to Japan at a rate of 512 feet per second, and its period near Japan was about twenty minutes. The length of such waves would be about 100 miles. The distance from crest to crest of waves propagated from Japan to San Francisco seems to have been a little over 200 miles.”

Prof. Russell says in his “Volcanoes of North America,” published by the McMillan Company:

“Of the gases and vapors emitted by volcanoes, it has been estimated that nine hundred and ninety-nine parts in a thousand consist of steam. Of the substances given off in a gaseous condition with the steam, the most abundant is usually sulphurous acid. Chlorine is also present, and gives origin to hydrochloric acid; it is the pungent fumes of this acid which frequently makes a near approach to the crater of Vesuvius impracticable. Sulphuretted hydrogen is also emitted, and, being inflammable, sometimes burns with a bluish flame. With the exception of flames of burning hydrogen, noted below, this is nearly always about the only actual burning that accompanies volcanic eruptions, and is of decidedly minor importance as a part of the spectacle witnessed. The idea that a volcano is a ‘burning mountain’ originated from seeing the glow of molten lava which is frequently reflected on the clouds of steam above a crater.

“Hydrogen has also been found in volcanic gases. From observations made by Siemens, at Vesuvius in 1878, as stated by Geikie, it was concluded that vast quantities of free hydrogen and of combustible compounds of that gas exist dissolved in the magma of the earth’s interior, and that these rising and exploding in the funnels of volcanoes give rise to detonations and clouds of steam. When the source of the water which furnishes the steam of volcanoes is considered, it will be found that it is not necessary to consider that the free hydrogen given off by volcanoes is necessarily derived from the earth’s interior, as just stated, as it may

arise from the dissociation of descending surface water on coming in contact with ascending lavas. At the eruption of Santorin, in 1866, hydrogen was distinctly recognized by Fouqué, who for the first time established the existence of true volcanic flames. These flames were again studied spectroscopically in the following year by Janssen, who found them to be due principally to the combustion of free hydrogen, but with traces of chlorine, soda and copper.

“Sodium chloride (common salt) is sometimes abundant, and in the case of Etna is said to occur in such quantities as to be of commercial importance. The whitening of the country about Vesuvius by salt precipitated from the air during an eruption has already been noted. The common occurrences of salt in the vapors of volcanoes is one of the arguments sometimes advanced for the purpose of showing that eruptions are due to the access of sea-water to regions where rocks are highly heated. That salt may be derived from other sources, however, will be shown later. Ferric chloride is conspicuous about many volcanic vents, and coats the rocks with yellow and reddish incrustations that are frequently mistaken for sulphur.

“Conseguina.—Of all the volcanoes on the North American continent, none have attracted a greater share of attention than Conseguina. It is placed first among the volcanoes here especially considered, having ‘by merit been raised to that bad eminence,’ on account of its fearful eruption in 1835. Previous to the explosion of Krakatoa in 1883, Conseguina, together with Sumbawa on the island of Sumatra, served as the best example of volcanic explosion on record.

“Conseguina is situated on the Pacific coast of Nicaragua, and forms the principal elevation of a peninsula which projects from the mainland towards the northwest and partially shuts off the Bay of Fonseca from the sea. The volcano is now extinct or dormant. From a distance it presents the appearance of a truncated cone, with an extreme elevation above the sea of a little less than four thousand feet. When more closely

examined the low mountain is found to contain a comparatively large crater-like depression in its summit.

“Of the appearance of Consequina previous to its now historic eruption in 1835, there seems to be no authentic record. At that time the summit of the mountain, which had been formed by material ejected during previous eruptions of a milder character, was literally blown away, and the rocks composing it reduced to fragments and distributed far and wide over the adjacent sea and land. By extending upward the sides of the truncated cone now remaining, an approximate restoration of the form of the original mountain may be made, which indicates that its height was in the neighborhood of 8,000 or 10,000 feet. This estimate, however, would be approximately correct only in case the mountain had been formed by comparatively mild explosive eruptions. It may have been truncated by violent explosions, previous to the one of which we have a record.

“The appearance of Consequina as seen from the sea is shown in the accompanying sketch, copied from Dollfus and Mont-Serrat. The crater within the truncated cone has a diameter of four miles and a depth below the highest point of its rim of three hundred feet.

“Of the many accounts of the eruption of Consequina that have been published, the most graphic as well as the most accurate, so far as I can judge, is one compiled by Squier, about fifteen years after the occurrence. This account reads as follows :

“On the morning of the 20th of January in that year (1835), several loud explosions were heard for a radius of a hundred leagues around this volcano, followed by the rising of an inky-black cloud above it, through which darted tongues of flame resembling lightning. This cloud gradually spread outward, obscuring the sun, and shedding over everything a yellow, sickly light, and at the same time depositing a fine sand, which rendered respiration difficult and painful. This continued for two days, the obscuration becoming more and more dense, the sand falling more thickly, and the explosions becoming louder and more fre-

quent. On the third day, the explosions attained their maximum, and the darkness became intense. Sand continued to fall, and the people deserted their houses, fearing the roofs might yield beneath the weight. This sand fell several inches deep at Leon, more than one hundred miles distant. It fell in Jamaica, Vera-Cruz, and Santa Fé de Bogota, over an area of 1,500 miles in diameter. The noise of the explosions was heard nearly as far, and the Superintendent of Belize, eight hundred miles distant, mustered his troops, under the impression that there was a naval action off the harbor. All nature seemed overawed; the birds deserted the air, and the wild beasts their fastnesses, crouching, terror-stricken and harmless, in the dwellings of men. The people for a hundred leagues grouped, dumb with horror, amidst the thick darkness, bearing crosses on their shoulders and stones on their heads, in penitential abasement and dismay. Many believed the day of doom had come, and crowded to the tottering churches, where, in the pauses of the explosions, the voices of the priests were heard in solemn invocation to Heaven. The brightest lights were visible at the distance of a few feet; and to heighten the terror of the scene, occasional lightnings traversed the darkness, shedding a lurid glare over the earth. This continued for forty-three hours, and then gradually passed away.

“ ‘For some leagues around the volcano, the sand and ashes had fallen to a depth of several feet. Of course, the operations of the volcano could only be known by the results. A crater had been opened, several miles in circumference (about twelve miles, according to Dollfus and Mont-Serrat), from which had flowed vast quantities of lava into the sea on one hand, and the Gulf of Fonseca on the other. The verdant sides of the mountain were now rough, burned and seamed, and covered with disrupted rocks and fields of lava. The quantity of matter ejected was incredible in amount. I am informed by the captain of a vessel which passed along the coast a few days thereafter, that the sea for fifty leagues was covered with floating masses of pumice, and that he sailed for a

whole day through it without being able to distinguish, except here and there, an open space of water.

“The appearance of this mountain is now desolate beyond description. Not a trace of life appears upon its parched sides. Here and there are openings emitting steam, small jets of smoke and sulphurous vapors, and in some places the ground is swampy from thermal springs. It is said that the discharge of ashes, sand, and lava was followed by a flow of water, and the story seems corroborated by the particular smoothness of some parts of the slope.’

“The terror inspired in the minds of the people inhabiting the region about Consequina calls to mind the graphic picture of the destruction of Pompeii during the eruption of Vesuvius, given by Bulwer. The eruptions in each instance were of a similar character, the summit of a mountain in each case being blown to fragments.

“The explosion as witnessed at the town of La Union on the northwest shore of the Bay of Fonseca, about forty miles distant from Consequina, has been described by Lieutenant-Colonel C. Manuel Romero, Commandant of the Post, from whose account the following has been compiled :

“The dawn of the day on which the eruption began (January 20, 1835) was serene, but at eight o'clock a dense black cloud was seen rising toward the southeast, preceded by a rumbling noise. The cloud continued to ascend until about ten o'clock, when it covered the sun and then began to spread toward the north and south; it continued to spread until it covered the whole firmament, and at about eleven o'clock enveloped everything in the greatest darkness. The darkness was so intense that the nearest objects were imperceptible. During this spreading of the cloud it was rent by lightning flashes, accompanied by thunder. At four in the afternoon, the earth began to quake, and continued in a perpetual undulation, which gradually increased in force. Next came a shower of what is stated to have been ‘phosphoric sand,’ which lasted until eight in the evening, when a fine, heavy powder like flour began falling.

Lightning and thunder continued the whole night, and the following day (January 21) at eight minutes past three in the afternoon, an earthquake shock of such violence occurred that men were thrown down. The effects of the appalling scene on men and beasts were also noted. The darkness lasted for forty-three hours. On the 22d it was less dark, although the sun was still invisible, and towards morning on the 23d tremendously loud thunderclaps were heard in succession, like the firing of the heaviest of artillery. This fresh occurrence was followed by an increase in the dust shower.

“On the 25th, 26th and 27th there were frequent, although not violent, earthquake shocks. The showers of dust lasted until the 27th. Galindo mentions other eruptions that occurred at the same time with the outburst of Consequina, five of which continued for eight days. In conclusion he says: ‘The volcanic energy seems to have operated on an extensive scale, and to have had vent in a great number of places. The country from Bogota, about latitude $4^{\circ} 30' N.$, longitude $74^{\circ} 14' W.$, throughout the whole isthmus, certainly as far as Belize (more than one thousand miles from the center of disturbance) was convulsed, or affected by the concussions.’

“Following the great explosion just described came fearful earthquakes along the Andes. The most disastrous of these was on February 20th, but they continued at the rate of three or four a day up to March 6th, and less frequently to March 17th. During one of these earthquakes the city of Conception, Chile, with a population of 25,000, was destroyed, only a single house remaining standing.

“After the eruption of Consequina, brilliant sunsets and sunrises, due to the quantity of fine particles blown high in the air and drifted by the wind to distant regions, were observed at widely separated localities.

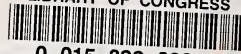
“The great eruption of Consequina, 1835, just described, presented in many ways the phenomena that accompanied the explosion of Krakatoa in 1833. The latter eruption was more carefully studied and a far better report made concerning it than in the case of the former. A better con-

ception of what took place at the explosion of Consequina can be gathered from reading the account of the eruption of Krakatoa given on a previous page, in connection with the reports just cited than can be had from the imperfect and unscientific accounts which are alone available concerning the occurrence.

“As will be seen when the theories advanced to explain volcanic eruptions are considered, the violent explosions that shook Central America at the time the summit of Consequina was blown away were caused by an escape of steam, augmented perhaps by the ignition of gases. A large volume of water probably gained access to the liquid lava that rose on the conduit on the volcano, and the steam and gases generated blew the liquid lava and the enclosing rocks to fragments and showered them over the surrounding region.”

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