

BURNING THE SIERRA MADRES.

BY CHARLES F. HOLDER.

The Sierra Madre Mountains from the vicinity of Mojave to San Diego have an important bearing upon what is to all intents and purposes the great American oasis, Southern California, being a fertile section between the Desert of California on the east and the ocean to the west. Stranger or more antipodean conditions are rarely seen in such close proximity, the mountain range forming the line of demarkation between one of the garden spots of the world and the greatest desert in America. From the summit of Mt. San Antonio, which is one of the sentinels of the region, the climber can by a mere turn of the head, a sweeping glance, take in all this wonderful country of extremes; or he can face the south and west and see both conditions at once. To the east are the burning sands of a region given over to the elements, the sandstorm, mirage and intense heat that in some localities, as Death's Valley, is almost intolerable, and death to man or beast caught in its toils without water. To the west the eye falls on the Southern Californian oasis, a small green strip on the ocean slopes of the mountains, abounding in groves of lemon, orange, vineyards, orchards of all kinds—a striking and remarkable contrast. The latter are possible on account of the water on the south slopes of the Sierras, which falls in the great watershed of the range from twenty to forty miles wide, and finds its way down to the Valleys of San Gabriel, Pomona, San Bernardino, Redlands, San Fernando, Santa Clara and others.

Originally the mountains were covered with a thick growth of chaparral, greasewood, manzanita, wild lilac, brush oak and many more growths, while the north slopes bore large oaks, spruces, and the cañons cottonwoods, bay, sycamore and others. The leaves and natural decay of this covering formed that essential for rain holding, an upper crust of dead vegetation which retained the water allowing it to slowly trickle down the mountain side and soak into the ground. Such was the normal condition, and fifty years ago the forests abounded in large trees and the valleys in attractive groves of live oaks of several kinds. Since the growth of towns and cities along the foothills the mountains have been devastated in every direction. Campers build fires and go off and leave them, and every year, for the past sixteen in the writer's knowledge at least, large fires have raged.

This has been particularly true in the last five years. Fires have caught on the valley side, swept up the mountains denuding the slopes of every bush and weed, leaving the barren rocks to alone tell the story. Opposite the city of Pasadena a huge blemish is seen on the face of the mountains. A vast acreage of the Sierra Madres has been fire-swept, and mile after mile of cañon and forest has been destroyed. The fires, especially in September, spread rapidly, the columns of smoke rising several miles into the air, forming a marvelous and majestic spectacle. The sun blazing upon this changes it into molten silver, while the flames from below color the lower portion with all the tints of red, scarlet, yellow and vermilion, while below this again masses rolled upward as from a volcano—black, brown, burnt umber and all the somber shades, producing a color scheme beyond the conception of the artist. The sides of the mountains for miles are seething yellow flames, at night presenting a brilliant spectacle, sweeping up the mountain side with the roar of a cataract, cutting out densely wooded cañons, leaping gulches—*incredible spaces*—and laying waste the entire section of country.

The repeated occurrence of these fires finally aroused the people of Southern California to the fact that the water supply, upon which everything depends, was threatened. When the rain came a



FOREST FIRE IN THE SIERRA MADRE MOUNTAINS.

stream as black as ink swept down the Arroyo Seco for days and weeks, showing the extent of the burned area and emphasizing the fact that the water was rushing down the mountain side carrying with it



EAST INDIAN COOLIE WITH HIS DONKEY.

the charred remains of the verdure which once covered it. It was evident that some definite and systematic method of fighting fire was necessary. The volunteers soon gave out, and as a result a force was organized under the direction of the forester of this section and a plan of action decided upon; but it came too late to save the best portion of the mountains. Now lines of white can be seen leading over the cuts after a snowstorm; these are the fir trails built by the fire fighters, first, to enable the men to ascend the mountains quickly, and, secondly, to aid in staying the flames, the barriers running across the range cutting off the fire from below.

These trails are from ten to twenty feet wide, the vegetation being entirely cleared away.

By thus systematizing the work a gang of from one hundred to two hundred men can successfully combat the largest fire. The fire has made serious inroads from San Francisco down, especially at Santa Barbara; the mountains known as the Santa Inez have been burned over many times, and on one occasion the Lick Observatory was saved only by the herculean efforts of Dr. Holden, then director, and a corps of volunteer fire fighters.

In the Sierra Madres the fires will continue every year, as in summer hunters, campers, fishermen and prospectors are in every cañon; many camps and small hotels in the interior of the range are liable to be cut off. The camps of Mt. Wilson, and even the hotel at Mt. Lowe have been in danger several times, but in the future these and other resorts will be well guarded.

EAST INDIANS IN THE ISLAND OF TRINIDAD.

When slavery in the British West Indies was abolished the sugar planters experienced a severe struggle with the labor problem. The negroes, when freed, refused to work in the cane fields, and it at once became necessary to get a fresh supply of labor from some other source or abandon the sugar colonies. Consequently the importation of coolies from India was resorted to. Agents of the British government were sent to Calcutta to arrange for the exportation of laborers. This exportation, which continues to the present time, as the planters demand, was made by an indenture with these coolie immigrants, by which they are bound to work for a term of five years on the plantation to which they are assigned by the government. In order to avail themselves of the use of this labor, the planters are obliged to execute a contract with the colonial immigration authorities, agreeing to provide food, clothing, lodging and medical attendance and to pay them 6 pence (12½ cents) per day each for their labor. The laborers are bound to work six days of 7½ hours each in every week. At the expiration of the term of five years the contract can be renewed if the laborer desires it, or he may have a free passage back to India. A fine of a day's pay is levied on the laborer for each and every day he neglects to do his bounden duty. The Colonial Government authorities reserve

the right to remove the laborers from any plantation if they are not properly treated.

The East Indians that immigrate to these colonies are either Mohammedans or Hindoos. The various caste distinctions are not easily defined by the uninitiated, but are as carefully observed as in their native country, and the smallest infringement is a deadly sin; and, although crossing the ocean degrades all Hindoos, the castes still keep their relative distances and never sink to the same level. The Mohammedans reverence two Persian saints, Hassan and Hosien, and an annual religious festival is held each year. The accompanying illustration represents this celebration in the Island of Trinidad. Hassan and Hosien were the sons of Ali, a Persian Caliph, and his favorite wife, Fatima, daughter of



MOHAMMEDAN RELIGIOUS FESTIVAL OF EAST INDIANS IN THE ISLAND OF TRINIDAD.

Mahomet. Ali was assassinated by a fanatical religious sect, and was succeeded by Hassan, who was murdered and the throne usurped. Hosien later led a revolution to regain the Caliphate, but was slain in battle, and in honor of these men these festivals are held. They consist of religious ceremony and mystic rites, and at times they become fanatical and torture themselves with burdens and slashes with knives. The miniature mosques seen in the picture are built of bamboo and tinsel paper, and are carried about the streets on their shoulders.

The East Indian coolies, as seen in this island, are physically well-shaped, with regular features, straight black hair, and aside, from their dark brown skin, have a similar appearance to the Europeans, belonging, as they do, to the Aryan race, from which all Europeans descended. The coolies are happy in Trinidad; most of them are industrious and thrifty, and many of them, at the expiration of their term of indenture have saved some money, and they buy land or go into trade.

The coolie will not intermarry with the negroes. The negro regards him as an inferior; the coolie, however, knows his position. He is proud of his ancestry and the ancient civilization of his race. At the present time the East Indians comprise fully one-third of the population of the island. That the commerce of the island is benefitted by the importation of these coolies is shown by the fact that the export of sugar has increased five-fold. The only opposition met with is from the negroes, who fear the industry and fruitfulness of the Indian immigrant.

Engineering Notes.

Important deposits of copper have been discovered in Siberia. It is thought that these mines will be sufficient to supply a considerable amount of the Russian demand for copper.

A brass wire screen in a stamp mill lasts from two to three weeks, and during that time from 200 to 250 tons of crushed quartz rock pass through it. A punched steel plate lasts much longer, and from 300 to 500 tons of quartz can be passed through it.

A steamship line is proposed between Java and America, calling at Chinese and Japanese ports. The projected line belongs to the Royal Packet Company. Should this route be opened San Francisco will be the American port of call, touching probably at the Hawaiian Islands.

The proposed ship canal between St. Petersburg and the White Sea is of considerable importance. The naval port of Cronstadt, which protects St. Petersburg, is to be connected with the new naval harbor, Sorotskaja, on the White Sea, by a canal of sufficient breadth and depth to admit the passage of Russia's largest cruisers. The extreme depth will be 31 feet and the water surface will have a breadth of 200 feet. The canal is 602 miles long and its course is as follows: From the river Neva to Lake Ladoga, across the lake to Svir River, the entire length of this stream to Lake Onega, thence due north to a new canal to Sego Lake; again by canal to Vigozero Lake, and thence to the Gulf of Onega and the White Sea. It will create cheap transportation for timber and grain, and will cause the establishment of saw and grain mills. With her contemplated canal and the Trans-Siberian Railroad Russia is well provided for in case of war.

A most extraordinary incident occurred at Mare Island Navy Yard on the 5th of June in which over 600,000 pounds of explosives were consumed at one time, but without causing any damage whatever except to the premises in which the explosive was stored. That such an amount of powerful explosives could be destroyed in a thickly populated community without causing widespread desolation is a marvel that is puzzling military and naval officials greatly. The fire was discovered at 6 o'clock in the morning. There was no shock or explosion. The first thing noted was the ascent of an enormous column of smoke or vapor, in shape like a balloon and possibly 2,000 feet in height. The roof of the magazine, constructed of thin sheets of iron, was raised above the supporting walls and torn out of all shape; but the building itself, constructed of stone with walls four feet in thickness, was not seriously injured. With the roof restored it will be as good as ever. As yet no one knows the cause of the fire. It occurred at a time when no person was in the magazine. The theory is that decomposition and spontaneous combustion took place. A board of inquiry has been appointed to investigate. The magazine was isolated; but just over a ridge was the residence of the officer in charge, which was not disturbed. Not a hundred yards away was the house for storing shells, which remained intact; while within 500 feet of the magazine was stored 800,000 pounds of black powder, which was unaffected in any way. The powder destroyed is believed to have been a lot of prismatic brown, of which a very large quantity was ordered by the government during the war with Spain and was considered obsolete, being used only for saluting.

RAILROAD TRACK NUT-LOCK.

In spite of the great amount of thought and expense that has been lavished upon the rail joint, it is to-day a most unsatisfactory feature in railroad track, and one that demands unremitting care on the part of the section gang. Much of the trouble is due to the tendency of the angle-bars to become loose, owing to the slackening up of the nuts on the screw-bolts. Many attempts have been made to remedy this, especially by the use of some form of spring nut-locks.

The accompanying illustration shows a very practical method adopted by the inventor, Mr. S. S. Jamison, of Saltsburg, Penn., for overcoming these difficulties, by providing a nut-lock which would be incapable of displacement when it once had been set up. The bolt itself differs from the ordinary bolt in the fact that the shank is not threaded, but, instead, has an axial hole bored in the end of it. The nut has a hole which fits closely on its inner end to the bolt, and increases in diameter toward the opposite face by a succession of independent steps, which have between them sharp detent edges. After the bolt is put in place through the fish-plate of the rail, the nut is slipped on with the smaller orifice next to the fish-plate, and a tapered tool is then inserted in the axial hole at the end of the bolt, and a blow from a sledge hammer on the tool serves to expand the end of the bolt until it fills the larger opening on the outside of the nut. The metal of the bolt is spread into these steps, and each shoulder between the steps forms a sort of detent that is tightly and closely buried into the metal of the bolt so that the bolt and nut are held snugly together. For applying the nut-



RAILROAD TRACK NUT-LOCK.

lock a special inverted U-frame is provided, which has one end forked to receive a pivoted cam. The cam is operated by the foot of the sectionman, and when depressed, as shown in our cut, serves to press home against the head of the bolt a cup-shaped angle-piece. The opposite end of the U-frame is perforated in line with the angle-piece, and carries a tapered expanding tool. When the clamping device has been adjusted and the cam-lever is depressed, the nut is brought snugly up against the angle-bar. A sharp blow from the trackman's sledge serves to drive home the expander and swell the metal out into the nut as above described, locking it permanently in place. Rails and fish plates are all drawn to place.

Ambassador White, of Berlin, reports that no final agreements upon the question of rendering the River Main navigable to vessels of greater tonnage has been reached. This measure, in connection with the extensive canal-construction bills, has been twice before the Prussian Diet. The plant is dependent upon the city of Hanau agreeing to build a harbor of refuge, and this it has not yet done. In this connection, it is of interest to note the growth of traffic on the canals of Germany since 1872, taken from the official statistics. The traffic in 1899 on the Ober-Elbe, at Entenwaerder, amounted to 2,959,000 tons, against 1,940,000 tons in 1895 and 1,550,000 tons in 1891. The traffic on the Spree, at Berlin, amounted in 1899 to 2,901,000 tons upstream, against 2,753,000 tons in 1895, and to 2,131,000 tons downstream in 1899, against 1,888,000 tons in 1895. At Mannheim, the Rhine traffic in 1899 was 3,462,000 tons upstream, against 2,436,000 tons in 1895.

Correspondence.

The Brooklyn Bridge Accident.

To the Editor of the SCIENTIFIC AMERICAN:

Your article on the East River Bridge was read with much interest by me. In connection with your suggestions for improvement of the structure let me ask what is the objection to carrying that part of the bridge supported by the short rods on rollers, either at the cable end or the floor end. I mean rollers between plates. The cables at that point are practically level, and I can see no difficulty in putting a longitudinal saddle on top of the cable, having a flat top, upon which might rest in turn a movable channel resting on rollers. To this latter could be attached the rods, which then could be fastened to the floor beams without the intervention of the trunnion blocks.

The pendulum action of the suspender rods necessarily shortened them and in consequence required them to pull up the floor at that point, while at the same time the longer suspenders away from the center of the bridge were expanding by the heat, allowing it to drop. The floor being stiffened by trussing, and this time refusing to buckle as it has on another occasion, the rods gave out.

T. W. MOORING.

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The Naval Programme for 1901.

To the Editor of the SCIENTIFIC AMERICAN:

In view of the fact that but two battleships and two armored cruisers are to be asked for at the present session of Congress, it will be remembered that last year Congress did not authorize the construction of any battleships or armored cruisers; therefore, the above ships to be asked for are really what should have been last year's appropriation. Such being the case, an appropriation much larger should be asked for, in order to bridge the gap of one year's delay.

While we have greatly profited by the compulsory delay by having had time to observe the behavior of our newest ships, besides having obtained a great deal of useful knowledge from experimental work in the model tank at the Washington Navy Yard, we have, in fact, lost a great deal more than a year's time owing to delays in shipyards on vessels just completed or under construction, due to strikes or failures of the government to deliver armor on time.

When we consider that Germany has about the same number of ships as the United States, and that she has in addition a fixed shipbuilding programme, it will be realized by those who take interest in the development of our navy that even a delay of one year means a great deal, both as regards the strength of our fleets and the moral effect upon our officers and men, who have no programme to look forward to, but must be satisfied with piecemeal appropriations from Congress.

Therefore, we suggest that three battleships and five armored cruisers be asked for, thus adding one battleship and three cruisers for this year's appropriation.

Germany will be the watchword of our future naval development. We have a position in the rank of naval powers which is quite sufficient; we do not need to be any higher up, but we cannot afford to let another naval power pass us on the road of naval development.

Objection may be made to the suggestion to increase the appropriation on the ground that our private shipyards are overcrowded; that some firms have too much government work already on hand. However much work the shipbuilding plants now have on hand we feel sure that if a foreign government were to negotiate for the construction of warships in American shipyards they would meet with little difficulty in having them constructed here. Furthermore, the government yards are now capable of constructing vessels. Armored vessels could be built at the New York Navy Yard, which now has admirable facilities for such work. Smaller vessels could be constructed at other government yards, thus relieving the private yards of such light work, while at the same time affording them more room to devote to the construction of armored vessels. That our private shipyards have all they can do was said a year or two ago when two vessels were under construction for Russia and two more for Japan.

Let Congress appropriate vessels sufficient in number and power to keep our navy always ahead of the one next in rank, and then, by the faithful work which the various bureaus of our Navy Department put into those ships, and the faithfulness with which our officers and men work under difficulties, we need have no doubt but that in a short time the fighting strength of our navy, as compared with the number of vessels composing it, will show a higher percentage than a like comparison of our rivals will show.

CARLOS DE ZAFRA.

New Milford, Conn., August 3, 1901.

The production of steel wire nails in the United States in 1900 was 7,233,979 kegs.