

A VISIT TO THE GREAT VOLCANO OF KILAUEA.

Among all the objects of natural scenery in the world, the one pre-eminent for its terrible grandeur is the great crater of Kilauea. Although this lake of molten lava, with its clouds of sulphur and billows of fire, has been repeatedly described, its constant changes make it an object of ever renewed interest. It was recently visited by Walter M. Leman, an old Californian, who gives a stirring description of its present appearance in the San Francisco *Bulletin* of Oct. 22d, from which we take the following extracts:

THE CRATER.

"The crater is of gigantic dimensions. It is of an oval form, upwards of three miles in length, by two and a half in breadth, with perpendicular walls or sides of from 600 to 1,000 feet in depth, paved with a black flooring of lava. In its center is the living lake of fire—the surface of which cannot at present be seen from the outer rim of the crater, and which in the day time, from that position, shows only a slumbering pit—surrounded by jagged walls of desolation, from which the smoke slowly and continually ascends and rolls off, generally to the northwest. To the right hand are the sulphur-beds, native deposits containing thousands of tons of sulphur. In front and on each hand are innumerable rifts and chasms in the earth, known as 'steam holes,' from which vapor continually arises, and in which the heat is of various degrees, from moderately warm to scalding. The phenomena exhibited by the action of this escaping steam on the atmospheric air—on moonlight nights—is said at times to be wonderful and grand. A jagged pathway, a short distance from the house, leads down into what may be termed the first bench of the crater, where stunted trees and ferns contend for a foot-hold on the very borders of eternal fire and ruin. Here also the ohelo, a juicy berry, hangs abundant on the bushes, and the strawberries ripen in the sun."

DOWN IN THE ABYSS.

"The weather on this and the succeeding night was inauspicious for a visit to the crater; and not until the 27th was our party favored with a night visit to the burning lake. At 3½ P. M., our preparations being completed, we started, intending to remain, if circumstances favored us, until the following morning. The weather was dubious, for a thick mist commenced falling as we began the descent. Following our guides we scrambled down to the first bench, and moved along over the trodden path, carefully avoiding the gaps and steam cracks. In looking from the upper bank one does not realize the depth and dimensions of this immense bowl in the earth, but the descent and consequent fatigue remind him of it. A walk of some half or three-quarters of a mile, sometimes ascending and sometimes descending, brings you to the lava floor of the crater—an impressive sight, as if molten iron had rolled up in huge billows, and cooled upon the gravelly shore, from which you step upon their adamantine surface. What from the upper bank appears a comparative level, proves to be rough and jagged and rifted into a thousand fantastic and tortuous forms, changing with every advancing step. Deep chasms occur frequently, caused by the cracking of the lava, of from six inches to four feet in breadth, varying in depth to forty feet or more. Across this rugged and awful pavement you advance towards the Stygian lake in the center, passing cones and pinnacles of lava rock, sometimes thrown up in ridges like a mountain chain, at other times in isolated singleness. Several of these are miniature craters of themselves, 30 to 50 feet high, expelling flame and sulphurous vapors with the noise of an iron furnace. One remarkable manifestation of this kind bears a strong resemblance to a chapel in ruins, with its towers and pinnacles and battlemented walls still standing and looking as if seared and blasted by fire. To this has appropriately been given the name of 'Pele's Church.' By direction, our guides diverged from the direct path, deflecting to the left hand, in order to show us the 'caves,' as they are called. These are immense chasms in the lava floor, down which we clambered from 30 to 50 feet, and thence under the overhanging roof of broken lava for a distance of 150 or 200 feet further, to the great peril of life and limb. We were preceded by our guides with lanterns. Spiracles of lava, encrusted with a species of gypsum, are here

obtained, and stalagmites of most curious and beautiful formation sometimes reward the patience and danger of the explorer. But the caves themselves are very pits of Erebus, from which, after an hour or more expended in threading their dark mysteries, we were glad to emerge once again to the light."

THE BURNING LAKE.

"Resuming our path towards the Burning Lake, as the day declined, with careful step we clamber down the inequalities and mount the congealed waves of lava for about a mile or a mile and a quarter; but long before we come to the brim of the abyss we are made aware of its activity by the noise of the terrible cauldron. It is quite impossible to convey an adequate description of this terrible scene. The reader is apt to think the relator carried away by the enthusiasm of his feelings, and fears he may be listening to the language of hyperbole and exaggeration; but no language can truly describe what is absolutely indescribable. For the last half century travelers have at various times visited the Crater of Kilauea, and hardly any two visitors have agreed in their description. This is not strange either, for this ever-burning and unquenchable lake—this awful valve for the pent-up flames of our earth's center, is ever changing its aspect, ever grand, mysterious, terrible!

"The surface of the lake, on the occasion of our visit, appeared to be about 40 feet below the rim upon which we stood, which rim or bank is composed of different strata of calcareous and other earths of exceedingly irregular formation. A depression in the shores of this pit appeared on our right hand, as we stood facing the northeast, from the rifts and chasms of which sulphurous vapors arise, and were swept off to the north, along with the clouds of smoke from the burning lake. On the left hand, the bank rose to a cliff some 30 feet higher than the level of the rim elsewhere; part of this cliff or precipice had some few weeks previous to our visit broken off and fallen into the pit; the rest threatens to follow, a wide chasm being visible between it and the rest of the bank. The part remaining assumes, from a standpoint of some 60 feet to the right hand, the severe outline of a human face, gazing down into the boiling cauldron whose flaming surface peeps through the gloom of night a spectral illumination over the hard features of this lava Sphinx. In the center of the lake arose an island of hardened or congealed lava of the apparent area of 10 by 20 yards, and elevated some 15 or 20 feet above the surface. The lava flood was, with slight interruptions of a few minutes, in continual action during the five hours we remained. Around the whole rim of the lake, where the lava impinged against the bank, a circle of sheeted flame and molten fire glowed with intense brilliancy, and a like belt of boiling fire encircled the island in the center; while every few minutes, in one or other part of the surface, the lava cauldron would commence to heave in fiery throes, momentarily accelerating in force, propelling the jets of crimson metal up 10, 15, 20 and 30 feet—indeed, oftentimes as high as the bank upon which we stood. These fiery jets would run one into another, until frequently as many as six or eight were in furious action together, when their united power would suddenly open a blazing seam across the blackening surface of the lake, which had rapidly cooled since the convulsion of two or three minutes previous, and then the liquid flood, released from the hardening crust which kept it down, would roll in flaming combers across the whole surface and then dash upon the Stygian shore."

FACTS CONCERNING THE VOLCANO.

"The crater of Kilauea is situated on the eastern flank of Mauna Loa, at an altitude of about 5,000 feet, and is approached by a not very difficult ride from Hilo of 30 miles. A shorter ride of 10 miles from the little Bay of Apua, on the south-eastern coast of the Island, would be attended with less fatigue than the journey *via* Hilo, but vessels rarely touch at that point. Passengers by steamer from Honolulu sometimes land at Kawaihae, on the western coast, and ride across the Island to Hilo; but it is a rough journey of 80 or 100 miles. For many reasons the trip by the way of Hilo is preferable.

"The volcano has been in positive activity since it first became known to civilized man, and in all probability for ages previously; but its activity varies greatly at different times. Several tremendous erup-

tions have occurred within the remembrance of our generation. From 1856, for three years, the volcano was in a state of unusual energy. In the latter part of January, 1859, a great eruption took place on Mauna Loa, when a new crater was formed at a much higher altitude than that of Kilauea. The lava torrent took then a northerly direction, and rolling over the plateau of another mountain plunged into the sea destroying a small fishing village in its course. Observers of this phenomenon, who hastened to Hawaii, were repaid by a spectacle of unparalleled grandeur. The fire rose 250 feet above the crater in a cone of flame, and the plunging lava curved along the mountain sides like a fiery serpent, leaping in a solid flood from precipice to precipice.

"When Mr. Ellis visited Kilauea, in 1822, he and his associates saw 51 conical crater islands of various sizes rising round the edge, or from the surface of the burning lake. Half of these emitted smoke or flame, or vomited streams of lava. Tradition, and the observation of the residents of the Islands, all go to prove that the volcano is in a constant transition state, sometimes more active, sometimes less, though for the past few years its general activity has undoubtedly decreased, notwithstanding its occasional fiery outbursts. An old resident of Maine, a gentleman of integrity, who visited it thirty years ago, assured me that the burning lake then occupied fully one-sixth of the area of the crater. Estimates of its present superficies vary. We thought it could not be less than 700 feet in diameter.

"The dark mythology of the Hawaiians has invested this appropriate arena with additional horror. It is the dwelling-place of their awful goddess, Pele, the prime divinity of their pantheon. Here, in company with her subordinate demons, she bathed and disported in its sulphur waves. Christian courage, here, too, subdued supernatural terror, when in 1825 the converted chieftainess, Kapiolania, braved the anger of the goddess and the attendant terrors of the path by descending alone into the crater, and casting with her own hands into the seething gulf the sacred berries, as an open and avowed act of desecration."

Great Improvement in Beef Packing.

In all the beef packing houses of this city, save one, the same process that was gone through in killing, drying, cutting, and packing ten years since exists now. There has been no change, no improvement, and little or no progress, except in the trade. A visit a few days since to the beef and pork packing establishment of A. E. Kent & Co., on the South Branch of the Chicago river, however, satisfies us that inventive genius has commenced operations even in this branch of industry. Hitherto the cutting of beef for market into mess, extra mess, prime mess, India mess, etc., has been done by hand—by single man power—but during the present season A. E. Kent & Co. have introduced circular saws and steam power. Two large saws have been erected which are driven by steam, and these saws are made to do the work of upwards of twenty men with hand saws, and in a much neater and better manner than formerly. The application of circular saws in cutting beef has been experimented with repeatedly by others, but it has never met with success till now. The great difficulty to be overcome was the clogging of the saws with the meat, so that no power could be applied that would make them work smoothly and regularly. Thanks, however, to Yankee ingenuity, this has been overcome. Besides the main table on which the saws are placed, a false table has been erected, running on rollers, so constructed that when the saw passes through the quarter of beef, the divisions of the table gradually spread, and this keeps the meat from interfering with the progress of the saw. The invention is very simple, but none the less valuable because of its simplicity. A whole quarter of beef is placed on this false table, which is pushed against the saw, and as the sawing proceeds, the table gradually spreads, so that the only part of the saw which is touched with the meat is the edge.

To test the labor-saving qualities of this improvement the product of ten head of oxen was placed on the table, to be cut into mess beef; the manager took his watch in his hand, and gave the order to start. Away went the saws whirring, and quarter after quarter of the beef disappeared, after having been

cut into small pieces; and in exactly six minutes from the time of starting the whole ten head of oxen were cut! Now, this was all done with two saws and six men, who fed them and took off the pieces as they were cut. At this rate these two saws and six men could cut up one thousand head in ten hours. This shows the capacity of the improvement when fully tested. But with ordinary running, the two saws and six men can more easily cut five hundred beeves per day than could fifteen men two hundred per day by the old hand saw process.

Here then is a saving of more than one-half the labor and about two-thirds of the time usually employed, and also a great improvement in the manner of cutting. When offering mess for sale the inspectors are particular in seeing that the pieces are cut square and smooth. If they are not they are rejected and branded inferior. This damages the sale, and the owner incurs a loss thereby. By the application of these saws every piece is cut alike—there are no ragged pieces, no ragged edges—every piece is cut smooth and clean and square. In this respect alone not to speak of the labor saved—the invention is a highly valuable one, and cannot fail to be greatly prized by the trade.

But Messrs. A. E. Kent & Co. have made other improvements in the beef packing department. Instead of killing the steers with a hammer, by knocking them on the head, they are shot in the head from a breech-loading rifle. Besides being less cruel, this is a much quicker mode, and the animals die instantly. Then as soon as they fall and are bled, a chain-drag is attached to the horns, and by turning a lever, steam power is applied, by which the carcass is immediately dragged from the slaughter pen into the dressing room. This is a great improvement on the old appliance of ropes, with block and tackle. Another improvement has also been introduced, which consists of a railway conductor, by which one man can convey an entire beeve from the dressing room to the hanging room. This has often been introduced into the pork packing establishments, but has never been used in hanging beeves.—*Chicago Tribune.*

THE MILITARY RAILROAD SYSTEM OF THE UNITED STATES.

Mr. Benjamin C. Truman writes the following interesting letter to the *New York Times*:—

Few persons, even of those in the highest military stations, are acquainted with the gigantic efforts which have been called into requisition to sustain our armies occupying this portion of the South-West.

It will be remembered that Nashville was first occupied by National troops in February, 1862. The Confederate forces, before retiring from the city, destroyed everything in the shape of machinery for manufacturing purposes, stores, etc.; but most particularly did the retreating enemies employ themselves in making complete their work of destruction in the shops and manufactories attached to the Nashville and Chattanooga, and the Tennessee and Alabama railroads, which had been of the most vital importance to the railroad system of this section, and eminently so in assisting the progress of the rebellion. Everything in the shape of locomotives and rolling stock was, of course, removed.

There are now about fifteen hundred miles of road, employing eighteen thousand men, as mechanics, engineers, blacksmiths, conductors, brakemen, laborers, etc. The rolling stock consists of two hundred and seventy-one engines and three thousand cars, while the buildings erected within the past year, and occupied by this particular branch, extend for several miles—a detailed description of which I shall give below. I will add, however, that these buildings are built upon the most improved plan of wooden structures, all of which are guarded, day and night, and protected against fire by a multiplicity of rotary engines, steam fire-pumps, cisterns, etc.

All this is, in a great measure, owing to the sagacity and zeal of Gen. McCullum, Col. J. C. Crane and Mr. Anderson, to whom the country at large is greatly indebted. To Col. Crane must the highest honors belong, for the existence of this stupendous transformation. His is the executive eye, and to him almost entirely belongs the credit of bringing about this great change. Great credit, however, is also due to Gen. McCullum, Mr. A. Anderson, and

the Commander-in-Chief of the Military Division of the Mississippi, who, together with Col. Crane, have shown to the world a new feature in the art of war, namely, building a railroad which shall keep pace with an advancing army, and each evening deliver its necessary supplies for the coming day.

The expenses incident to the running of the military railroads in the Division of the Mississippi, including the purchases of material and the payment of employees, reaches the astonishing sum of \$2,200,000 per month.

Below I give a detailed description of Col. Crane's department, the result of a visit which I made on Tuesday last.

LOCOMOTIVE AND MACHINE DEPARTMENT.

This is by far the immensest establishment of the kind in the country—perhaps in the world. I shall endeavor to give you a fair view of its exterior and interior, realizing the fact, however, that no picture can urge the imagination to a proper conception of its vast proportions.

The locomotive and machine department is under the efficient superintendence of Mr. E. P. Benjamin, and employs three thousand men. The main building is two hundred feet long and eighty wide, and is in process of extension, its projected extreme length to be four hundred and fifty feet. The upper part of this building is used for rebuilding and repairing locomotives and tenders, and is called the erecting floor. This capacious room will accommodate thirty-four engines at a time. Really, the shop has not yet built a new locomotive; but every piece of machinery necessary in the construction of an engine or locomotive, with the exception of the wheel tire, has been turned out. Captured and crippled locomotives find their way into this shop, and in a few weeks steam out as good as new. The foreman of the locomotive shop pointed out to me a magnificent looking engine which had been elevated from a worn-out boiler. Everything about the structure had been manufactured in this shop, except the boiler and driving wheels. While I think of it here, nothing is manufactured by the government, the foreman informed me, which involves a loss, except a steam whistle. These can be bought cheaper than they can be manufactured, and the manufacture of them in whole has been discontinued in consequence.

MACHINE SHOP.

Adjoining this huge building is the machine shop, which is over 200 feet long, filled with the most improved machinery of the age, up stairs and down. There are some very fine machines down stairs, including a marine lathe, for turning heavy shafting; a lathe for truck axles; compound planer, for all kinds of light planing; two heavy planers; drill press, for doing all sorts of light and heavy drilling; heavy drill press; large lathe, for turning locomotive driving wheels; slotting machine, used for horizontal planing; and two boring mills. In the upper machine shop are five bolt-cutting machines, capable of doing the heaviest of work; cotter and key-seating machine, self-feeding; several gear-cutting machines; six drilling machines; large boring and turning mill; large hydrostatic press, for putting car wheels on axles; two large driving-wheel lathes; seven planing machines; two milling machines, and twenty lathes, of all sizes and descriptions. The entire machinery is new, and of the most improved pattern, and is chiefly from the well-known establishments of William Sellers, Philadelphia; Bement & Dougherty, Industrial Works, Philadelphia; Putnam Machine Co., Fitchburg, Mass.; Lowell Machine Co., Lowell, Mass.; John Paishley, New Haven, Conn., and others.

The machinery of the whole establishment is run by two horizontal engines of 300 horse power. These engines were formerly in the Memphis Navy-Yard. After the breaking out of the rebellion they were removed from Memphis and placed in the gun-factory erected in this city by the enemies of the country, for the manufacture of small arms. The engine and fire-room is a perfect parlor, over which towers a chimney 130 feet in height, the brick used in its construction having been taken from old houses which were torn down for that purpose.

BLACKSMITH SHOP

One of the most perfect and completely-arranged blacksmith shops is connected with the locomotive and machine department. The foreman of the shop

Mr. Duncan Livingstone, pronounces it the completest workshop of the kind in the country. It is about 200 feet in length, and eighty in width, and employs nearly two hundred of the best blacksmiths that could be found, all of whom receive from \$3 50 to \$10 a day. There are forty forges which are blown by steam. By an invention of one of the employees of this shop the ashes and coal-dust is carried off by the same blast which blows the fire, making the forge present a clean appearance at all times. Every variety of heavy work as well as light is turned out here.

Connected with this department is a foundry, in which all kinds of work are turned out. There are also carpenter and pattern shops, in which the wood-work for the locomotives and tenders are manufactured.

A "round house," which is to be the largest in the country, is in process of erection, which, when completed, will have sixty stalls, and will be so constructed that 100 locomotives may be accommodated at a time.

THE CAR DEPARTMENT.

The main building of the car department is 202 feet long and 80 wide, and is solely used for the manufacturing and repairing of cars. At present Mr. Herrick is having a headquarters car built for Gen. Thomas, which, for convenience and elegance, is the finest affair I have ever seen. With the exception of the ornamental work, this model combination of house and carriage is complete. It is an iron-plated vehicle, 50 feet in length and of the usual width, containing a kitchen, dining saloon, sleeping apartment, wash-room, water-closet and office. Nothing could be more complete, while the upholstery and ornamental work is *recherche*.

The cars are all ventilated by an invention of the manufacturer, and when empty present an incomprehensible mass of network, composed of iron and india-rubber. Each car will accommodate 36 badly wounded. The hospital train always follows the passenger train, and the utmost care is taken to guard against accidents, and I will state here, that since the commencement of running these improved hospital carriages, no soldier has sustained the slightest injury. There are attached to the Car Department a blacksmith's shop, brass and iron foundries, and paint, glass and upholstery shops, besides a spacious storehouse. The blacksmith shop is upon the same order as the one in the locomotive and machine department, except that it does not employ so many hands. This shop, in connection with the iron foundry, manufactures all the iron work and castings used about a baggage or passenger car and engines. The brass foundry turns out all the articles of this metal required about cars and engines, all of which are handsome specimens of excellent workmanship. Every ounce of dust and dirt is saved, and all the sweepings of the foundry, and washed out like gold dust. The paint, glass and upholstery shops employ about a hundred hands, who are kept constantly at work at their various trades. The employees in the car department are as amply accommodated with lodgings as those at the locomotive and machine shops.

COL. CRANE.

I cannot close without saying a few words more in relation to Col. John C. Crane, the efficient and accommodating Quartermaster who is at the head and front of this immense railroad fabric. Col. Crane is one of those extraordinary young men who, despite the great responsibilities of his office, the continuous annoyance that must necessarily exist where so many employees are congregated, bears all with seeming ease. His office is at all hours besieged with a crowd of men, each of whom brings his story of grievances, or request for favors, to all of which he listens with kind attention, tendering such advice as his judgment suggests as most likely to subserve their interests and the welfare of the Government. Every spike, every nail, every foot of timber, every pound of metal used in the shops and on the roads, must be properly accounted for, as well as every dime of the \$2,200,000 which is monthly expended. Col. Crane entered the service as a private soldier in the First Missouri Cavalry, but he was shortly after selected for a more prominent position—one more fitting his ability. By his devotion to duty, etc., he has fairly won his present rank.