

A RAILWAY ON THE MOUNTAIN.

In the last century, Pontoppidan, the bishop of Bergen, published an account of Norway, in which, speaking of the deficiency of the country in roads, he suggested laying them out on the top of the mountains, though it would be a work of difficulty, he admitted, owing to the snow. To readers unacquainted with the region, this seemed a preposterous idea. But the Scandinavian mountains have a contour which goes far to vindicate the bishop from having entertained an extravagant conception. They present no succession of pointed peaks, sharp-backed ridges, steep declivities, deep ravines, and narrow valleys; but, after having risen precipitously on the side of the ocean, their upper surface extends for miles and leagues nearly on a level. Roads might be carried for great distances upon them, without encountering greater difficulties in their level than in the plains of England, the patches of snow over which they would have to pass, even in summer, being the only hindrances. But ordinary highland countries, where the mountains are serrated ridges, presenting yawning gulfs and frowning precipices, have, by engineering skill, been intersected with highways admitting of convenient transit across the Alpine barriers. The loftiest carriage-road in Europe, 9,174 feet, crosses the ridge of Monte Stelvio, one of the Rætian Alps, a little way down the valley of the Adige, and is a great thoroughfare between the Tyrol and Lombardy.

Railways, at first thought to be only practicable on level lowlands, when their practicability there was admitted, are now rapidly taking possession of the highlands; and the locomotive already snorts, screams, and whistles, at an elevation about equal to that of the highest point of the British Isles. In England, the summit level of the Cromford and High Peak Railway is 1,290 feet; but that of the line between Vienna and Trieste, in the Semmering Pass, is 3,000. This is exceeded in Spain by the line from Santander to Reynosa, across the Austrian mountains, partly opened for traffic in 1857, which has two of its stations 3,031 and 3,053 feet above the main tide of the Bay of Biscay. In the United States, the locomotive has not been carried up above 2,700 feet, the summit level of the Baltimore and Ohio railway, in the pass of the Blue Mountains; but in South America, on the Copiapo extension line, it travels at the height of 4,075 feet, which will be increased to 4,479, when two miles further are completed. This is we believe, at present, the highest railway in the world; and deserves notice not merely on that account, but as traversing one of the most extraordinary regions of the globe—a waterless desert teeming with wealth!

Glancing at a good map, the port of Caldera will be perceived on the coast of Chili, one of the stopping places for the Pacific company's steamers. Ten years ago it was a most miserable spot, consisting of a few fishermen's huts upon the beach. But in the brief interval it has become a rapidly rising town, with a good landing wharf and mole, a custom-house, shops, hotels, machine-establishments, and a convenient railway station, which would do honor to the provincial town of any State. From hence, a railway extends to the city of Copiapo, 50 miles inland, where an excellent station greets the traveler. The engineers arrived from England in April, 1850: the first sleepers were laid in the following December, and the line was opened for traffic towards the close of 1851. It traverses a most hopeless waste, where there is no vegetation, not a stream, rill, or spring; and the whole of water required by the engines is carried along with them in tanks, every drop of which is distilled from the sea at Caldera. The entire country is bleached with saltpeter and other salts, lying some depth upon the surface, and forms the southern boundary of the terrible desert of Atacama, which stretches for hundreds of miles to Peru, between the coast and the snow-capped Andes. Formerly, the journey occupied a long day, one of great suffering from the intense heat and suffocating clouds of dust, far surpassing the similar discomforts of the transit between Cairo and Suez. It is now accomplished daily in less than three hours.

The railway was constructed in order to bring the two great mining districts of Chili into easy communication with the coast, facilitate the transport of provisions and water to the establishments, where the price was enormous, with the conveyance of the ores to port. The mines were originally opened for copper, under the superintendence of hardy Cornish miners; and the ores

had to be conveyed to the nearest shores by mules, with great difficulty, privation, and cost, to be sent thence round Cape Horn to the smelting-works at Swansea, in Wales. But now silver is the capital product. No localities can well be conceived more arid, verdureless and repelling in appearance, than those which are the richest in subterranean wealth—sandy wastes, intersected by the most bare, rugged and forboding-looking mountains. Apart from the rising villages, and a few wretched wanderers hunting after treasure, who frequently perish in the wilderness, there is scarcely a living creature, animal, bird, or insect, except the far-sighted vulture, soaring in mid-air to desery his prey, which so surely and so often sinks with fatigue and thirst in the plains below, or is perched moodily on some adjoining crag, digesting its horrid repast. In unfrequented places, human remains are sometimes found, those of the "cateadores," or mine-hunters, in a wonderful state of preservation, looking like fresh mummies, owing to the dryness of the climate. The bodies of mules are more frequent, some in the most striking positions, having died in the very act of leaning against a rock for support, or while attempting to nibble a last atom from, here and there, a miserable thorn bush. Five years have sometimes passed without a single shower. Hence the cost of water, brought on the backs of donkeys from many leagues distance, has formed a very considerable item in the accounts of the mines, amounting in one instance to not less than \$10,000 annually. A nine-gallon cask of brackish water has cost \$8; the baiting of a horse or mule, \$15; and the sum of \$2,000 has been paid for a well of indifferent water 11 feet deep. Yet in these inhospitable regions there are stored incalculable riches, concealed beneath the surface, but in many instances cropping out. Besides copper, lead, iron, bismuth, cobalt, antimony, arsenic, and quicksilver, veins of the purest silver-ore intersect the sterile wilds.

From Copiapo, at the height of 1,200 feet, an extension railway, recently opened, proceeds to Chanareillo—"stunted bush"—distant about 50 miles to the south, where it attains the elevation of more than 4,000 feet. This place, now a town, with rich silver mines, chiefly confined to a spur of one of the mountain ranges, was 30 years ago almost a perfect solitude. It happened on the 18th of May, 1832, that a mulever, Juan Gallo, reached the spot while hunting guanaco. Having wounded his game, he pursued it till he was so utterly overcome with fatigue and thirst, that he could advance no further, and sank down on a rock, trusting that on the return of his dogs, their mouths would show that they had come up with their victim. In a very short time he found that he was sitting on a rugged block of pure silver, which had crested out from a vein immediately beneath. From that moment the fame of Chanareillo dates as a rich mining country. Immediately afterwards, a poor peon slept beneath a projecting crag, and in the morning found that his frugal fire had brightened the wall of his resting-place. That wall was the outside of an isolated mass of silver, which, when cut out, yielded 2,800 marks to the fortunate owner; but there were no indications whatever of a vein underneath. But others were discovered, and successfully worked, till the miners came down upon a mass of hard rock, known in the language of the country as a *mesa de piedra*, or "stone table." Here the veins were lost, and it seemed to be the limit of their course. But encouraged by a beautiful old Spanish proverb, *Toda flor tiene su raíz*—"Every flower hath its root," Don Jose Gallo resolved to attempt the passage of the barrier. Shafts were sunk; fathom after fathom was pierced; but the "table" appeared to be of interminable thickness. His means became so utterly exhausted that his wife had to keep a small school, and his sons to take to manual labor in order to provide for their support. At last, at the great depth of 266 feet, the barrier was cut through, when vein after vein, band after band, of rich native silver rewarded the adventurer. Other prospectors then imitated his example with the like success. A second extension railroad from Copiapo is contemplated, leading northward to Los Tres Puntos, three pointed heights in the center of an equally remarkable mining district, as well as a grand trunk line across the Andes, connecting the shores of the Pacific at Valparaiso with those of the Atlantic at Buenos Ayres.

Mercury boils at 670° Fahrenheit.

SUGGESTION TO AQUARIUM BUILDERS.

Messrs. Editors:—In common with all aqua-vivarium builders I have been much annoyed by the rapid growth of *conferva* on the sunny sides of the tank. Perhaps it would be interesting to many of your readers to learn that by a very simple contrivance I have entirely rid my tanks of these troublesome parasites. My plan is to spread a fine green veil over the sides of the tank that are exposed to the sun. I select this color because it allows the passage of more chemical rays of light than any other color. It also forms a very grateful shade for the fish, besides concealing any cloudiness in the water. One of my tanks fitted with this contrivance, has been exposed to the sun for two or three hours a day, for over a month, and I cannot yet detect the slightest trace of *confervoid* growth. Strange to say, this exclusion of light does not seem to interfere with the vegetation of the plants. I am also in the habit of covering the tops of my tanks with a blue veil. This admits the passage of a large number of chemical rays and thus aids the vegetation of the plants directly beneath.

I would also suggest to aquarium makers that one side of their tanks be constructed of light green glass.

J. C. BARTLETT.

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UNDERSHOES FOR HORSES.—Many attempts have been made to shoe horses without the continual driving of nails into the hoof, by which great injury is sometimes inflicted upon valuable horses by nails pricking the quick. In order to diminish this evil, one of our London exchanges states that George Thomas, of that city, has invented a double-bottomed shoe, which is constructed and applied as follows:—"He takes an ordinary horse-shoe, and forms a groove in the part which comes in contact with the ground. This groove is about a quarter or three-eighths of an inch deep, and half an inch or more wide, according to the size of the horse and shoe, and within three-quarters of an inch from one extremity of the shoe to the same distance from the other. The groove at the ends and toe of the shoe is cut under. A piece of iron of the same width and shape with the groove, only thicker, and slightly curved upwards, is so fitted at the ends and toe that, by the tap of a hammer, it is driven into the groove, and hence into the under cutting. The junction forms a complete dovetail, which prevents the removal of the inner shoe unless by the forcible aid of a chisel. The advantage of this inner shoe is that it is made to project beyond the ordinary shoe, and, when worn down, can easily be removed and replaced by another, without pulling off the shoe from the horse's hoof. Besides, in frosty weather, the inner shoe needs only to be jagged, and you have the horse frosted."

EXPERIMENTS WITH CANNONS.—A correspondent of the *Baltimore American*, writing from Old Point Comfort, gives an interesting account of gunning experiments which were recently made there before a board of officers at the head of which is Captain Dyer. The guns tried were rifled cannon, with flanged and expanding projectiles, and the ranges that have been determined are as follows: at 10° elevation a distance of 3,400 yards has been attained; at 13½°, 4,200 yards; at 31° 6,100 yards. The ranges obtained from a 24-pounder gun, with 5½ pounds of powder, and hells weighing 45 pounds, at 10° and 13½° elevation, respectively, are about equal to those heretofore obtained from a ten-inch columbian (128-pounder) with 18 pounds of powder at 15° and 20° elevation.

THE CHAMELEON SHOE.—The fashion of decorating ladies' slippers either by needle work, by figured patterns on the leather, or other material, or by the insertion of colored silk or satin, old as it is, has just been improved upon. Mr. Leprince, of Regent-street, London, has contrived a method of changing the pieces of colored satin as long as the wearer desires, without in any way injuring the slipper. He makes a little pocket in the upper part of the slipper, under the perforations of the pattern, into which is placed the piece of silk to be worn. When the wearer wishes to change the color, nothing is easier than to withdraw one piece and insert another. A dozen pieces of satin on stiff linings, of various shades and colors are sold with the slippers. Tasteful bows and ribbons with buckles may also be attached to the shoes by a simple contrivance, and as easily removed. The novelty has for its name the "chameleon shoe."