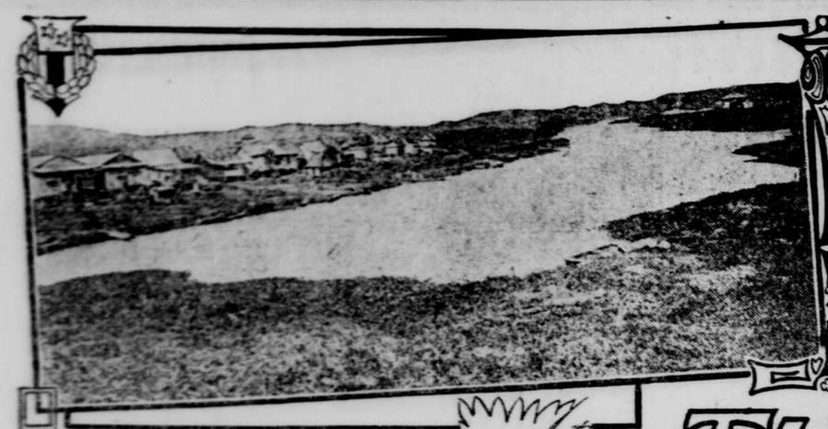
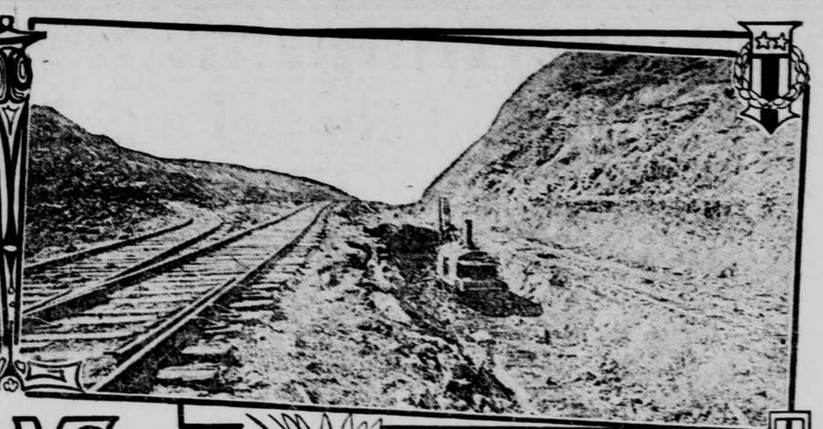


VILLAGE ON THE BANKS OF THE CHAGRES RIVER



CULEBRA CUT — SHOWING GOLD HILL

THE PANAMA CANAL

BY WM. E. W. YERBY

WHEN one looks upon the gigantic work that is in progress on the Isthmus of Panama and beholds the hills and the mountains giving way before the onward march of modern machinery—sees steam, electricity, air and water all harnessed and made to do the bidding of man, he can but stand in awe and ask the question: What is the propelling power back of this great undertaking?

And the question comes to him in redoubled force as he remembers that the spot on which all this great work is in progress was only recently regarded as the death-hole of the world—but now, when he beholds a land freed from the fearful ravages of the diseases that had for centuries taken their toll of human life by the tens of thousands, he is constrained to ask again: What has wrought this wonderful change?

And the answer comes back to him from far down the rugged road that is filled with the fumes of the midnight oil that has been burned by students and men of science of past and present times: O, fellow-toiler, over and above and around and directing this great enterprise, upon which the eyes of the world are centered today, is the irresistible power of well-trained, cultured intellect.

It is remarkable the number of people one finds who are of the opinion that the idea of a canal across the Isthmus of Panama is something of recent origin, when the fact is, it is a matter that has engaged the attention of the civilized world for nearly five hundred years. Many unsuccessful attempts have been made to accomplish the object in the past, and it is good to realize that the dreams and designs of the Spanish adventurers of the fifteenth century are about to be brought to pass by American engineers of the twentieth century. Spain, Portugal, England and France have each in turn made a failure in their attempts to pierce the Isthmus with a canal.

Columbus was the first to propose a water highway from Europe to Asia, westward, by way of the Atlantic. It was such a highway he sought, and not the new world, which he really found. He landed on the Isthmus of Panama, near the present site of Colon, in the year 1502, but it was a Spanish engineer named Saavedra, one of Balboa's followers, who first advocated the construction of a canal across Panama. This was in 1517, and after studying the question for a dozen years, he submitted his plans to Charles V., king of Spain. Surveys of the isthmus were made, but the work of cutting a canal was reported to be impracticable. After the death of Charles V. his successor, Philip II., in 1657, sent an engineer to survey the Nicaraguan route, who likewise made an adverse report. The question was then abandoned for 200 years, after which time it was again opened, and has been before the public ever since.

In the year 1880 the French people, headed by Count Ferdinand de Lesseps, who had gained both fame and fortune by the successful completion of the Suez canal, took up the matter of constructing the Panama canal, and went vigorously to work to connect the two oceans. The great engineer thought he had really an easier undertaking before him than he had recently been successful in accomplishing—that is, the cutting of the Suez canal—but he was vastly mistaken. As work progressed on the canal with seeming success, glowing reports were wafted back to France of what was being done, and the fame of de Lesseps rose to the point of hero worship. In 1884 he was elected to the French academy, and was saluted by Gambetta as "the Grand Old Frenchman." In 1885 he was seated among the Immortals—Victor Hugo, the great French novelist, being his sponsor, and Renan, that other brilliant French writer, delivered the valedictory.

But the dark clouds were gathering behind all this fantastic show, and in a few more years the crisis came. The expenditure of money that had been contributed mostly by the poorer people of France was something awful—the amount being placed as high as $500,000,000 in eight years; and then the crash came, burying beneath the wreck the hopes and expectations of the great engineer, and carrying sorrow and want to the homes of thousands upon thousands of French people who had contributed their little all toward forwarding the great enterprise. The nation was brought to the very verge of revolution. Judicial proceedings were instituted, and trials were had, extending over a period of five years. There was disclosed to the horrified world such an orgy of corruption as history had never before recorded. A hundred French senators and deputies were accused of having taken bribes, and the police department was under the same charge.

Count de Lesseps never recovered from the shock—and went down to his grave in 1894—only 16 years ago—a broken-hearted old man—but his fame will remain immortal despite the sad ending of his career.

In 1903 the United States purchased the interests and belongings of the French company on the Isthmus of Panama, paying therefor the sum of $40,000,000—the assets consisting of valuable surveys, implements of all kinds, many thousand houses, railroads, land; and also paid the Republic of Panama $10,000,000 for the Canal Zone—a strip of land in said Republic of Panama ten miles wide and practically 50 miles long—extending from Colon on the Atlantic side to Panama City on the Pacific. Through the center of this ten-mile strip the canal is being constructed. At present there is an army of nearly 40,000 men engaged in the gigantic undertaking of building this great water highway from ocean to ocean.

The first party of Americans went to Panama in 1904 to begin work, but they found the country infested with diseases of the most fatal kinds, and the year 1904 was practically spent in improving health conditions. This work has been under the supervision of Col. W. C. Gorgas, and so effective have been the methods pursued by him and his able assistants in the Canal Zone of the Isthmus of Panama that the health conditions of that tropical country are about as good today as those of the southern states of America.

Contrary to the general belief, the United States is not digging a "big ditch" across the Isthmus of Panama. When the canal is finished and ships are steaming across Panama from the Atlantic to the Pacific, or vice versa, the waters of the two oceans will still be at least forty miles apart. They will never meet at all. A sea-level canal, which would have allowed the waters of the Atlantic and the Pacific to come together, is not being dug; but an 85-foot lock canal is being constructed. As to the relative merits of the sea-level and the lock canal it is not within the province of this article to discuss.

The 85-foot lock canal which is being constructed consists of a sea-level entrance channel 7 miles long, 500 feet wide and 41 feet deep on the Atlantic side to the foot of Gatun (pronounced "Gatoon") locks. On the Pacific side there is a corresponding sea-level channel to Miraflores locks, about 8 miles long, 500 feet wide and 45 feet deep.

At Gatun the 85-foot lake level is obtained by a great dam about a mile and a half long, and nearly half a mile thick at the bottom or base. The dam rests on impermeable material of sufficient supporting power, and fills the openings between the hills at Gatun, through which the Chagres (pronounced "Shaggers") river flows to the sea. This river crosses the channel of the canal no less than fifteen times in its serpentine course and is one of the most turbulent streams known during high water, though it looks peaceful enough during the dry season. It was one of the great obstructions to the possibility of digging a sea-level canal, but this enemy has been converted into a friend, and will be made to supply the greater portion of the water for filling the great artificial lake.

The great Gatun dam—upon the successful completion of which depends the success of the canal—consists of a water-tight center or core composed of clay and sand mixed in proper proportions. These materials were adopted after consultation with the best experts in the world, who came to the conclusion that clay and sand were the most impervious materials that could be used. This material, after being properly mixed, is deposited hydraulically—that is, by being pumped in by dredges. This center core is confined by a rock wall on each side, the rock so used being taken from Culebra cut. At the bottom this impermeable core of clay and sand has a width of about 860 feet, and gradually tapers upward until a minimum thickness of 400 feet will be had at the water level of the lake. The dam will rise to a height of 115 feet, or a distance of 30 feet above the level of the lake. The artificial lake—which will be known as Lake Gatun—will cover an area of 164 square miles, or over 100,000 acres. The entire navy of the United States can find safe anchorage therein.

The greatest obstacle that has stood in the way of the engineers for the past 500 years in constructing a canal across Panama has been the mountain range known as the Cordilleras—the backbone of the continent. It was here that the French people wasted and squandered such a great amount of money that the picture shown above is called "Gold hill"—it being asserted that they spent enough in their endeavor to cut through the mountain at this point that the money used would have covered the sides of the excavation with solid gold. The cut through these mountains is known as Culebra cut, and is nine miles in length—through solid rock. The cut begins at Bas Obispo and ends at Pedro Miguel locks.

The question is often asked, What becomes of the vast quantities of dirt, rock, etc., that are taken from the canal? It is loaded on trains by means of the steam shovels and hauled off—a portion being placed on Gatun dam, a portion is taken to the Atlantic and a portion to the Pacific oceans and placed on the great breakwaters that are building there, and yet other trains are busily engaged in hauling the excavations to the railroad tracks that will skirt the northern edge of the canal, and which will have a solid rock bed the entire distance. They find use for every particle of it. Getting rid of these excavations has caused the Canal Zone to become the busiest railroad center in the world. It is said that 900 trains pass a given point near the town of Culebra in a day, hauling out the rock from the cut.

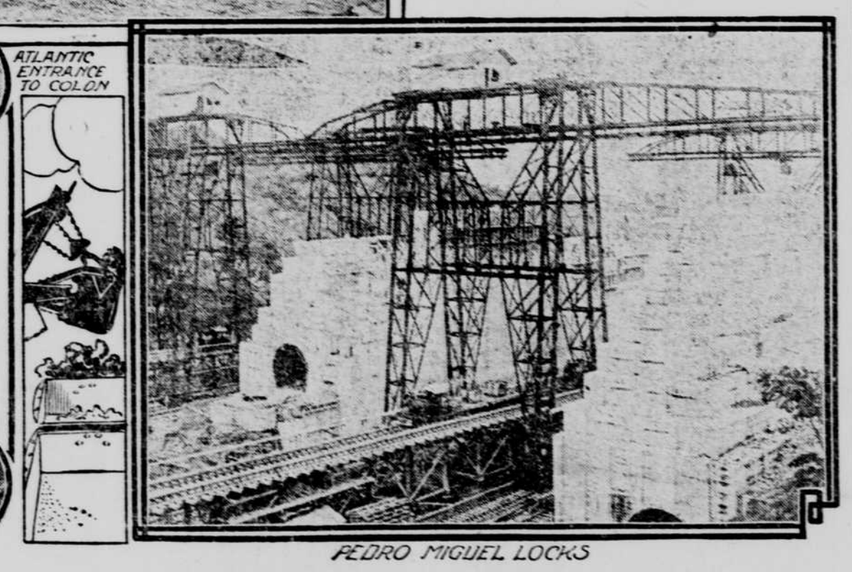
The United States is constructing a lock canal, as before stated. These locks are in pairs, each having a width of 110 feet and a length of 1,000 feet. Each lock consists of a chamber, with walls of concrete, and with water-tight gates at the ends. The level of water is to be regulated through openings in the bottom by the operation of valves in the side and center walls, which will permit the water to flow into and out of the locks by gravity. It is estimated that it will require eight minutes to fill one of them. The locks are the largest that have ever been designed in the history of the world. The gates consist of two leaves and are massive steel structures 7 feet thick, 65 feet long and from 47 to 82 feet high. Eighty-four leaves will be required for the entire canal, and their total weight will be 86,000,000 pounds, and will cost nearly $6,000,000.

When the canal is completed—which Colonel George W. Goethals, who is in charge of the great work, says will be some time during the year 1913—here is the manner in which a vessel from the Atlantic side will get to the Pacific: It will enter the sea-level channel at Colon and go a distance of seven miles to the foot of Gatun locks; there it will be lifted by means of these locks a height of 85 feet above the sea level to the surface of Gatun lake; the gates of the lock will be opened and it will steam out on this lake and go a distance of 23 miles to the beginning of the great Culebra cut, and carefully proceeding through this cut a distance of nine miles, it will check up at Pedro Miguel locks, where it will enter the lock and be lowered a distance of 28 1-3 feet to the level of Miraflores lake, and then it will steam a distance of three miles across this lake to Miraflores locks, where it will be lowered by two flights a distance of 56 2-3 feet to sea level; and then it will enter the Pacific channel of the canal and go a distance of eight miles out to deep water of the ocean. It will require from ten to twelve hours for a vessel to make the passage from one ocean to the other—thus saving many thousands of miles of travel, and many days of time in a journey to any of the ports on the Pacific side of the Americas and also to the Orient.

Colonel Goethals states most positively that the cost of the canal will not be over $375,000,000; and in this amount is included the purchase of the French company's belongings—$40,000,000—and the $10,000,000 paid for the Canal Zone, and also the cost of the sanitary department, which of course has been a considerable amount.

In order to get some idea of what the cost of the canal means—$375,000,000—and put it so the mind can in some measure grasp the figures, we make the following statement: There are in the world nine principal canals, to wit: The Suez, the Kiel, the Manchester, the United States Ste. Marie, the Canadian Ste. Marie, the Amsterdam, Corinth, Cronstadt and the Erie-Ontario canal. The total cost of all nine of these canals was $264,000,000, which is less by $111,000,000 than the Panama canal alone will cost at the lowest estimate. But even if this amount is doubled, the United States will complete it. The pride and reputation of the nation are at stake, and she cannot afford to make a failure as all the other countries have done that have gone before.

HAULING OFF EXCAVATIONS FROM CULEBRA CUT



ATLANTIC ENTRANCE TO COLON

PEDRO MIGUEL LOCKS

IMPORTANCE OF ERADICATING INJURIOUS CATTLE TICK

Southern States Need More and Better Live Stock and Larger Dairy Industry—Objects be Promoted by Destroying Pest.

The eradication of the cattle tick from the southern states is a problem of prime importance to the agricultural interests of that section. Moreover, the good that would result from the elimination of the tick would not be entirely confined to the region directly concerned, and thus the matter assumes to a certain degree a national importance.

The south needs more and better live stock and a larger dairy industry, and these objects would be greatly promoted by the destruction of the tick. The increased production of live stock by reason of its important bearing in maintaining and improving the fertility of the soil, would be of distinct benefit in increasing the yield of field crops. An incidental though important advantage of stock raising and dairying would be found in the distribution of the farmer's income throughout the year, enabling him to live on a cash basis. It can thus be seen that the benefits which would accrue to southern agriculture from the extermination of the cattle tick would be very great and far-reaching.

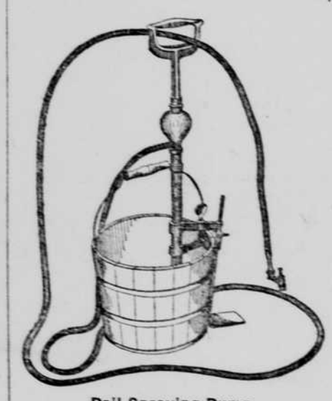
There are several species of cattle ticks, but the chief one is commonly called the "cattle" or "Texas fever" tick. It is the one most frequently found on cattle and is much more abundant than the other species. When the losses occasioned by this parasite are once thoroughly understood by farmers and stockmen there will be little need for arguments in favor of tick eradication. Some of the losses are not directly noticeable and consequently make little impression, while other losses properly chargeable to the tick are frequently attributed to other causes.

Various writers have estimated the annual loss due to the tick at from $40,000,00 to $100,000,000. These figures should be ample argument, even to the most comprehensive, for the eradication of the pest.

In getting rid of the tick, it may be attacked on the pasture and on the cattle.

In freeing pastures the method followed may be either a direct or an indirect one.

The former consists in excluding all cattle, horses and mules from pastures until all the ticks have died from starvation. The latter consists in permitting the cattle and other animals to continue on the infested pasture and treating them at regular intervals with oils or other agents destructive to ticks and thus preventing engorged females from dropping and reinfesting the pasture. The larvae on the pasture, or those which hatch from eggs laid by females already there, will all eventually meet death. Such of these as get upon the cattle from time to time will be destroyed by the treatment, while those which fail to find a host will die in the pasture from starvation.



Pail Spraying Pump.

Animals may be freed of ticks in two ways. They may be treated with an agent that will destroy all the ticks present, or they may be rotated at proper intervals on tick-free fields until all the ticks have dropped.

Spraying is probably the most convenient and practical way of treating cattle on the majority of farms. A good style of pail spray pump will be sufficient for treating small herds. About 15 feet of 3-3 inch high-pressure hose is required and a type of nozzle furnishing a cone-shaped spray will be found satisfactory. A nozzle with two small an aperture should not be used.

Every portion of the body should be thoroughly treated, special attention being given to the head, dewlap, brisket, inside of elbows, thighs and flanks, the tail and the depressions at the base of the tail. Crude oil alone may be used, but in general a 20 to 25 per cent. emulsion will be better.

All the cattle should be sprayed every two weeks and the treatment should not be discontinued simply because the ticks have become scarce or seem to have disappeared.

In localities where ticks commonly occur on cattle in considerable numbers during the winter time it will be advisable to continue spraying. In localities where ticks disappear or are present in very small numbers during the winter, the cattle should be inspected carefully each week to remove and destroy any ticks that may be present. When warm weather comes, it will be well in all cases in which spraying has been discontinued during the winter to begin spraying and continue until it can be determined with certainty that eradication has been accomplished. The spraying should not be delayed until ticks show again in considerable numbers. One tick destroyed in the early spring will save the trouble of destroying thousands a few months later.

Lambs and Wool.

It is asking too much of a ewe to make her grow the heaviest or next to the heaviest fleece of her life, and raise a lamb in one year. It cannot be done without checking the growth of the sheep and producing a lamb lacking in constitution. Continuing in that line for several years, the flockmaster will have a very uneven flock, and constitution will be bred out of them.

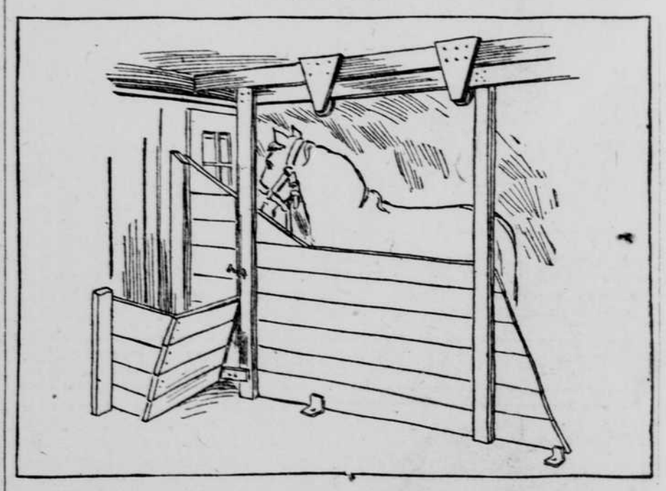
The Hogpen Floor.

The cement flooring with movable slat platforms makes the ideal floor for the hogpen. The cement floor alone is too cold and damp for the hogs, but with the slatted flooring on top, which may be taken up to clean out the place, there is nothing which is better.

Beans in Michigan.

The cultivation of beans in Michigan has become so large that bean threshers with complete outfit of machinery and men travel over some parts of the state to harvest the crop as wheat threshers do in other states.

SLIDING PARTITION IN STALL



The sliding partition shown in the accompanying illustration provides a safe way to approach the head of a kicking horse to feed it or put on the harness. It does away with the necessity of entering the stall from behind and the risk of being kicked. The partition reaches as far as the manger, and the entire framework and boards are carried on two rollers attached to a joist above. Small metal clips are fastened to the floor on each side of the partition to keep the bottom in place and guide it in sliding back.

MEXICAN STYLE OF FARMING

Most Primitive Methods of Agriculture Are Still Carried on in Many Parts of the Old Republic.

(By VICE-CONSUL R. M. STADDEN.)

The most primitive method of farming is still carried on in many parts of Mexico. The plowing is done by the old-time bull tongue, which is a crooked stick with the point covered with an iron shoe, which only scratches the soil.

Corn is planted by hand, a man following the plow, dropping the seed and covering it with his foot. It is cultivated with the same plow, which gives very poor results in destroying the weeds. The fodder is gathered by pulling the leaves or blades from the stock, which are made into bundles and carried from the fields by pack mules.

Rice is planted, after the native plow has scratched over the land, by being thrown broadcast, and covered by hauling a bunch of brush over the land. When the rice is about one foot or 18 inches high it is cut down with grass hooks; not even a scythe is used for this work. This cutting back is said to make the rice grow more bunchy and enables the rice plant to get the best of the weeds, whereas, if the land had been properly plowed before planting, there would be no weeds and this cutting back would not be necessary. Some eight or ten days before cutting or harvesting time the water is shut off from the rice fields to allow the rice to ripen, when it is cut with the same grass hooks. It is then piled up for three days, when it is threshed by being hand beaten on a rock, by which process five to ten per cent. of the grain remains on the straw. During the eight or ten days the field is drying out a loss of about 40 per cent. of grain occurs from various causes.

This style of farming, without farm implements, could be continued through the long list of crops that are raised in that country.

Hunt Buffalo in Autos

Enraged Bison Escaping From James J. Hill's Farm Is Run Down.

The screams of school children barricaded in a district school seven miles from Anoka prevented a charge through a window of the building by the enraged buffalo that escaped from James J. Hill's farm 20 miles away, and gave the clue to the whereabouts of the beast that led to its death, says a Minneapolis dispatch to the New York World.

Reporters ascertained in their chase of the animal that it really was a full-grown American bison. In an automobile the reporters began the hunt for an animal now almost extinct.

Even the skeptical people of the country, who scouted the first reports of farmers, who were terrorized by sight of the beast, are convinced that it really was a buffalo.

Early the countryside was roused and the chase renewed. After an exciting hunt the animal was located in the heavy timber a quarter of a mile from Barney Monlon's place, on the State road. County Attorney H. Pratt and Lee Giddings left the automobile, in which they had been pursuing the beast, and hastily entered the timbert tract. On the other side of the woodland Pratt made out the creature dashing through a field of stubble. Though it was a long shot, Pratt fired. This was followed by a volley from Giddings, and together the men hastened in the direction of the clearing. A trail of blood was found, and another glimpse through the farther thickets showed that the animal was hampered in his rapid flight by a slight limp. Later in the day the buffalo was shot and killed by a posse.

The Shapely Back.

It is only within comparatively recent years, says the London Daily Sketch, that women have come to realize the importance of the back view. Bernhardt insisted on having the backs of her gowns trimmed and it was counted an eccentricity. Many women are charming simply because the lines of their backs are good, while others get no credit for pretty faces because their backs are poorly shaped. One reason for dressing the back well is that people gaze at backs more than at faces. It is not permissible to do the latter, while nobody can object to the former.