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*Drainage and Irrigation, combined with Water and Land Transportation.
One of the Detroit, Florida, Canals.*

A Peaceful Conquest

RECLAIMING LAND IN THE FAR SOUTH

—BY—

M. C. L. PERRINE

IT is a fact generally admitted that first impressions are ones most vivid and lasting. They are not easily eradicated from the mind even after conclusive proof that they were erroneous. Our geographies, picturing the wonderful thrift of the Dutch people in reclaiming lands below sea level, instead of going forth for conquest in other lands, have fixed Holland indelibly in our minds as an industrious and peace-loving nation.

While being impressed with the wonderful work that had been accomplished in Holland, we were also receiving our first impressions of

Florida and the Everglades. There are thousands of people today who, when Florida is mentioned, immediately conjure up visions of the alligators and swamps that were pictured in those old school books, and it is difficult to get them to see it otherwise.

Perhaps there was some excuse, in those early days, for the entertainment of this view of South Florida, for at that time very little was known about it, except as tales of the vast lowland plain south of Lake Okeechobee were taken north by adventurous explorers. There were no railroads



and no highways; the land near the Atlantic coast and along the banks of the navigable streams which had their source in the great Everglades, was, for the most part, overgrown with an almost impenetrable jungle. As at that time the only known way to reach Dade County was in boats, the few who had ventured to explore these streams were led to believe that the greater part of this region was either swampy marsh or jungle. As a matter of fact, less than one per cent of the entire country is jungle.

By degrees, however, as the tide of humanity flowed southward and the virgin forests disappeared before it, many of the old prejudices disappeared also. A railroad pushed through the tabooed region, bringing with it the comforts of modern civilization and carrying back to thousands of people a new picture of the only tropical part of our country.

The enormous amount of cultivable land in the United States had rendered unnecessary, until recently, government reclamation of waste lands. It has begun, however, to build for the future, and to supply water to the arid lands of the west, has been a splendid achievement of the past decade, costing millions of dollars. Attention is now being turned to the problem of removing the same element from the overflowed portions of the United States.

The greatest undertaking of this nature now going on, lies in South Florida, where approximately 5,000 square miles, or over 3,000,000 acres of this class of land will be reclaimed by the state, the means to be employed being several hundred miles of canals, which are designed to be used for transportation and irrigation as well as drainage.

These lands have a considerable advantage over the reclaimed lands of Holland; instead of being from sixteen to twenty feet below sea level, as are the lands of that country, here they lie nearly that number of feet above sea level. In addition, these lands, when reclaimed, are capable of producing several crops yearly, for in this mild climate they may be crop-

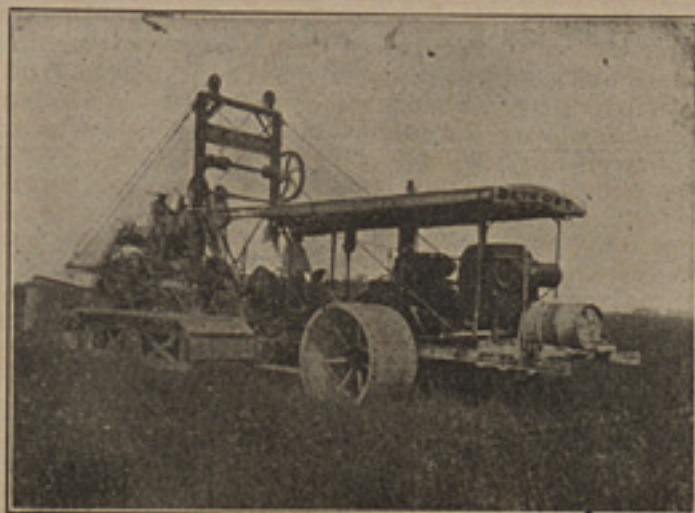
ped continuously instead of for a few months only, as is the case in Holland. Florida's children cannot have skating tournaments on the ice in the canals, but there is nothing to interfere with a motor boat regatta in the middle of the winter!

At least 80 per cent. of the soil of the Everglades is pure muck. This is a fibrous substance, the greater part of which was formed from the leaves which fell from the trees in the hammock and timber lands south from what is now known as Kissimmee (which is 35 feet above sea level), and the saw-grass—a tall growth with triangular blades having "saw teeth" on two sides. During periods of high water when Lake Okeechobee overflowed, these leaves and the grass were submerged, successive seasons burying them deeper and deeper. In certain lower places or ponds, lilies, flags and other fibrous plants were growing where water stood continuously, and their roots, together with the fallen leaves also decayed. All this formed the fibrous substance which, in certain stages of decay is called peat—the material which is so important as fuel in parts of Europe, where also a good grade of paper is made from it. After this peat is fully decayed, it is known as muck.

By actual analysis of 100 samples, taken from different parts of the Everglades it is shown that this soil contains over 3 per cent. ammonia nitrates. Many so-called "complete fertilizers" do not contain more than this percentage of available nitrogen, hence this element, which is one of the most expensive, need not be added to the soil.

To become fit for cultivation, this muck must be well drained, and it is desirable, strange as the statement may seem, that water should be provided for irrigation after it is drained. When the present plans of the Florida Everglades Drainage Commission have been fully carried out, there will be placed at the disposal of the truckers of South Florida, a vast expanse of this valuable soil having four essential features not found elsewhere

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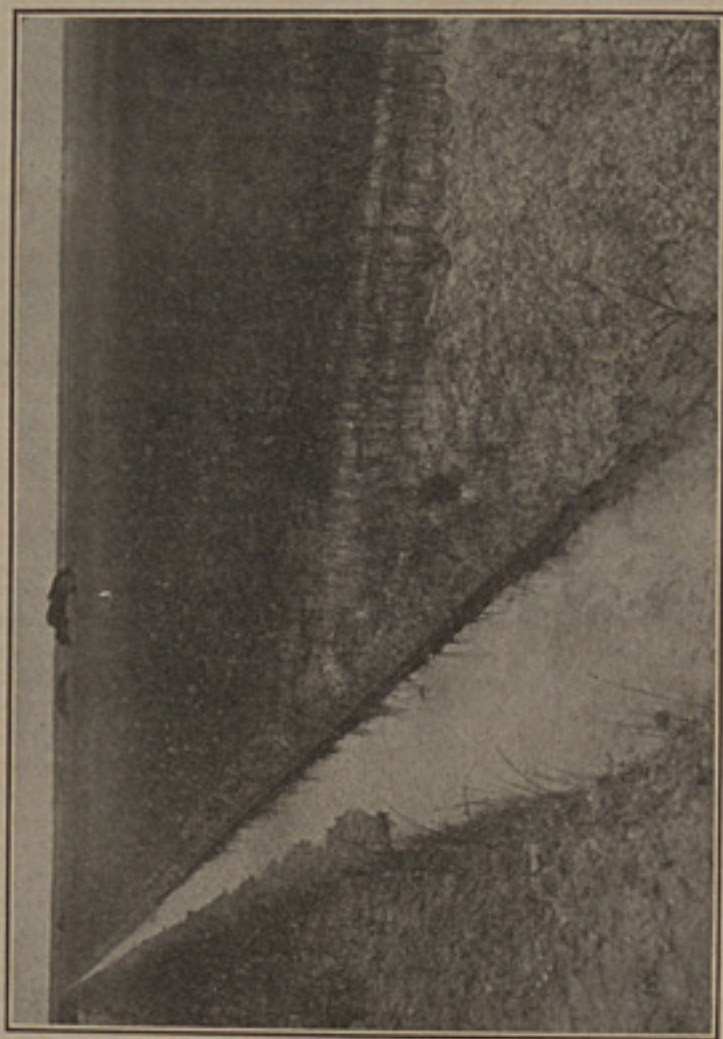
A Ditcher with Caterpillar Tractor.

in any one place in the world, namely: (1) drainage, (2) aeration, (3) irrigation and (4) transportation. The main canals will provide the cheapest form of transportation in the world.

But there is another class of soil in South Florida which is, if anything, more valuable than the muck, and moreover it is ready for use now. This is the soil known as marl.

The term "marl" is of varying significance in different localities. As generally understood, it is an earthy substance essentially composed of carbonate of lime and clay in varying proportions, which is used in many places as a land plaster or fertilizer. The marl, for instance, which is found in Virginia is very different from that found in South Florida along the east coast. The latter has a much higher content of carbonate of lime; by actual analysis 92 per cent.

It also is entirely different from the soil known as muck, though often found side by side with it. This fact may perhaps be better understood with the aid of the following explanation. Anyone traveling in Dade County will have noticed that a high rock ridge runs along the edge of the pine woods, which is from a quarter of a mile to nine miles from Biscayne Bay. This ridge is solid limestone. Now, according to scientists, the lands lying between this ridge and the present dead level was once the bed of the ocean. At some remote period, the water receded suddenly, leaving these lands a solid mass of shells—mussels, oysters, snails, etc.—and decayed vegetation which had settled in sedimentary form. These, combining, eventually formed the land known today as the marl of South Florida, which lies, as a rule, from four to five feet above the present sea level.



Marl Prairie and Drainage Ditch, Detroit, Florida.

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Some scientists believe that the Gulf Stream, which averages 40 miles in width and from 900 to 3,000 feet in depth, and which always has a current, flowing north, of three to eight miles an hour, has by the deepening of its channel, drawn the water from these lands. As nowhere in South Florida are there any signs of an earthquake this may be the correct explanation.

It is on this marl that the famous winter crops of tomatoes and other vegetables have been grown so successfully, bringing fortunes to the growers. There has been, however, an element of uncertainty in the venture, for these lands, while not in the Everglades, were subject to overflow during heavy rains, where there were no ditches or canals to carry off the surplus water quickly, and crops which would have brought the growers good returns, were ruined in a few hours.

Land that can produce hundreds of dollars in a single season, and that the one when the rest of the land is frozen, is valuable enough to warrant a considerable expenditure to insure its crops against loss in unusual seasons. When Dade County truckers realized that the longed-for drainage project was at last to be undertaken by the state, they were jubilant, for it meant the removal of their one real disadvantage.

It is to be regretted that the state, while a willing worker is proverbially slow in getting started, and deliberate in progressing. Herein lies the advantage of private enterprise in development work, when backed by ample capital. A private corporation secured a tract of about 20,000 acres of this marl prairie, which is exceptionally well located, about 30 miles south of Miami, lying east of the high pine ridge, which cuts off all the water from the Everglades. Besides this, the railroad embankment extends a distance of about sixteen miles from this tract to Jewfish creek, making the danger from surface water from the back country practically none. The only danger

left, then, was that from excessive rainfall.

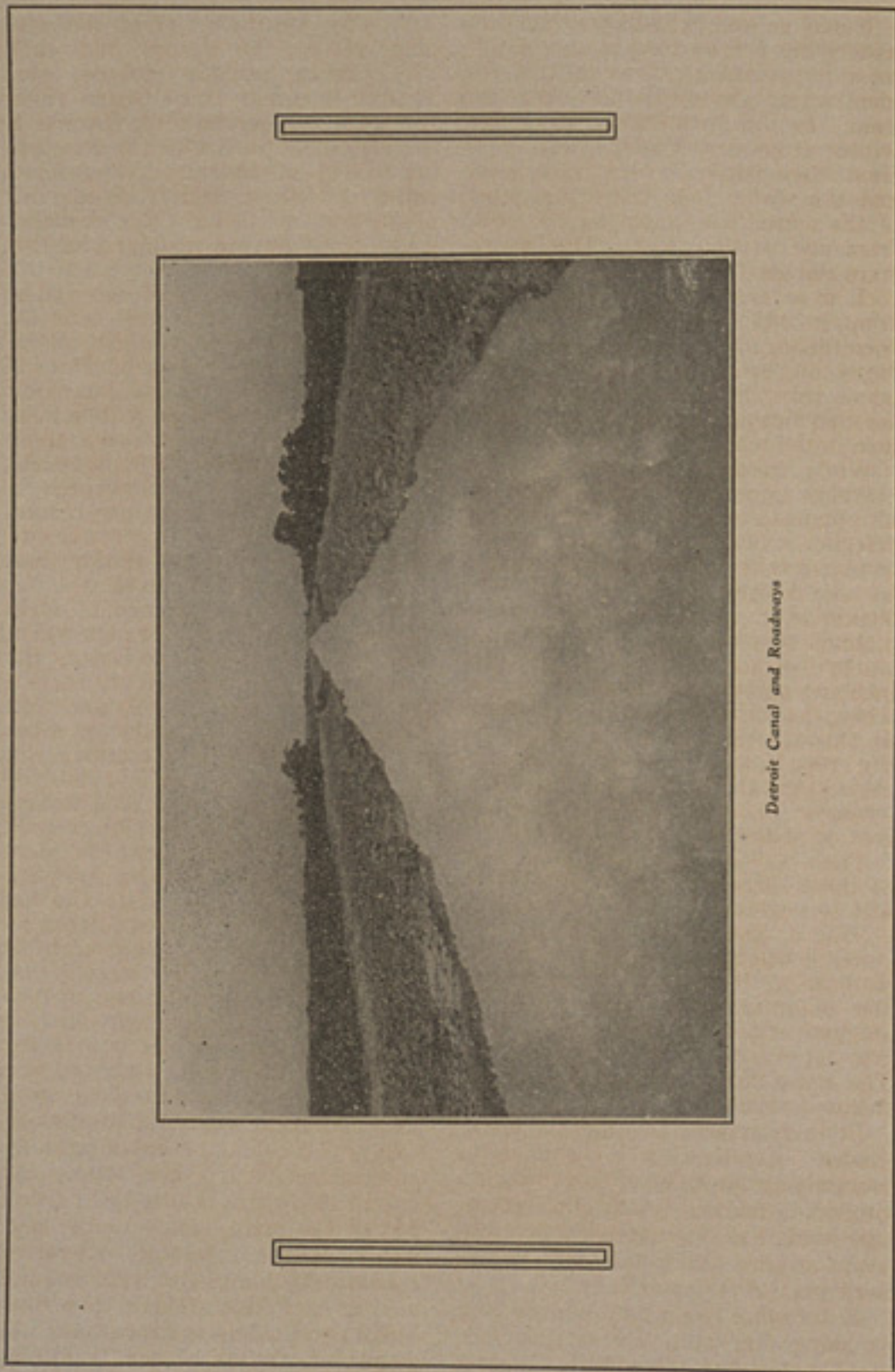
Realizing that it might be years before the state reclamation work would be sufficiently advanced to benefit this particular tract, they proceeded to "reclaim" it themselves without waiting the state's leisure.

It is indeed a remarkable undertaking for private capital. Bear in mind that only a small portion of this vast prairie was accessible. There were no good roads, there was the possibility of overflow during excessive rains; so only that portion of land adjacent to the railroad had been cultivated. A plain nearly nine miles wide, between the high land and the bay, which was capable of producing an immense amount of vegetables and tropical fruits, was non-producing.

Manifestly the thing needful was to provide for the removal of excess rainfall; this they planned to do by digging canals, from the highland to the bay, thirty feet wide and nine feet deep. And they did it.

The eighteen miles of canals are to be connected by laterals and whenever and wherever necessary, by ditches three feet deep by four feet wide. The canals are wide enough and deep enough to be navigable by small boats and barges, which can be used to transport supplies and products, as well as for pleasure, as they give access to the bay and ocean.

The soil averages from eighteen inches to six feet in depth, and is underlaid with a very fine coralline rock. As the canals are dug the marl is thrown out on the banks on either side; then the rock is blasted and thrown on top of that; after which the heap is leveled and graded for roads. There will be about 200 miles of these roads, and they will be good ones, for there is no better material for the purpose. The County Commissioners, recognizing the value of this development work, have appropriated a small amount to help in building one of these roads to the bay. The company has spent at least \$75,000 on roads.



Detroit Canal and Roadways

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It may be well to add here that this underlying porous rock is one of the most important features of this region, where the canals are dug so deep. In the springtime, when the winter crops are made, there is a time when there is very little rain, and the water falls below the level of the actual soil, exposing the rock from one to two feet. The water from the marl soil seeps through this rock over the entire surface, and from it into the canals. The air then rushes into the porous rock, thus furnishing aeration to the soil. The whole thing may be compared to an earthen flower-pot, with its drainage hole in the bottom.

While making crop failure from overflow impossible, this system is also planned to overcome the possible effects of drought, for locks will be so placed that the water can be raised to any desired height if this soil should ever need irrigation. It is planned to plow the lands in beds thirty feet wide, with furrows eight inches deep between them. The water when the locks are closed, will back up through the canals and ditches to the crops in need of water. It is estimated that the entire acreage can be irrigated in twenty-four hours at a cost of about \$1.50.

Trees will be planted on the tops of these ridges, and damage to them and to vegetables will be impossible, should a cloudburst occur at any time, as the water would run off immediately. It might be thought that the water in these canals would be sluggish and unhealthful; on the contrary it is beautifully clear and pure. The main canals have a fall of six inches to the mile.

In their report, the Florida Everglades Engineering Commission, recognizing the value of this drainage project in relation to the state drainage work, has recommended that the state acquire the canals as a necessary part of its system.

A terminal basin half a mile long is being dug just east of the railroad where the townsite is located. Here is the industrial addition, where

will be located the ice plant, the canning factory, the garage and auto supply house, packing houses, etc. Though it is only three years since the work was commenced, there is a thriving little town which is demanding all sorts of enterprises. They have called it Detroit, and it claims the distinction of being "the farthest south town on the mainland of the United States."

The company has just received a powerful tractor with steel caterpillar tracks made of extra width, which when attached to a gang of five 14-inch plows, can bed up the land much better than could be done with horses. It is estimated that over ten acres per day can be plowed with this machine. They have also secured a scarifier with steel teeth like a harrow. This "scarifies" the roads into fine particles. A steel grader then makes them perfectly level.

A "V" shaped triangular steel ditcher and marl road grader which they have, is intended to bed up the lands and make roads, giving them a crown from which the water will readily run off. It will make ten miles per day. Another new machine will cut a ditch four feet wide at the bottom and five feet wide at the top, thus providing material for a good road in front of every ten acre tract. This can make and complete seven miles per day. With the exception of the "V" shaped ditcher all of these machines are designed to be used with the caterpillar tractor.

In addition to being one of the most useful undertakings in the south, this tract will be one of the most beautiful as well. Only one who has lived in the south and has seen the wonderfully beautiful tropical effects which can be produced in an almost miraculously short time, can picture its future beauty. On either side of the main canal there have been planted tropical flowering shrubs and other plants, with avenues one hundred feet wide of the wonderful royal palms and coconuts. As completed, the other canals will be similarly treated.

Though tomatoes are the most important crop in this section, there are thirty different kinds of vegetables which have been successfully grown on this tract the past year, including corn. Alfalfa and clover were planted on a small scale and have proven successful, as the soil seems to be inoculated with the bacteria necessary to their growth. Every tropical and sub-tropical tree and shrub can be grown, as well as every northern summer vegetable. All roses do exceptionally well on marl. Citrus trees grow splendidly also and the fruit is exceptionally fine flavored and in every case bright colored—a valuable characteristic.

A trip from Miami to Detroit is

one long to be remembered. Mile after mile over ribbon-like roads of smooth white rock, through hammocks—tropical jungles with palms and orchid-covered live oaks—through forests of pine, straight as armies of well-trained soldiers, through grapefruit groves, their glossy dark green hung with beautiful clusters of waxy yellow fruit, past occasional groups of mango and avocado trees, and over prairies which have yielded their full quota to the trucker, except when what should be one of man's greatest blessings, pure water, has been too abundant.

Surely such a trip will drive away the last vestige of those school-day impressions!



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