

## OBSERVATIONS

BY SARAH B. HARRIS

## Nicaragua or Panama

THE commission appointed by President McKinley has made its report of the Isthmian canal route. The work of the commission included a survey of other routes besides Panama and Nicaragua, but it is well understood that no other routes will be considered by congress.

The former engineer-in-chief of the Panama route, Mr. Philippe Bunau-Varilla, recently delivered an address to the chamber of commerce of New York on the relative merits of the Nicaragua and Panama routes. His address is based on the preliminary report of the Isthmian canal commission of 1900 and the report of the Nicaraguan canal commission, 1897 to 1899. The figures in his address which are not taken from these two American reports are compiled from the report of the Technical commission of the new Panama canal company, which contains the names of some of our most distinguished American hydraulic engineers.

In regard to the respective lengths of the two canals: total length of Nicaragua canal navigation, 120.53 miles plus 66 miles in free, deep water in river and lake, making a total length of 186.53 miles from ocean to ocean. Of the 120.53 miles of canal, 22.96 miles will consist of an artificial channel dug below the bottom of Nicaragua lake, and 27.96 miles will consist of an artificial channel dug through the sand and silt below the bottom of the upper San Juan river, 16 miles below the bed of the river. At Panama there are only 38 miles of canal navigation proper and seven miles of deep-water navigation through the artificial lake which will be formed by the Bohio dam.

The deepest cut in the Panama route will be only 110 feet. On the Nicaragua route there is one cut 297 feet deep and two other deep ones, 218 and 170 feet deep respectively.

As to the relative difficulty of constructing the dams, which are a characteristic feature of both canals, Mr. Bunau-Varilla quotes the Isthmian Canal Commission as stating that the Bohio dam can be built of earth as well as of masonry, whereas the great dam across the San Juan river at Boca San Carlos would be the most difficult engineering work in connection with the project, since it would necessitate compressed air foundations to a depth of 100 feet below low-water level of the river, and would have a total height of 150 feet from crest to foundation.

At Nicaragua nine locks must be built in the neighborhood of volcanoes where seismic disturbances are constant. At Panama only five are necessary. At Nicaragua ships will have to be lifted by the complicated, heavy, and yet delicate machinery of the locks 110 feet. The Panama locks must lift the ocean liners only 90 feet. And the Panama locks can be built on solid rock. Only five of the nine Nicaragua locks can have this advantage.

The San Juan river whose waters will be poured into the Nicaragua canal, has a much larger watershed than the Chagres river, which will flow into the Panama canal. From two to one-half times more rain falls in the Nicaragua district. Consequently the water that must pass off is much greater and generates stronger currents.

The Nicaragua canal will receive the waters of the tributary rivers Frio and Poco Sol whose sources are on the slopes of the volcanic range. Mr. Bunau-Varilla asked the question, "What disposal will be made of the enormous deposits of sediment brought down by this river and emptied into the canal?"

Not to mention the amount of sediment deposited in a channel by a volcanic river, there is the problem of maintaining a channel of uniform width and depth. Nature does not like regular depth and width in a river bed. The water digs into the bed of a great river almost soundless depths and widens itself here and there according to unknown but surely wise laws.

Ships of the largest ocean size, of great length, and slow maneuvering ability are very hard to steer in shallow waters. The currents destroy the normal action of the helm, hence curves should be as infrequent as possible, and where they exist, they should have the largest possible radius. The engineer said: "In examining the two proposed canals on this basis, we find the most extraordinary difference; for while the Panama route has twenty-five curves in a total length of curvature of 19.5 miles, the Nicaragua route has eighty-two curves of a total length of curvature of 53.5 miles. As regards the most vital question of radius, or ease of curves, we find that in the Panama Canal, with the exception of three curves of 8,200 feet radius, all are of 10,000 feet radius, or more, while on the contrary there are sixty-nine curves in the Nicaragua Canal below 8,000 feet radius, of which no less than fifty are of 3,000 and 4,000 feet radius."

Regarding this feature, the author of the paper says: "It must be borne in mind that in that part of the canal which lies in the San Juan River itself, there will be nearly 28 miles excavated into the bottom of the river to a depth of 16 feet for the larger part, and that in this portion of the route there are forty-three curves of between 3,000 and 4,000 feet radius." He maintains that this sharply-curving channel, opened as it is down into silt and sand, will be extremely difficult to maintain, since it will necessitate constant dredging in a river which carries during flood-time 100,000 cubic feet of water, or one-quarter the amount which goes over Niagara Falls. "Obviously," says Mr. Bunau-Varilla, "ships will meet there an accumulation of extreme difficulties in the way of sharp curves, heavy river currents, constant strong winds and impediments either from the dredges themselves or from the sand and silt they will have to remove. In Panama the large and easy curves, absence of winds, scarcity of currents and the rarity of floods give quite a reverse impression as to the eventual facilities offered for navigation." With regard to harbors, the advantage is generally admitted to be with Panama, since two excellent harbors exist, one at each terminus. At Nicaragua, on the other hand, the Atlantic terminal is unsatisfactory, because of the enormous quantities of sand emptied into the sea by the San Juan River, and carried across the proposed mouth of the canal by the trade winds. The harbor on the Pacific will also have to be artificially constructed. Furthermore, two additional harbors will be necessary at the entrance and exit of the canal at the great inland sea of Lake Nicaragua. Were the two canals both finished and open to traffic, the time of transit by the 45-mile Panama Canal would be only twelve hours, whereas by the 183-mile Nicaragua Canal the time of transit will be thirty-three hours.

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Amos Judd

A new edition of an interesting book is like a friend in a new dress. The friend is the same, but his costume gives him additional distinction and dignity. Amos Judd, by Mr. J. A. Mitchell, the editor of Life, was the success of the year in which it was first issued. A book can not make a

second debut. The surprised delight of its first appearance can not be duplicated. If it were otherwise I do not know of a book which deserves a second debut more than the one named Amos Judd.

The author has an exquisite sense of form. The first chapter is devoted to a deposed little Indian prince, eight years old, his arrival in this country, and his adoption by Josiah Judd, a Connecticut farmer. The second chapter, because the book is not a juvenile, begins twenty years after when the hero has been graduated from college and has entered upon his career of gentleman farmer. Mr. Mitchell tells all the necessary details and even ornaments his story with a fancy which if allowed free growth would riot all over the place, in two hundred and fifty-one small pages with an average of one hundred and forty words to the page. To tell so complete a story in 35,140 words is a feat worth recording in these days of Mrs. Humphrey Ward and the "longer English novelists," Black and Hardy, for instance. Mr. Cable's new story, The Cavalier, contains 91,745 words.

Mr. Mitchell has the genuine editor's talent for conveying information, suggestion, and stimulating the imagination in few words. He refrains from expatiating. He leaves out all the moralizing on sin and suffering, all theories concerning the distribution of wealth, the immortality of the soul, the theories of religion and the other hundred and one subjects that essayists have chosen to discuss in books they call novels. For all these omissions the people who are still fascinated by a good story and restlessly seek it in the essays which their authors call novels are truly thankful.

A fancy as rich as the ornament of an Indian temple, and an imagery fantastic and mystic is temperately used by Mr. Mitchell. The result is a story which fascinates by its perfect form and rapid action. The exiled prince walks to his fate with the certainty of the hero in the Greek tragedy. The chorus is always audible even in the days of his graceful courtship. He dies as the chorus has said he would die, and the consciousness of the perfect form of the narrative and of the inevitableness of his death is complete.

The edition is published by Charles Scribner's Sons with illustrations in color by A. I. Keller.

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## The Cavalier

"If I tell you that," said the captain, "you won't like me the least bit."

Whereat Cecile replied, "Ah—well! we cou'n' like you the leaz bit any-ow."

"I suppose that's so," laughed the officer. "I'll tell you how it was. My guard were just about to hang me for saying I thought we had a right to make soldiers of the darkies, when your friend came galloping along, saw the thing and rushed in and cut the halter with his sword."

"Oh, sir," cried Estelle, whose eyes, brows, lashes and hair were all of the same luminous red-brown, and in whose cheeks the rose seemed always to burn through the olive, "how can you and your people seek to kill such men as that?"

"Such as which?" asked the Yankee, with a twinkle. "There were two kinds."

No American writer has conveyed the creole character with so much charm and accuracy as Mr. George W. Cable. The soft gliding vowels and the ignored consonants of the creole patois, the graceful, frank manners and the engaging personal appearance of the Louisiana creole suggested in "Old Creole Days," in "Dr. Sevier," and in all of Mr. Cable's southern stories is a unique contribution to literature. Their charm, their languishing ingenious creole charm is truly a discovery. The very name creole suggests, to northern minds, at least, Cable's men and women whose complexions seem to be made of two textures, the upper one a transparent olive and the under one a scarlet that glows and changes in the changing lights and emotions of the volatile, passionate sons and daughters of southern France married to the sons and daughters of the southern states of

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