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SCIENTIFIC AMERICAN SUPPLEMENT

No. 520,

For the Week Ending December 19, 1885.

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REVIVAL OF THE NICARAGUA CANAL PROJECT.

An official report has been submitted recently to the Navy Department by Civil Engineer A. G. Menocal, U.S.N., of the relocation of the Nicaragua Canal made by the government expedition of last winter.

The route now given the preference extends from the harbor of San Juan del Norte, or Graytown, on the Caribbean Sea, to the port of Brito, on the Pacific, a total distance of 169·8 miles, of which 40·3 miles are canal proper and 129·5 miles open navigation through Lake Nicaragua, the river San Juan, and the basin of the river San Francisco.

The summit level is 144·8 miles long, and is elevated 110 feet above the mean level of the sea. It is supplied from Lake Nicaragua. Three locks are projected east of this level, and four locks west. The first lock east of the lake is intended to have a drop of 53 feet, and a rolling or tumbling gate of original design has been invented by Civil Engineer Peary. The locks are to be magnificent structures, 650 feet long between gates, 65 feet wide between gate abutments, and with 29 feet of water over the sills, capable of containing the City of Rome or the Acapulco and Colon together.

The length of canal and basins east of the lake is 22·44 miles; west of the lake, 16·54 miles, but so divided that vessels can conveniently pass each other except at short intervals, the longest of which is only 3·67 miles.

The yearly capacity is estimated at 20,000,000 tons (against 6,000,000 on the Suez Canal). The time of passage from ocean to ocean is to be 30 hours, perhaps less.

The lake will require to be excavated and dredged for a distance of 8½ miles, and the San Juan River 24 miles. The San Francisco requires but slight excavation.

The soil to be excavated for the canal is mostly sand, gravel, and rock, not much clay having been observed, giving a desirable average.

The climate is styled salubrious, inasmuch as no officer was sick for a day during the four months of the survey.

By the new plan, the necessity of large harbors to accommodate shipping will be obviated, by reason of the change of location of the tidal lock at Brito from the inner end of the harbor to a point 1·4 miles inland, virtually extending the harbor that distance. At the Graytown end the tidal lock is 11·6 miles inland.

The water supply is estimated to be ten times as much as will be required for lockage.

As compared with former route, the length of the line from sea to sea has been reduced 11·46 miles, the length of the canal proper reduced 21·44 miles, and the number of locks from 21, as proposed by the United States Surveying Expedition of 1872–73, and 11 as proposed by Mr. Menocal in 1880, to 7.

The work, it is asserted, can be completed in six years; and the cost, on a new and reduced basis of estimate of prices, as compared with that of the location of 1872–73, is given as $64,043,699.

Substantially the same process was followed in estimating for the Panama Canal. The route was resurveyed and relocated. Improvements were made, new estimates calculated, and the costs greatly reduced. Results show they should have been increased, not lessened.

In a trenchant little volume entitled "The Panama Canal," by J. C. Rodrigues, just issued by Scribner, the history of that enterprise is brought down to September of the present year. The author was on the Isthmus in 1880 with De Lesseps's technical commission, and appears to be quite at home in the subject. In 1879, when it was estimated that only 46,000,000 cubic meters must be excavated, it was estimated that the cost would be $85,000,000, and the time required four years. De Lesseps himself now admits that 125,000,000 meters must be removed. Others put the amount as high as 150,000,000. Up to June, 1885, only 13,000,000 had been removed, of which not over three-quarters of a million had been taken during any one month. The most rapid progress possible, then, with unlimited capital, would seem to demand at least twelve years for the completion of the enterprise.

Estimates indeed range from this up to fifty years, and it is by no means certain that the obstacles are not insuperable. The problem of so directing and restraining the Chagres River that it shall not in an hour demolish and sweep away the labor of years does not appear to be soluble on any *a priori* considerations, but only satisfactorily demonstrated by its actual accomplishment. Again, who can predict with certainty the successful removal of the Culebra Mountain, and can give reasonable guarantee that the ditch, if ever dug through clay and quicksand, can be maintained secure from inroads of detritus borne by the torrential currents so often following the wake of tropical storms?

Assuming for argument's sake, however, that the work may possibly some time be completed, Rodrigues figures out the cost as not less than $540,000,000, and the annual amount of expenditures over receipts as over $16,000,000.

The present condition of the Panama Canal offers very little inducement for the construction of a second and rival canal at Nicaragua. For the present, so far as our government is concerned, much the wiser course will be to give what little encouragement is needed—and only a little is asked—to the construction of Capt. Eads' ship railway over the Isthmus of Tehuantepec. The Mexican government has granted the rights of way and made other valuable concessions of lands and moneys. The project is indorsed by eminent engineers, is approved by nearly all representative men who have given the subject consideration. Public opinion is setting strongly in its favor all over the country.

In considering the merits of a Nicaragua Canal and a Tehuantepec Ship Railway, we should remember that estimates of railway construction, owing to vast experience, may be made with precision, while those of ship canals, for lack of experience, are notoriously unreliable and misleading. This fact has evidently become apparent to the practical mind of the President, for in that part of his message to Congress in which he alludes to the matter, he expresses an unmistakable preference for the Eads ship railway. He says: "The Tehuantepec route is declared by engineers of the highest repute and by competent scientists to afford an entirely practicable transit for vessels and cargoes by means of a ship railway from the Atlantic to the Pacific. The obvious advantages of such a route, if feasible, over others more remote from the axial lines of traffic between Europe and the Pacific, and particularly between the valley of the Mississippi and the western coast of North and South America, are deserving of consideration."

In these few words the President hits upon the two principal features of the ship railway project, and factors which any scheme of trans-isthmian transit should possess to win popular favor.

In these practical days, it is not enough that a scheme should be possible, it must be practicable.

The returns must not only be commensurate with the cost of construction and maintenance, but it must be possible to foresee with something like accuracy the sum total of gross expenditure. There is always a tendency among projectors to get the State so involved in their schemes as to be unable to retire; for once in deep enough, retreat can only be made by a sacrifice of what has already been accomplished.

It is not meant by this to cast any discredit upon those urging the Nicaragua Canal route. No doubt they are entirely sincere in their belief that their estimate is a true one, and there is nothing to show a sinister design of misleading the government. But it cannot be overlooked that a recent government commission, made up of capable engineers, estimated the cost of a canal at Nicaragua at $100,000,000, or $15,000,000 more than the original estimate of the Panama Canal, and that the report of Major McFarland, made some years ago and suppressed, estimated this cost at $140,000,000, with labor at one dollar a day—a rate which is shown by the prices now ruling at Panama to be absurdly low.

Again, the position of the Tehuantepec Ship Railway at the extreme northern end of the narrow strip of land which separates North from South America is, as the President implies, a very important advantage. To cross at Panama or Nicaragua, a ship must sail hundreds of miles down the Isthmus, and then back again on the other side to regain her course; the route from New York to San Francisco being about 1,200 miles longer by way of Panama than *via* Tehuantepec, and about 600 miles longer *via* Nicaragua than *via* Tehuantepec.

The ship railway scheme appears to present many valuable features. It can be completed and put in operation, its projectors say, within four years. Would it not be well to try it? If, after all, we must ultimately fall back on the canal, we can still have that alternative; and meanwhile, unless the Panama scheme collapses, experience gained in the progress of that work may throw much light on the working details of the Nicaragua route, and if, after all, De Lesseps should surprise all the critics by snatching victory out of the jaws of defeat, why, then, we should have an interoceanic canal, and there certainly is not business enough for two; while, on the other hand, the Tehuantepec Ship Railway would be an extremely useful and convenient one, canal or no canal.

A Valuable Cotton Hybrid.

Dispatches from the South state that ex-Mayor Schorten, of Baton Rouge, Miss., has produced a hybridized cotton plant, about 14 feet in height, and capable of yielding four bales to the acre, should its successful culture be accomplished. It is matured by removing the stamens of the cotton blossom early in the morning before it opens, and by hybridizing the pistils of the cotton by the pollen of an ocra blossom. The hybridized blossom is then protected by cloths to prevent insects from doing it any harm. As soon as the boll is formed, the cloths are removed. The two prolific stalks raised this year had produced a sufficient amount of seed to plant an acre. The lint of the hybrid is reported to be long and silky. Should the seeds prove fertile, the new variety will be of immense importance.