

A BAMBOO BRIDGE IN SIKKIM, INDIA.

This picturesque but frail structure is one of those extraordinary feats of native engineering to be seen spanning the mountain streams in all parts of the Himalayas. More commonly they are made of cane work, but where bamboos are to be had in plenty and the engineer has genius, their form takes the bolder outline to be seen in the picture. During our autumn holiday last year we one day reached this spot after a long but very enjoyable ride over the road that skirts the lower reaches of the River Teesta. The day had been indeed one succession of lovely vistas of winding sunlit river and dark forest-clad hill, and this bridge and its wooded surroundings seemed a fitting end to our morning ride; so we dismounted on a turf-clad rock overhanging the stream, and, having seen to our jaded ponies, proceeded with keen appetite to discuss the contents of our tiffin basket. The scene was a lovely one. Up stream the waters leapt suddenly and noisily into view at a sharp bend, and with a crest of white foam, raised in many a tussle with the glistening boulders that strewed the banks, rippled into a soberer calm as they flowed through the deep pool under the bridge. Below this it disappeared into the dark over-hanging foliage of the lower reach. Our after-

means of a long hose, which admits of 40 cubic meters of air per hour, and allows of the free respiration of natural air. The dome is furnished with an optical tube 16½ feet long, and slightly over 4 inches in diameter, within which a set of mirrors reflect the image of the object to be observed and magnify it before it meets the eye of the observer. The special advantages claimed for the new boat over all others are its absolute stability, even when submerged in a strong current; free respiration, without the necessity for reservoirs of compressed air, and consequent ability to remain under water for lengthened periods; and finally the special optical apparatus which permits of a good lookout being kept when the boat is under water, and of distances being accurately measured. The boat is intended solely for coast defense, and is armed with torpedoes.—*The Steamship.*

Astronomy Graphically Portrayed.

At the Carnegie Music Hall, in New York, there was recently given the first of a series of illustrated astronomical lectures on an entirely novel plan. The spectators saw a realistic display of lunar and solar eclipses from the standpoint of observers on the earth, then on the moon, and again from space. This is the first time

80,000 miles away. They see the earth hanging in space, a large globe, with stars shining about it. The rays of the sun coming from the right illuminate half of its surface. The moon is seen to come into the sun's rays and its shadow falls upon the earth and advances across its surface. The phenomenon of a solar eclipse is thus graphically explained.

The next scene depicts an eclipse of the moon in space, and in the fourth scene the spectators are looking from a distance of 4,800 miles at the moon suspended in space. From behind the scenes the sun's rays fall upon the moon, and the shortening shadows of the mountains on the moon indicate sunrise.

In the next act, for the representation is divided into acts, the observers are supposed to be actually on different portions of the moon's surface, looking on its mountains and craters. The barrenness of the moon's surface is sharply defined in the sunlight striking across it.

In another scene the earth is seen hanging over the moon and casting its reflected light upon it. The sun rises on the horizon of the landscape, and is eclipsed by the earth itself, the strange red glow cast upon the moon's surface being very well reproduced. The last act has scenes upon the earth again, one a lunar



A BAMBOO BRIDGE IN SIKKIM, INDIA.—PLATE BY THE PAPHYROTINT PROCESS.

noon journey was upward, and we could see afar off, through the tangle of foliage, the hill we had still to climb, beginning, even then, to lose the strong coloring lent it by the midday sun, for those softer violet tints that betoken the declining day in the Himalayas. But we dawdled over our tiffin and then over our camera until our syces, who saw only a long march in the dusk before them, aroused us into action. So we picked our way with cautious steps over the rickety bridge to our fresh ponies awaiting us on the other side and got safely over. But hardly a day too soon, for we subsequently learnt that it had come down with a crash about a week after, its remains disappearing in a sudden rise of the waters below.—*Jour. Photo. Soc. of India.*

A New Submarine Boat.

A submarine boat has been designed by a Portuguese engineer, Don Fontes Pereira de Mello, and it possesses several novel features. The boat has a length of 72 feet, a diameter of 11 feet 2 inches, and a displacement when submerged of 100 tons. Power is furnished by a motor working from accumulators, which drive a pair of screws and give a speed of six knots, maintainable for 14 hours. The boat is submerged by introducing water ballast into reservoirs, and by horizontal propellers, its perfect stability under all conditions being insured by a special arrangement. When submerged, direct communication is kept up with the outer air by

that the effort has been made in this country to depict these astronomical phenomena by scenic and mechanical means. Similar representations have been given in Berlin by the Urania Society, which was organized for the purpose of spreading astronomical knowledge among the people. Andrew Carnegie is responsible for the reproduction of this unique form of entertainment in America, and he has imported all the necessary theatrical properties from Berlin to establish the enterprise here on a similar basis, it being intended, if this kind of educational amusement is appreciated, to have it repeated in the leading cities. The first scene shown to the spectators was one of the most interesting of the whole evening. It represented a landscape near Berlin, with a lake in the background. It was darkened at first, and then the clouds in the sky began to take on a rosy hue. It was a very good simulation of an approaching sunrise. The sun appears above the horizon as a blood-red crescent. It is being eclipsed, and as it ascends less and less of the crescent is seen, until the sun is totally eclipsed. It appears then simply as a black disk with the corona about it. The landscape is involved in the curious darkness which results from an eclipse. The sun's reappearance is faithfully depicted, until it becomes a full round ball of pure white light, a very good counterpart of the original.

In the next scene the spectators are viewing the same solar eclipse from a point in space supposed to be

landscape in the highlands and another a sunset in the Indian Ocean.

H. G. KETCHUM, engineer of the Chignecto ship railway, is credited as the author of a scheme by which vessels drawing upward of 20 feet of water can be pushed through the present St. Lawrence canals from Port Arthur to Quebec, and through the Soo Canal now being excavated, without deepening the canals or enlarging the locks, thus obviating the expenditure of millions of dollars upon canal deepening. Mr. Ketchum proposes that large vessels be placed upon steel rafts or pontoons, and thus floated through the canals and over river shallows, the vessels to be placed upon the pontoons by means of hydraulic lifts established at the entrance of each canal. He says \$500,000 would provide pontoons and lifts for all the existing canals; but these lifts could be used as graving docks; but little time would be lost in placing the vessels upon the floats, and the plan has been successful elsewhere.

THE new 12 inch naval gun made a successful trip across the continent in eleven days, arriving at San Francisco January 23. The attendants who accompanied it state that the gun has attracted great attention on its tour across the continent, crowds of people gathering at the stations along the line to view it, and in many places school children were given a half holiday for the purpose.