## FERDINAND DE LESSEPS AND THE CHAGRES CANAL.

The Viscount Ferdinand de Lesseps, with his family and staff of engineers, arrived in this city, Feb. 25, from Panama, where he had been to examine the route of the proposed Chagres Canal.

Born in Versailles, France, Nov. 19, 1805, M. de Lesseps early entered the diplomatic service of his country, continuing therein some forty years. In 1854, he went to Egypt on the invitation of the Viceroy, Said Pasha, to examine the project for a ship canal across the Isthmus of Suez, and two years later he published a memorial giving full details of the enterprise. A stock company for the construction of the canal was formed, and M. de Lesseps gave himself up entirely to the prosecution of the great undertaking. The work was begun in 1859, and completed in 1869. This great achievement, conceived and carried out in spite of gigantic physical, financial, and political difficulties and discouragements, gave M. de Lesseps undisputed rank as the first engineer of the age.

Since the completion of the Suez Canal M. de Lesseps has suggested or has been consulted with regard to several great geographical and speculative enterprises—among them the conversion of a large area of the Sahara desert into an inland sea; the cutting of a ship canal through the Isthmus of Corinth, which is now being excavated; and the laying out of an elaborate scheme of Russian railways connecting the south and east of Europe with India. All these projects, however, are of comparatively small importance beside that of severing the Isthmus of Panama by means of a salt water ship canal at sea level.

With the history of this enterprise, since the Canal Congress in Paris last spring, our readers are already familiar. M. de Lesseps says that as early as 1869 he was convinced that a sea-level canal without locks was the only one practically possible for the Isthmus; and at a public meeting in Paris, in 1870, he confidently asserted that opinion. This, however, it is proper to remember, was purely a matter of theory, for at that time there had been no careful survey of a route for a canal without locks, and accurate estimates of the practicability or probable cost of such a work were out of the question.

Having gone to the Isthmus determined to demonstrate the wisdom of his choice, M. de Lesseps has naturally succeeded in finding confirmation of the justness of his *à priori* belief.

The proposed canal substantially follows the route of the Panama railroad. A tide-lock is to be constructed in the Bay of Panama to control the level of the canal. In the Bay of Limon, on the Atlantic side, it is necessary to construct a breakwater two kilometers long, on account of storms. The cost of the entire work, estimated at 843,000,000 francs, includes the following items: All excavations, dredging, and removal of earth, 570,000,000 francs; dam at Gamboa, 100,000,000 francs; changing the waters of the Chagres, Obispo, and Trinidad, 75,000,000 francs; tide-lock on the Pacific, 12,000,000 francs, and breakwater on the Atlantic coast, 10,000,000 francs. Contingencies are estimated at 76,000,000 francs. The work will take eight years to complete, and it may be commenced before next June. The estimates contemplate the removal of 75,000,000 square meters of rock and soil.

The Gamboa dam will be required to form an artificial lake to receive and regulate the flow of the waters of the three rivers, whose periodical floods furnish the most serious danger to the proposed canal. This dam will be 5,000 feet long and 40 meters high. It will be exceeded in size only by the three great dams at St. Etienne, France. La Gemappe, Belgium, and Alicante, Spain. The last has stood for three hundred years.

As a reception given to M. de Lesseps by the American Society of Civil Engineers, Feb. 26, the distinguished engineer insisted that the proposed Chagres Canal was a much less difficult task than the canal at Suez. The deepest cutting would have to be about the height of the Brooklyn bridge towers. One of the visiting engineers, M. Douzat, said there would be seven miles of deep cutting, averaging 180 feet, of which 160 was rocks. The deepest cutting in other parts of the canal would average 40 to 45 feet. The entire length of the canal is about 45 miles. In answer to the question why a sea-level canal was preferred to one with locks, M. de Lesseps said:

"If the Commission of Engineers which had gone down to Panama has reported in favor of a canal with locks, I should have put on my hat and left the whole project and would have had nothing to do with it. That plan will do for small ships, but when we have vessels now afloat 500 feet long, and others on the stocks 600 feet long, it is impossible to say for what you would have to build locks. Single locks would be slow, and double locks, though quicker, would be very expensive and require constant repairs. At Nicaragua they intended the use of locks, and with the earthquakes which prevail there the repairs would be ruinously expensive, and even at Panama, where earthquakes do not exist, they would be fatal by reason of the loss of time. I would not have anything to do with a locked canal except for little ships. It is not the proper idea for a grand inter-oceanic canal."

M. de Lesseps is a man of medium height, strongly built, alert in all his movements, erect and elastic in carriage, and seemingly not much over fifty years of age, though really seventy-four. His first days in New York have been devoted to the inspection of the elevated railways, the Brooklyn Bridge, the working of the fire department and the Croton water service.—*Scientific American.*

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TECHNICAL NOTES.—Prof. Egleston, in a recent lecture on Gold, made the point that the idea that this metal was confined to the most ancient formations must be abandoned, since it has been found in deposits of all ages. He made the curious calculation that all the gold in the world would only suffice to make a pile 25 feet wide, 45 feet long, and 25 feet high.——A paragraph is going the rounds of the technical press that sheet iron covered with gum of the *euphorbeaceæ*, common and luxuriant in the tropics, affords an excellent protection against fouling when exposed to the action of sea-water. A test-piece of iron, covered as above stated, and immersed at the Chatham dockyard, England, where every thing becomes rapidly fouled, was taken out after lengthened immersion quite clean. This gum is described as being intensely bitter and poisonous to the lower forms of life. Further details will be found elsewhere in this department.——The experiments in electric lighting in London, inaugurated some time ago by the Metropolitan Board of Works, are said to have given such satisfaction that a further extension of the system (the Jablochkoff plan is employed) has recently been made from the Central Station at Charing Cross on the Thames embankment.——The sensation created by the last announcement from Menlo that Edison had succeeded in solving the problem of electric lighting for domestic purposes has died out sooner than we had anticipated. At present writing, the globes are affected with a disposition to crack, the carbon horseshoes disintegrate, and, saddest of all—for those upon whom it was unloaded—the stock of the company has fallen almost as rapidly as it "boomed." Moral: "Never holler till you're out of the wood."——A contract for laying a submarine cable across the Gulf of Mexico, connecting the United States with the Mexican Republic, has been approved by the Mexican Congress.

—A daily action of the bowels, says *Hall's Journal of Health*, is essential to good health under all circumstances; the want of it engenders the most painful and fatal diseases. Nature prompts this action with great regularity, most generally after breakfast. Hurry or excitement will dispel that prompting, and the result is nature is baffled. Her regular routine is interfered with, and harm is done. This is a thing which most persons do not hesitate to postpone, and in the case of riding to town, a delay of one or two hours is involved. This never can occur with impunity, in any single instance, to any person living. This very little thing—postponing nature's daily bowel actions—failing to have them with regularity—is the cause of all cases of piles and anal fistulas, to say nothing of various other forms of disease: fever, dyspepsia, headache, and the whole family of neuralgias. A man had better lose a dinner, better sacrifice the earnings of a day, than repress the call of nature; for it will inevitably lead to constipation, the attendant and aggravator of almost every disease. To arrange this thing safely, breakfast should be had at such an early time as will allow of a full half hour's leisure between the close of the meal and the time of leaving for the cars.

CELLULAR CONSTRUCTION.—A good illustration of the principle and strength of cellular construction may be given as follows: Take a piece of tin, some 12 inches long and 6 inches broad. Lay its ends on two blocks. Thus suspended a few ounces of weight bends it down to the ground, but roll it up in a tight roll and you may suspend very many pounds from it without its yielding a particle. This illustrates the strength of cellular construction. On this plan the *Great Eastern* steamship was built, she having, up to the water-mark, an inner and outer metal shell of three-quarter-inch plate, placed three feet ten inches apart, and between them, at intervals of six feet, run horizontal webs of iron plates, which convert the whole into a series of continuous cells or iron boxes.