

of a new system by the British military authorities, which is exciting a good deal of interest on the part of the war departments of continental Europe, and which, in view of the conflict now in progress between this country and Spain, may likewise commend itself to Secretary Alger and Gen. Miles.

It seems that for some time, by orders of Field Marshal Lord Wolseley, the British commander-in-chief, careful and exhaustive experiments have been in progress with a view to ascertaining the relative effects of alcohol and of total abstinence upon the physical endurance and staying qualities of the troops. Advantage has been taken both of the annual maneuvers, as well as of these petty wars of which England has a few on hand in one part or another of the world almost all the time, to examine carefully the question. One regiment would be deprived of every drop of stimulant, while another belonging to the same brigade would be allowed to purchase as usual its malt liquors at the canteen, and a third, probably a Highland corps, would receive a sailor's ration of grog in the form of whisky. In each instance the experiment went to show that, whereas at first the corps which had received an allowance of grog surpassed the others in dash and in impetuosity of attack, yet that after the third or fourth day its members began to show notable signs of lassitude and a lack of spirit and endurance. The same manifestations, though in a minor and slower degree, were apparent in the regiments restricted to malt liquors, whereas the men who had been kept from every kind of stimulant increased in staying power, alertness and vigor every day.

The result of these experiments led the British war department to decide, not on the ground of principle, but solely for the sake of maintaining the powers of endurance of the troops now engaged in the Soudan campaign, not to permit a single drop of stimulant in camp save for hospital use. Spirits, wine and malt liquors have been barred from the officers' mess table as well as from the regimental canteen, and from generals in command down to the drummer boys and the camp followers liquid refreshments have been restricted to tea and oatmeal water.

When one remembers how devoted the Englishman is to his beer and the Scotchman to his "mountain dew," modern history abounding in the upsets of cabinets ill advised enough to attempt an increase of the tax on these stimulants, which are regarded not as luxuries, but as actual necessities of life, the boldness and likewise difficul-

ties of the innovation will be appreciated.

But the scheme has fulfilled all expectations. Thanks to total abstinence, the men have been able to make forced marches of the most extraordinary character across the burning desert and under a blazing sun, the heat of whose rays can only be appreciated by those who have lived under the equator.

The Soudan is famed for its deadly climate, which either kills or prematurely ages the majority of white folks who penetrate beyond its frontiers. Indeed, it has often been nicknamed, and with good cause, too, the "Man Eating Soudan," by reason of the number of white lives that it has consumed. Yet, in spite of this, there has never been a campaign where there has been so little sickness, where so few men have been compelled to fall out, even in the longest marches, and where the troops have been got into such magnificent physical and moral training that they would actually cover 30 miles of sand with empty water bottles, without slaking their thirst once from the beginning to the end of the march, at the close of which they would still find themselves sufficiently fresh and vigorous to win a hard-fought victory such as that of Atbara.

Although the British admiralty has not yet followed the example of the United States, which has long since abandoned the daily ration of grog to the men of its navy, and which prohibits the use of stimulants on board when at sea, yet orders have recently been issued to the commanders of all British men-of-war in commission that in lieu of the double rations of grog formerly served out to the crews when going into action, not a drop of alcoholic liquor, no matter whether spirit, wine, or malt, is to be allowed when there is any fighting to be done. In order to satisfy the thirst engendered by the heat, exertion, and smoke inseparable from a naval combat, supplies of oatmeal and water for drinking are arranged all over the ship.—Chicago Tribune.

THE PRESENT CONDITION OF THE PANAMA CANAL.

Extracts from an article on "The Trans-isthmian Canal Problem," by Col. William Ludlow, U. S. A., published in Harper's Magazine for May.

The Panama project has claimed serious attention from the outset. With the exception of San Blas, it is the shortest (of the possible trans-isthmian routes); with the exception of Nicaragua, its summit elevation is the least; and the natural harbors at each end are capacious, and can be made to accommodate the heaviest class of vessels.

By the construction of the Panama railroad it gained the additional important advantages of rail transportation throughout its length, and of established lines of communication with foreign centers by sea from both ends.

The principal drawbacks are the heavy rainfall—10 to 12 feet at Colon—the heavy floods of the Chagres and the necessity of controlling them, and the evil repute of the vicinity for unhealthfulness. To these another formidable obstacle is added in the treacherous nature of the materials through which the cut has to be made, but this was not known until the excavations were actually begun in 1884.

The most moderate estimates that could be made of the cost of the work discouraged undertaking it, until the brilliant success of the Suez canal, under De Lesseps, concentrated French interest on the project, and stimulated the expectation of a still more important conquest and even greater pecuniary rewards.

It is needless to follow in detail the history of this gigantic enterprise, that, at the time of its collapse in 1888, after five years of active prosecution, had absorbed a total expenditure of \$300,000,000, with the work less than one-third done, the worst of it yet to do, and none of the serious problems, such as the control of the Chagres and the practicability of making the deep cut, even approximately solved.

The isthmus was an orgy of reckless expenditure, and the millions poured in from Europe disappeared as if by magic, until at last the stream ran dry and wholesale ruin ensued.

The coup de grace was delivered by the Culebra mountain, through which the huge cut, ultimately intended to be 300 feet in depth, was in progress. The heterogeneous mass, whose unstable and treacherous constitution had not been investigated before attacking it, included clays of various kinds, some of them extremely plastic, and when the excavation had reached a comparatively early stage the south slope slipped gently forward and paralyzed the undertaking by a silent demonstration of its futility.

The fundamental error made by De Lesseps and his associates was in basing the Panama plans and estimates upon the most favorable results obtained in the Suez constructions, without making adequate or any allowance for the radically different conditions. Suez was merely 100 miles of level digging through sand, in a region where the rainfall is but an inch or two in a year, the climate comparatively cool and healthful, a large supply of native la-

bor, and the mechanical resources of Europe at no great distance; but, notwithstanding these advantages, the work, planned on an estimate of \$40,000,000, cost \$110,000,000, on a reduced cross-section, before it was opened.

The physical conditions on the isthmus are the precise reverse of those in Egypt, and the cost of every item of work was enormously greater. A material increase was inevitable, even with the most careful and economic management. The scarcity and diminished effectiveness of labor, losses from disease and sickness, the interference and burden of the heavy rainfall, would at least have doubled the cost, and to these drawbacks were added political disturbances and local acts of violence, with a home administration of unparalleled extravagance.

The old company left behind it assets that have been reasonably computed as amounting to \$60,000,000 or \$70,000,000, including the ownership of the Panama railroad, and estimating the actual value of the work done and the immense plant collected—much of it in readiness to use.

With this as a basis, and with a working capital of \$12,000,000 or \$15,000,000 restitution money recovered from bankers, contractors and others who had unlawfully obtained possession of it, a new company, with a total change of personnel and methods, has been for three years pursuing an extended system of engineering research into the particulars affecting construction and cost—boring, gauging, leveling, experimenting and computing—with the purpose of effecting a thorough study and making final plans and estimates before again submitting the project to public consideration. At the same time a considerable amount of actual work has been done, as set forth in the annual printed reports, and a force of between 3,000 and 4,000 men been kept at work, mainly at the Culebra pass, but with preparations for extending the work to other points.

Pending the completion of the studies in the field, an engineering commission has been formed, to whom the finished plans and estimates are to be submitted for consideration and report; and if this commission, which, it may be stated, includes a distinguished American engineer, Gen. Abbott, of the United States army, shall confirm the results of the latest examinations and find the proposed constructions practicable and adequate, and the estimates sufficient, the project is to be made public and endeavor made to secure the financial aid to carry the enterprise to a conclusion.

The reports state that this is to be done during the present year.

A LITTLE REPUBLIC TO BE EXPECTED.

It was not until 1841 that Costa Rica made any pretensions to independent sovereignty. Since then she has enjoyed almost continuously the blessings of peace. For the last thirty years she has not suffered the shock of a pronunciamiento; and her presidents have been elected by ballot under constitutional regulations. She has never interfered in the affairs of her neighbors, although her good offices have often been exercised in the settlement of their differences. It was through her aid that Walker and his fellow filibusterers were overcome and driven from Nicaragua; and, although there have been frequent misunderstandings, she has never engaged in a war. It is also remarkable that although the percentage of foreigners among her population is larger than that of any of the neighboring states, no claim has ever been presented to Costa Rica for damages or injury caused by the arbitrary acts of her authority against a citizen of another nation. Elisee Reclus, the famous savant, in his "Geographie Universelle," calls Costa Rica "a model republic;" and in many respects she sets an example worthy to be followed by the other Latin-American states.

Costa Rica suffers from a scanty population; for, although it has increased 50 per cent. in 15 years, the total does not exceed 300,000. But, next to Uruguay, the little country has the largest amount of foreign commerce per capita of any of the American states. In the United States, according to recent calculations, foreign trade averages \$26.52 per capita; Costa Rica shows an average of \$68.66.

Coffee is the chief product of the country, Costa Rica having been the first of the Central American states to develop its culture. A large quantity of fruit is shipped to the United States, with which a weekly steamship connection exists. Most of the coffee goes to Europe; not more than one-third of it to the United States. The greater part of Costa Rica's imported goods come from England, France and Germany. This is chiefly due to the fact that her importing and exporting merchants are Europeans, and exchange their invoices for bills of lading for coffee exported to the European market. Recently, however, quite a number of Americans have settled in Costa Rica, and the relations between the two countries will thereby be much benefited.

The educational system of Costa Rica is more extensive and better sustained than that of any other of the Central American republics. The primary schools are free, and are supported by the government under a system similar to that of the United States. A compulsory education law is in force, except in the very sparsely settled districts, where its operation would be a hardship to the people. The reports of the bureau of education at Washington show that there is a larger percentage of the population attending school in Costa Rica than in any other American country except Uruguay, and that the number and improvement of the schools have kept pace with the advancement of the country in other respects. In 1886 there were 260 primary and secondary schools, with an average attendance of 20,000 pupils. In 1897 there were 353 schools, with an average attendance of over 30,000. There were colleges for both sexes, as well as a national university supported by the government, with faculties of law, medicine, surgery and engineering, which is attended also by students from the neighboring states. The government pays for the tuition of a certain number of students at foreign universities as an encouragement and reward for those who distinguish themselves in their studies, and to provide instructors for its own schools in branches of science and art that are undeveloped in Costa Rica.

Costa Rica was the first of the Central American states to extend the telegraph and the telephone to all its centers of population, and to introduce electric lights, underground sewers and other modern improvements into its cities. The people are progressive and proud of their achievements. They love peace and order; and, although there are occasional political disturbances, it is more difficult to start a revolution in Costa Rica than in any other country between the Mexican border and the isthmus. Property is safe; the presence of foreigners is welcome, and the government offers liberal inducements for the investment of capital and the settlement of its public lands.

The resources of the country are similar to those of Nicaragua. There is an abundance of timber and mineral deposits; the valleys have a deep and fertile soil for agriculture; while on the northern frontier is a large area of grazing land capable of sustaining millions of cattle. The water power is abundant and convenient, and by and by Costa Rica will increase her wealth by the introduction of mechanical industries; but labor is so scarce and the