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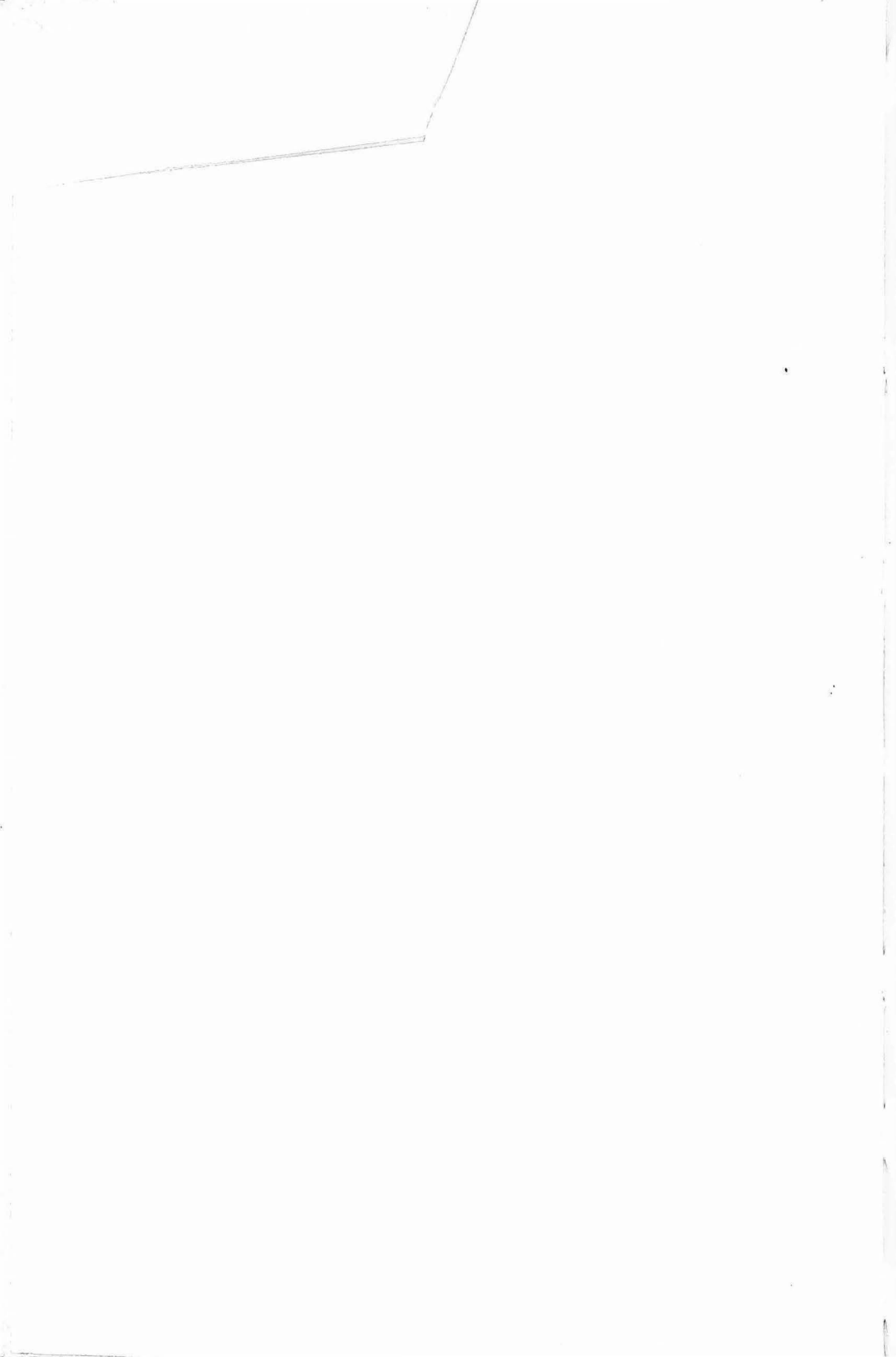
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E. H. SELLARDS, PH.D., STATE GEOLOGIST

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BULLETIN No. 2

# ROADS AND ROAD MATERIALS OF FLORIDA

BY

E. H. SELLARDS, H. GUNTER, AND N. H. COX

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LETTER OF TRANSMITTAL.

*To His Excellency, Hon. Albert W. Gilchrist, Governor of Florida.*

SIR:—I submit herewith for publication as Bulletin No. 2 of the Florida State Geological Survey, a brief report showing the present condition of the public roads of Florida, prefaced by an account of the road-making materials of the State.

Very respectfully,

E. H. SELLARDS,  
*State Geologist.*

Tallahassee, March 31, 1911.

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## CONTENTS.

|                                                      | PAGE. |
|------------------------------------------------------|-------|
| Introduction .....                                   | 7     |
| Road Materials of Florida.....                       | 9     |
| Classification of the rocks of Florida.....          | 9     |
| Siliceous materials—flint, chert and gravel.....     | 10    |
| Calcareous materials—limestone, shell and marls..... | 11    |
| Argillaceous materials—road making clays.....        | 13    |
| Bog iron ore .....                                   | 13    |
| Phosphatic rock .....                                | 14    |
| Road construction .....                              | 14    |
| Marl and crushed stone roads.....                    | 14    |
| Shell roads .....                                    | 16    |
| Gravel roads .....                                   | 16    |
| Pine straw roads.....                                | 17    |
| Graded dirt roads.....                               | 17    |
| Cement, asphalt, and vitrified brick.....            | 17    |
| Sand-clay roads .....                                | 17    |
| County reports .....                                 | 18    |
| Road statistics .....                                | 30    |

## ILLUSTRATIONS.

PLATE

FOLLOWING PAGE 16

- No. 1.—Fig. 1. Crushed stone road, Gainesville, Alachua County.  
           Fig. 2. Shell road, Pierson, Volusia County.
- No. 2.—Fig. 1. Sand-clay road, Tallahassee, Leon County.  
           Fig. 2. Sand-clay road, Tavares, Lake County.
- No. 3.—Fig. 1. Sand-clay road, Vernon, Washington County.  
           Fig. 2. Pine straw road near Tavares, Lake County.
- No. 4.—Fig. 1. Unimproved sand roads in southern part of Leon County.  
           Fig. 2. Unimproved sand road, Pierson, Volusia County.



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## ROADS AND ROAD MATERIALS OF FLORIDA.

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E. H. SELLARDS, H. GUNTER, AND N. H. COX.

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### INTRODUCTION.

An investigation of the road materials of Florida was begun by the State Geological Survey in 1907 and a brief report on this subject was incorporated in the First Annual Report of the State Geologist, pp.46-53, 1908. The work was continued at intervals as opportunity afforded during 1908, 1909, and 1910. In the present bulletin an effort has been made to complete the statistics on all counties up to the close of the calendar year 1910. While it is recognized that the road statistics, especially as regards the mileage and the cost of construction of the different kinds of roads, are necessarily approximate, yet it is believed that the data are sufficiently accurate to give in a reliable way the present condition of road building in the State.

The county reports are based upon information given by the officials of the respective counties, and whatever merit these reports possess is due to the courtesy of these gentlemen. Among those who have given information are the Clerks of the Court of the different counties, many of the County Commissioners, County and other Engineers. The Survey is also indebted to the Office of Public Roads of the United States Department of Agriculture for assistance in completing the statistics.

The information supplied by the several counties shows that at the close of 1910 the total number of miles of improved roads in Florida, exclusive of graded dirt roads, was 2,070. Of this number 611.3 miles are surfaced with marl or crushed stone; 146.1 are surfaced with shell; 22.5 miles are surfaced with gravel; 8.5 miles are surfaced with brick; 0.4 mile is surfaced with asphalt; 5.2 miles are surfaced with cement; approximately 1,000 miles are surfaced with sand-clay, and 277 miles are temporarily improved by the use of pine straw.

Under the present system the county is the unit of road management, and the County Commissioners are in charge of the road construction and responsible for the expenditure of the road funds, although in one or two of the counties which have issued bonds this responsibility is shared so far as bond money is concerned with the bond trustees. Road engineers are employed in seven of the counties of the State as follows: Dade, Duval, Hillsboro, Manatee, Nassau, Palm Beach, Putnam, and St. Johns Counties. Road supervisors are employed in several counties. In other counties the County Commissioners supervise the roads in their respective districts. Some of the counties own deposits of road materials while others purchase material as needed, or rely upon that which occurs on the right of way or is contributed by citizens.

The county prisoners were used on the roads during 1910 in the following counties: Dade, DeSoto, Escambia, Lee, Madison, Marion, Monroe, Orange, Palm Beach, Polk, Santa Rosa, St. Johns, Volusia, and Washington. After January 1, 1911, county convicts will be worked on the roads all or a part of the time by Duval, Gadsden, Hernando, and Hillsboro Counties. A number of the other counties apply the returns from the hire of convicts to the road fund.

In addition to the funds available from regular and special taxes and other sources, eight counties have issued bonds for road improvement as follows: Dade County, \$75,000; Duval County, \$1,000,000; Hillsboro County, \$400,000; Manatee County, \$50,000; Nassau County, \$60,000; Palm Beach County, \$200,000; Putnam County, \$155,000; St. Lucie County, \$200,000.

The total expenditure on public roads in the forty-four counties from which reports have been received was \$1,080,949. The expenditures of the three counties from which no reports were received, Duval, St. Johns, and Manatee, will probably bring the total expenditure on roads during 1910 to approximately one and a quarter million dollars.

## ROAD MATERIALS.

The road materials considered in this bulletin are such as are found available for use in building country roads in the several counties of the State.

## CLASSIFICATION OF THE ROCKS IN FLORIDA.

For the convenience of a brief treatment the rocks of the earth's crust may be classed as either igneous or sedimentary. The igneous rocks are those which appear to have cooled from a molten condition, such as trap, basalt, obsidian, and the granites. The sedimentary rocks are those which are formed by the accumulation of sediments. The sediments may be of purely mechanical origin, as in the case of sandstones, shales and clays; or of organic origin as in the case of the limestones. In a broad sense, the sedimentary rocks are made to include even those which are of chemical origin, such as bog iron ore formations. However, should one attempt a minute and exhaustive classification of rocks these two main divisions would be found insufficient. Chemical changes are going on incessantly in the earth's crust and affect all rock formation. Chemical and physical forces have in many instances so profoundly altered formations that it is no longer possible to determine whether they were originally igneous or sedimentary. It has been found necessary to establish for these a third division known as metamorphic rocks. With regard to the Florida deposits, however, the classification is not greatly complicated, as no igneous formations occur in Florida, all of the rocks of this State being sedimentary.

In the first of the following tables the rocks of Florida are classified according to their origin; in the second according to their chemical composition.

## ROCKS OF FLORIDA CLASSIFIED ACCORDING TO ORIGIN.

Rocks of—

|                         |                                                                                                        |
|-------------------------|--------------------------------------------------------------------------------------------------------|
| Mechanical origin ..... | { Sandstones,<br>Shales,<br>Clays.                                                                     |
| Organic origin .....    | { Shell limestone,<br>Infusorial earth,<br>Muck, peat, lignite.                                        |
| Chemical origin .....   | { Bog iron ore,<br>Oolitic limestone,<br>Flint or chert,<br>Crystallized limestone,<br>Phosphate rock. |

## ROCKS OF FLORIDA CLASSIFIED ACCORDING TO CHEMICAL COMPOSITION.

Disregarding mode of origin and placing the rocks according to chemical composition, the classification may be arranged as follows:

|                        |                                                                              |
|------------------------|------------------------------------------------------------------------------|
| Siliceous rocks.....   | { Flint and chert,<br>Sandstone,<br>Infusorial earth.                        |
| Calcareous rock.....   | { Shell limestone.<br>Crystallized limestone,<br>Oolitic limestone,<br>Marl. |
| Argillaceous rock..... | Clay and shale.                                                              |
| Carbo-Hydrates.....    | Muck, peat, lignite.                                                         |
| Ferruginous rocks..... | Bog iron ore.                                                                |
| Phosphatic rocks.....  | Pebble and rock phosphate.                                                   |

## SILICEOUS ROCKS:—FLINT, CHERT AND GRAVEL.

Flint is chemically an oxide of silica  $\text{SiO}_2$  with more or less accompanying impurities. It is a variety of the mineral quartz, occurring massive and non-crystallized or more accurately very imperfectly crystallized (crypto-crystalline). The term "chert" is often used interchangeably with flint. Properly chert is an impure flint or flinty rock. Flint and chert are lacking in cleavage. They break, as do the other varieties of quartz, with conchoidal fracture. A flint rock when crushed breaks into sharp cornered pieces of varying size. The mineral quartz, of which flint is a variety, has a hardness of seven on a scale in which the hardest mineral, diamond, is ten. The varieties of quartz vary in hardness slightly according to the impurities that they contain. Silica is one of the least soluble of minerals and among the most resistant to decay.

Flint and chert occur mostly as masses or "horsebacks" in the limestone formations. A good illustration of the manner of occurrence may be seen in phosphate pits or in some of the pits of the Florida Lime Company, at Ocala. In some of the sinks on Thompson's farm two miles east of Sumterville will be seen flint masses exposed by the natural decay of the limestone. The flint masses appear to conform to no rule as to size and extent. Flints may form a ridge running through the limestone; or again they occur as rounded or elongate masses. Occasionally the flint forms as a thin stratum lying horizontally. This flint bearing limestone lies at no great distance from the surface

throughout all of the central peninsular section of the State from Columbia County on the north to Sumter County on the south and from the Suwannee River and the Gulf coast to east Alachua and Marion Counties. Much of the hard rock phosphate rests upon this flint-bearing limestone, and from the phosphate pits great quantities of the flint may be obtained. Occasional flint hills such as that crossed near Evinston and Micanopy stand out as evidence of the resistance of flint to the weathering agencies, the surrounding limestone having disappeared through erosion. This flint-bearing limestone is known as the Vicksburg formation. It is not to be inferred that no other Florida formation contains silica for, on the contrary, many of the formations are highly siliceous. The Vicksburg Limestone is, however, the chief flint-bearing formation of Florida.

The flint masses were clearly not present in the limestone as originally formed. This formation when not affected by chemical change consists typically of a mass of calcareous shells varying in size from minute foraminifera to larger bivalves and gastropods with which are interbedded coral and other fossils, along with a limited amount of siliceous material supplied principally by sponge spicules. Originally, without doubt, the limestone consisted largely of the remains of these calcareous shells, the flint masses having been subsequently deposited through the agency of underground water. Water in its round of circulation through surface and deeper formations takes silica as well as other substances into solution. In the course of its circulation through the limestone, the silica in solution in the water replaces the calcium carbonate of the limestone. The direct evidence that the flint masses are formed by the replacement process is to be had from the examination of a piece of flint. In this it will be seen that the foraminifera and other shells which were originally calcareous have been changed to silica. The replacement process is by no means confined to the formation of flints. As mentioned in the introduction to this chapter, chemical changes are constantly going on among the minerals making up the rock formations, and replacement of one mineral by another is one of the important phases of chemical change.

Siliceous gravels are widely scattered over the State and in a few localities occur in sufficient abundance to be used as a road material. Gravel pits have been opened at Interlachen and at Grandin in Putnam County and in Escambia County.

#### CALCAREOUS MATERIAL.

Calcareous road materials occur in the form of shells, shell and coral limestones, oolitic limestone, and marls. All of these rocks consist essentially of calcium carbonate or of the double carbonate of calcium

and magnesium, and have certain features in common. They are much less resistant to wear than is quartz. When pure and crystallized the mineral calcite ( $\text{CaCO}_3$ ) has a hardness of only three in the scale in which quartz is seven. It is thus much softer than the steel tires of wagons. In fact a chief item in the repair of calcareous roads arises from the fact that steel tires cut holes in the soft material. On the other hand, an advantageous property of calcareous material is the readiness with which it re-cements itself. Calcium carbonate dissolves to an appreciable extent in water containing  $\text{CO}_2$  gas or weak organic acids. Chemical readjustment is therefore rapid in a mass of crushed or broken calcareous rock, the dissolved calcium carbonate acting as a cementing material.

In practical application, the physical condition in which these materials occur must be taken into consideration. In the case of recent shells, the calcium carbonate is in a compact amorphous condition. The shells of a shell limestone are usually brittle and often crumble easily. The oolitic limestone is made up of innumerable minute round concretions barely large enough to be readily visible to the eye. These are held together by a calcareous cement. After crushing, the particles re-cement more or less perfectly. The marls are calcareous deposits which are sufficiently soft to be applied to roads without previous crushing. More or less perfectly crystallized limestone occurs locally in the State. Its formation is probably due to a replacement process similar to that described for flint and chert. The chemical changes in this case involve a rearrangement of the constituent molecules, as a result of which the non-crystallized material of the rock assumes a definite form. When partly crystallized the limestone becomes compact and close grained.

*Distribution and Amount of Calcareous Rocks.*—The calcareous rocks are widely distributed in the State. The Vicksburg Limestone, as already stated, is found near the surface over much of central Florida. Oolitic limestones make up an extensive formation running north and south from Miami and forming the east border of the Everglades. Coral and oolitic limestones form the foundation of the keys from Miami to Key West. Shell limestone occurs extensively along the Caloosahatchee River. Tampa Bay affords a compact limestone which often carries much silica. The Chattahoochee series of compact limestones occurs extensively in parts of west Florida. The marls are usually of local occurrence and are restricted to no part of the State. Shells, thanks to the oyster industry of the present, and to the shell mound builders of the past, occur in inexhaustible quantities.

## ARGILLACEOUS MATERIALS—ROAD-MAKING CLAYS.

Fine grained clay mixed in proper proportion with coarse, angular quartz, makes a road that has been found useful where cheapness of construction is necessary, and where the roads have light travel. In mixing sand and clay for road purposes the proportion should be so adjusted that there is enough clay in the mixture to fill the voids or interstices between the grains of sand. If too little clay is added the sand grains will lack bonding power and will not make a solid roadbed. If too much clay is added, the sand grains are widely separated and the road behaves much as though the sand were not present at all. The amount of clay necessary to mix with a given volume of any particular sand may be roughly determined by ascertaining the amount of water necessary to fill the interstices of the sand. A simple procedure recommended in Farmers' Bulletin No. 311, U. S. Department of Agriculture, p. 10, is as follows: "Two ordinary glass tumblers of the same size are filled to the brim, one with dry sand to be tested and the other with water. The water is then poured carefully from the one glass into the sand in the other until it reaches the point of overflowing. The volume of water removed from the glass which was originally full of water can be taken as an approximate measure of the voids in the unit column of sand contained in the tumbler. A simple calculation will reduce this to percentage volume."

Since all clay contains more or less sand, it may be expected that certain localities will supply clay that contains the right admixture of sand and clay to form a natural sand-clay road, or so nearly the proper admixture that it will serve that purpose satisfactorily. Fortunately for Florida, almost every county is supplied with an abundance of clay which serves admirably the purpose of road-making. With this material at hand, road construction in country sections is carried on at a minimum expense. These roads find their greatest usefulness in country sections where cheapness in road-making is necessary.

The road-making clays are of a red or yellowish color, indicating a high percentage of iron compounds which probably assist in the bonding power of the material. In texture the clay is rather coarse, and breaks up readily.

## BOG IRON ORE.

Bog iron ore occurs in various parts of the State, but usually in thin deposits and of local extent. It has been stated by Shaler (U. S. Geological Survey, 15th Ann. Rept., p 272, 1895), that where the surface of a limestone road can be covered with iron ore, the firmness of the mass is much increased. An iron oxide, such as bog iron ore, serves

as a cementing material, and this is doubtless the explanation of its usefulness for this purpose.

#### PHOSPHATIC ROCK.

Low grade phosphate may serve in some localities as a useful road rock. The hard rock phosphate is harder than limestone and is reported to have better cementing qualities. Phosphate screenings have been used to some extent and have proved satisfactory.

### ROAD CONSTRUCTION.

The improved roads are surfaced with marl, crushed stone, shell, gravel, sand-clay, pine straw, cement, or vitrified brick, the kind of road constructed depending largely upon the materials available that are cheap enough to be economically used. Sandy clays suitable for country roads are the most widely distributed of the road materials, and at the present time the mileage of roads built of sand-clay in this State equals the mileage of roads built of all other materials combined. Marl, limestone and shell are the next most widely distributed materials, while flint, bog ore, gravel and phosphate rock are more restricted.

#### MARL AND CRUSHED STONE.

The term "marl" in connection with road making is applied to any calcareous material that is sufficiently soft to admit of direct application to roads without previous crushing. The marls as a rule are taken direct from the pits to the roads. With the soft marls, traffic over the road serves to crush, smooth, and pack the material, although the harder marls after being spread on the road are broken up by hand or crushed with a roller. A characteristic of marl is that after being thus packed the material recements itself, forming a uniform surface. The marls used for roads include several varieties. A form frequently used is an amorphous marl found usually in old swamps. Marls of this character were formerly used extensively in Orange County, being obtained in the western part of the county. Marls used in Brevard County, west of Titusville, are of a similar character. The swamp marls are usually of local occurrence and may be expected in almost any part of the State. Some of the limestones of the State are sufficiently soft to serve as marls. Thus the extensive formation known as the Vicksburg limestone is, as a rule, comparatively soft, and is extensively used for road making, being commonly classed as a marl. This formation underlies the State and is exposed extensively along the central part of the peninsula in southern Columbia and Suwanee Counties, and in Alachua, Marion, Sumter, Citrus, and Hernando Counties, and in west

Florida in Jackson, Holmes, and Washington Counties. The marl roads of Marion County are made from this limestone, numerous pits being opened in the county for this purpose. The oolitic limestone of the Miami section, although requiring some crushing, is likewise used and classed for road purposes as a marl. Distinctly shell marls are of frequent occurrence. A good exposure of shell marl may be seen in the pits used for road making at DeLand.

The cost of construction of marl roads differs so much in the different counties and with different conditions that an average can scarcely be given. Some marl deposits can be mined much more cheaply than others, the cost being affected by the depth of the overburden to be removed and the depth of the marl deposit and the ease with which it can be removed. The cost of the road is further very materially affected by the distance the marl has to be hauled or shipped as well as by the width of the road and the thickness of the coating of marl spread over the road. The marl roads now in use vary in width from 8 to 30 feet, and in thickness of the coating of rock from 6 to 14 inches on the crown, and from 3 to 10 inches on the edges. Where the material occurs along the road and is cheaply mined the marl roads cost little if any more than the sand-clay roads. In Citrus County 12 miles of road 10 feet wide, and having a thickness of surfacing material of 7 inches at the center and 5 inches at the edge, built of the Vicksburg limestone, is reported to have cost \$750 per mile, and in Sumter County 5 miles of road made of this limestone, 12 feet wide, 14 inches thick at the crown and 10 inches thick at the edge, cost \$800 per mile. The average cost of roads made from the Vicksburg limestone is, however, somewhat above this amount. The roads of Dade County, 9 feet wide, the surfacing material having an average thickness of six inches, made of the crushed Miami limestone cost from \$900 to \$1,000, and roads of the same material 20 feet wide, and of an average thickness of 12 inches, cost from \$1,800 to \$2,000 per mile. In Orange County, where the marl was taken from the swamps and hauled by freight, the average cost of 16 miles of road, part of which was 16 feet wide and part 10 feet wide, 8 inches deep at the center and 6 inches at the edges, was \$2,000 per mile. The shell marl road of Volusia County cost from \$2,500 to \$3,000 per mile.

Crushed stone is being used somewhat extensively for roads. For this purpose hard limestone, flint, or phosphate rock is used. After crushing, the coarser material is spread on the road, making a secure foundation, on which the fine siftings are used thus filling in and making a top dressing, giving a smooth surface and a very durable road.

The cost of the crushed stone roads varies with the methods used and the thickness of the dressing. The crushed stone road of Pasco County including three miles, 12 feet wide, 6 inches thick in the middle and 4 inches thick at the edges, are reported to have cost \$4,500 per mile. A crushed stone road under construction in Taylor County, 20 feet wide, 6 inches thick at the center and 4 inches at the edges costs 45 cents per square yard or \$5,180.85 per mile.

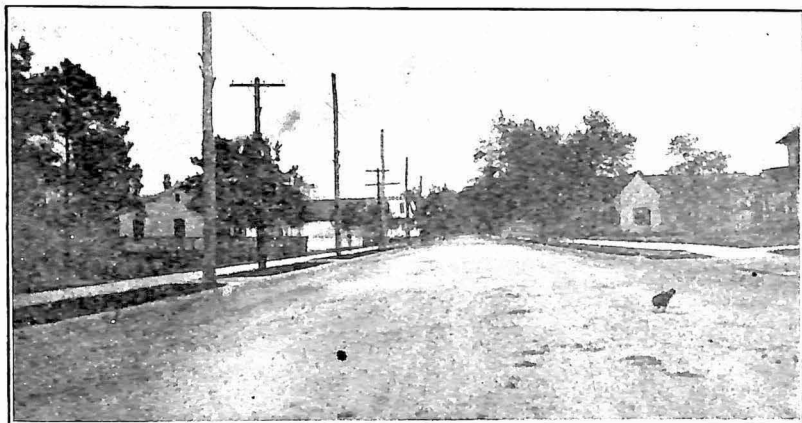
The total amount of marl and crushed stone roads in the State including that built from the ordinary amorphous marls, the shell marls, and the limestones such as the Vickburg, and Miami formations, was, at the close of 1910, 611.3 miles.

#### SHELL ROADS.

Shell deposits are less uniformly scattered over the State than marl and limestone and are less extensively used for roads. The principal shell deposits are the oyster shells found near the coast or along inlets from the coast, and the chief supply of these is afforded by the shell mounds accumulated in the past by the Indians, although modern oyster canning factories give an important added supply. Aside from the shell mounds of the coast there is a notable series of shell mounds along the St. Johns River, which consists chiefly of small univalve shells with some mussels. These were likewise accumulated by the Indians. Aside from the shells accumulated by human agencies the shell deposits accumulated by natural agencies should be mentioned. Among these are coquina rock and other marine shell deposits. The coquina accumulated as beach deposits and subsequently became more or less cemented, forming in places hard rock. Elsewhere masses of uncemented shells occur, such as those previously mentioned at DeLand. These are usually classed as shell marls. The total number of miles of shell road in the State is 146.1.

#### GRAVEL ROADS.

Gravel is not extensively used for road building in Florida. About 12 miles of gravel road have been reported in Clay County, which are said to have cost about the same as sand-clay roads. Some phosphate gravel road has been constructed in the western part of Alachua and in Citrus Counties and has been found very satisfactory. In Escambia County 4 miles of gravel road have been built leading from the city of Pensacola to Fort Barancas. This road is 18 feet wide, and the gravel is spread 12 inches thick on the crown and 3 inches at the edges. The cost was \$9,000 per mile, the high cost being due to freight charges and to handling. In Duval County 6½ miles of gravel road has been constructed at a cost of about \$8,000 per mile. The gravel used in Duval

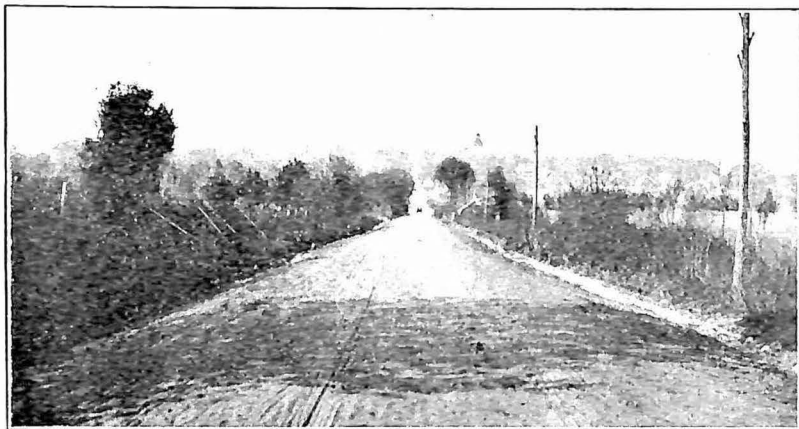


CRUSHED STONE ROAD, GAINESVILLE, ALACHUA COUNTY, FLORIDA,  
LEADING TO THE STATE UNIVERSITY.

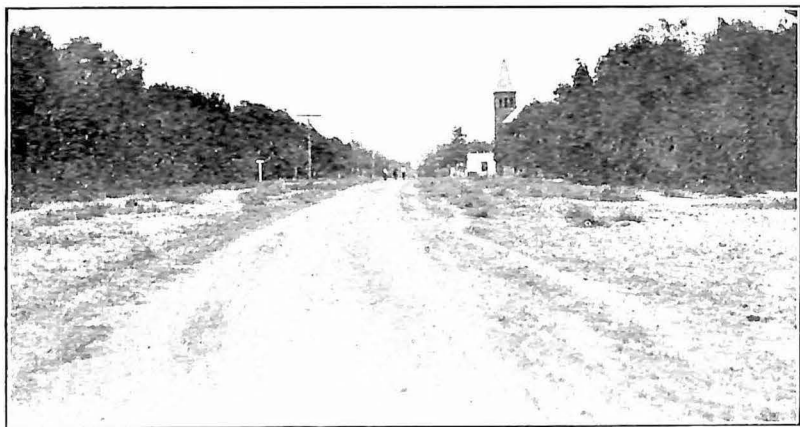


SHELL ROAD, PIERSON, VOLUSIA COUNTY, FLORIDA.





SAND-CLAY ROAD, TALLAHASSEE, LEON COUNTY, FLORIDA. BELLAIR ROAD LEADING INTO TALLAHASSEE FROM THE SOUTH.



SAND-CLAY ROAD, TAVARES, LAKE COUNTY, FLORIDA.





SAND-CLAY ROAD, ONE MILE NORTH OF VERNON, WASHINGTON  
COUNTY, FLORIDA.

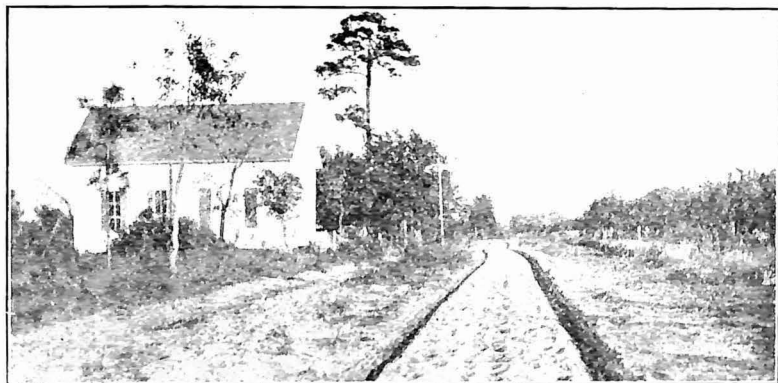


PINE STRAW ROAD NEAR TAVARES, LAKE COUNTY, FLORIDA.





UNIMPROVED SAND ROADS IN SOUTHERN PART OF LEON COUNTY,  
FLORIDA.



UNIMPROVED SAND ROAD, PIERSON, VOLUSIA COUNTY, FLORIDA.



County is shipped from South Carolina. The total number of miles of gravel road in the State is 22.5.

#### PINE STRAW.

Pine needles or pine straw is frequently used as a covering for sandy roads and serves a very useful purpose. The cost of strawing a road will not exceed \$40 a mile and under favorable conditions the work may be done more cheaply. The total amount of pine straw road in the State is about 277 miles.

#### GRADED DIRT ROADS.

In the absence of other road material a vast improvement in road conditions is made by grading and draining the dirt roads. When all stumps and roots are removed and the roads straightened and graded travel is much easier than over the usual crooked road with its stumps, roots and ditches. The mileage of graded dirt roads has not been obtained and is not included in the totals given above.

#### CEMENT, ASPHALT, AND VITRIFIED BRICK.

These materials have been but little used for road building outside of the cities. Duval County has built 6.5 miles of cement, 0.4 miles of asphalt, and 8.5 miles of vitrified brick, and in addition has about 20 miles of brick road under construction.

#### SAND-CLAY ROADS.

Sand-clay, because of its wide spread occurrence, is the most extensively used road material in the State. Almost every county has sandy clays suitable for road making, or the clay suitable to mix with or cover the sands of the natural sandy roads. These roads, while not all that could be desired, are a vast improvement over the ordinary sand roads and their cheapness recommends them to general use.

The sand-clay roads vary in width from 9 to 30 feet and in thickness of surfacing material at the center from 6 to 14 inches, and at the edges from 2 to 10 inches. As in the case of the marl roads the cost differs so much with varying conditions that an average can hardly be given. A number of the counties of the State, notably Leon, Jefferson, Madison, Gadsden, Jackson, Hernando and parts of other counties have a natural sand-clay foundation for the roads. In such cases grading is practically all that is required to afford a sand-clay road, although in places and in parts of each of the counties it is found necessary to haul the clay some distance to mix with the sand. The total amount of sand-clay road in the State at the end of 1910 was about 1,000 miles, constructed at a cost of approximately \$731,600.

## COUNTY REPORTS.

## ALACHUA COUNTY.

The total amount of surfaced roads in Alachua County is reported to be 111 miles. This consists chiefly of sand-clay roads, although some limestone, low grade phosphate rock and gravel have been used in the western part of the county. The roads are built 12 feet wide, the surfacing material being 8 inches thick. The average cost of this type of road is \$800 per mile. The county does not own its road surfacing material, but in only a few instances has a royalty been paid, the citizens furnishing all material needed free of charge. The county pays a general road tax of 3 mills, which in 1910 amounted to \$19,568. In addition to this regular tax the districts which include the towns of Alachua, Hawthorne, High Springs, Micanopy and Newberry, pay a special 5-mill road tax, which amounted to \$11,351. The receipts from this special tax are expended on the roads within each special tax district. The revenue from the lease of county convicts is also applied to the road fund. This amounted in 1910 to about \$6,000. All money is expended under the direct supervision of the County Commissioners, who also supervise the construction of roads within their respective districts. The county's road equipment is valued at about \$4,500 and consists of 5 complete camping outfits, including 10 tents, cots, cooking utensils, etc., 18 mules, 9 wagons, double plows, 3 graders, shovels, and various tools. A traction engine valued at \$2,200 not included in the above, is also owned by the county, but is not in use. The road-making materials of this county include sand-clay, limestone or marl, flint, phosphate rock and phosphate pebble. The total amount expended on public roads and bridges in the county for 1910 was about \$24,000.

## BAKER COUNTY.

Baker County has about  $\frac{1}{4}$  mile of sand-clay road leading up the hill side on the south prong of the St. Marys River. The county pays a road tax of 2 mills, which amounted in 1910 to \$2,451.50. The receipts from the lease of county convicts are applied to the road fund. A road supervisor for each district is employed by the County Commissioners. Roads are worked by laborers paid \$1.00 per day. The road-making materials of this county consist chiefly of sand-clay. The total amount expended on roads and bridges in 1910 was \$4,399. A road extending across the county from east to west is proposed.

## BRADFORD COUNTY.

Bradford County has built 7 miles of pine straw roads, 7 feet wide, at a cost of \$30 per mile. The county pays a road tax of  $3\frac{1}{2}$  mills, the receipts from which in 1910 were \$9,041.62. The county's road equipment consists of one 6-mule grader, one 3-ton roller, plows and drag, and is valued at about \$700. The roads are worked by laborers employed by the County Commissioners and also by contracts let by the County Commissioners. The convicts are leased out and the receipts from this source are applied to the road fund. The number of miles of public roads in the county is estimated to be about 500 or 600. The road materials include sand-clay and limestone. The total expenditure on roads and bridges during the year 1910 was about \$11,000.

## BREVARD COUNTY.

Brevard County owns its road surfacing material and has about 20 miles of road surfaced with marl and coquina shell rock. A supervisor is employed. The road equipment consists of mules, wagons, and a road roller valued at about \$1,700. The roads are worked by laborers employed by the County Commissioners. The road-making materials of this county include marl and shell rock or coquina. The total expenditure on public roads and bridges for 1910 was \$11,019.93.

## CALHOUN COUNTY.

Clay occurs near the surface over the greater part of Calhoun County and forms a good foundation for roads. Therefore, besides grading and proper drainage, little is necessary to make a good road. The county has built good steel bridges across the Chipola River. Calhoun County does not as a whole pay a road tax, although district number 5 voted a three-mill tax for two years from October, 1910. The roads are worked by the citizens, the county convicts being leased out. The total expenditure on roads and bridges for 1910 was \$3,967.17.

## CITRUS COUNTY.

Citrus County reports a total of 60 miles of improved roads. Of this number 25 miles are surfaced with sand-clay, 12 feet wide, 8 inches in the center, and 4 inches at the edges, at a cost by contract of \$1,000 per mile; 23 miles are surfaced with crushed stone, 12 feet wide, 8 inches in the center and 4 inches at the edges, at a cost by day labor of \$750 per mile, and 12 miles are surfaced with limestone, 10 feet wide, 7 inches in the center and 5 inches at the edges, at a cost of \$750 per mile. In addition 7 miles of rock road are now under construction. The county pays a 7-mill road tax which amounted in 1910 to \$11,031.37. Road district number 3 pays a special tax, which amounted in 1910 to \$1,500.37. In addition to this, the receipts from the hire of county convicts is applied to the road fund, which amounted for the year 1910 to about \$2,000. The roads are worked by laborers employed by the County Commissioners. The road equipment consists of a 10-ton motor road roller, crusher, screen, elevator, and five 2-mule teams, the value of which is about \$6,500. The number of miles of all public roads in the county is estimated at about 217. The road materials of this county include sand-clay, limestone, and phosphate rock. The total expenditure on public roads and bridges during 1910 was \$14,500.

## COLUMBIA COUNTY.

Columbia County is now engaged in clearing the right of way of a road proposed to cross the country from east to west. In 1910 a 3-mill tax was assessed for road improvement, amounting to about \$8,713. The roads are worked under the 8-day system. The county convicts are not worked on the roads. The road to be built will probably be a sand-clay road, 15 feet wide, 8 inches in the center and 3 inches at the edges. The cost of this type of road is reported to approximate \$700 per mile. The total number of miles of public road in the county is about 150. Columbia County in co-operation with Alachua County completed a new steel bridge across the Santa Fe River at an expense of about \$1,900, Alachua County sharing an equal expense. The road-making materials of this county include sand-clay and limestone. The total expenditure during 1910 on roads and bridges was \$3,400.

## CLAY COUNTY.

Clay County reports 3 miles of shell road, 20 feet wide, 6 inches thick in the center and 2 inches at the edges, built at a cost of about \$1,500 per mile, and  $\frac{1}{2}$  mile of sand-clay road 15 feet wide, 8 inches thick in the center and 2 inches thick at the edges, built at a cost of about \$1,000 per mile. The county pays a 2½-mill regular road tax which amounted in 1910 to about \$3,960. In addition to this regular tax, road district number one has levied a special 5-mill tax. This special tax which will be collected in 1911 amounts to \$2,540.34. The roads are worked by laborers employed by the County Commissioners. The road materials of this county include sand-clay, shell and a phosphatic limestone. The total expenditure on public roads and bridges in 1910 was about \$3,000.

## DADE COUNTY.

Dade County has built about 145 miles of crushed limestone roads, and in addition about 35 miles more are now either under construction or contracted for. These roads are built of the Miami oolitic limestone. The dimensions of the roads built vary from 9 to 16 feet in width, the surfacing material from 6 to 12 inches in depth. The average cost of a road 9 feet wide, with an average depth of 6 inches, is from \$900 to \$1,000 per mile; the cost of a 16-foot road, with an average depth of 8 inches, is \$1,600 per mile; the cost of a 20-foot road, with an average depth of 12 inches, is \$1,800 to \$1,900 per mile. The county owns its road-making material. A road tax of 8 mills has been levied which amounted in 1910 to \$34,692. The county has issued bonds for road improvement to the amount of \$75,000. The road money is spent under the direct supervision of the County Commissioners. The county has a road engineer and also a road supervisor. Roads are worked by paid laborers and also by convicts. The road equipment consists of two steam rollers, one ten-ton and one fourteen-ton; one traction engine and eight cars; four gasoline seven-ton rollers, and other lighter equipment. The estimated total number of miles of public roads in the county is 175. The total amount expended on roads and bridges in 1910 was \$138,200.27.

## DE SOTO COUNTY.

The number of miles of sand-clay roads in DeSoto County is reported to be approximately 15, including surfaced roads within the towns of the county. In some instances pine straw has been used and has temporarily improved the roads. A 7-mill tax, amounting to \$31,332.81, was assessed in 1910 for the improvement of roads. The road equipment consists of six mules, graders, shovels, and other implements. The county convicts are worked on the roads and also at times paid laborers are employed. The road materials of this county include sand-clay, shell, and marl. The total expenditure on roads and bridges in 1910 was \$39,866.55.

## DUVAL COUNTY.

The total amount of hard surfaced road reported in Duval County, exclusive of city streets, is 71.8 miles. Of this amount 18.1 miles are built of marl or crushed stone; 33.1 miles are built of shell; 6.5 miles are built of gravel; 8.5 miles are built of brick; 5.2 miles are built of cement, and 0.4 miles are built of asphalt. The county does not own road materials. The shells used are obtained near the mouth of the St. Johns River and cost 75c to \$1.15 per cubic yard de-

livered on shore at the point nearest to where they are to be used. The other materials are imported. The marl and crushed stone is shipped from the limestone section of central Florida. A county engineer is employed. The county convicts will be worked on the roads during a part of 1911. The road equipment includes a 14-ton roller, a 10-ton roller, and a 7-ton roller, and other general supplies valued at \$10,500. The county in 1910 voted a bond issue of \$1,000,000 for road improvement. The total mileage of public roads is estimated at 505 miles. The total expenditure on public roads during 1910 was not given.

#### ESCAMBIA COUNTY.

Escambia County has, exclusive of the streets and roads within the cities, 115 miles of sand-clay and 4 miles of gravel road. The sand-clay roads are built 20 to 25 feet wide, 14 inches thick at the middle, and 4 inches at the edge, at a cost of \$1,000 per mile. The gravel roads are 18 feet wide, 12 inches thick at the middle, and 3 inches at the edges, and were built at a cost of \$9,000 per mile. The high cost is due to the freight on the gravel and to the cost of hauling. The county paid a road tax of 3 mills in 1910, which amounted to \$33,775. A road supervisor is employed and the county convicts are used on the public roads. The county road equipment includes mules, road graders, camp outfits and general supplies valued at \$8,600. The total mileage of public roads in the county is about 1,000. The chief road-forming materials of this county are sand-clay and gravel. The total expenditures on public roads for 1910 was \$40,354.90.

#### FRANKLIN COUNTY.

Franklin County has completed about 25 miles of road, surfaced with shell. The county does not own its road-making material, but shells are furnished free. The county pays a road tax of 6 mills, which amounts to \$7,569. All road money is spent under the supervision of the County Commissioners. The county has no road engineer and the roads are worked by the citizens. The total expenditure on public roads and bridges during the year 1910 was \$4,406.21.

#### GADSDEN COUNTY.

Gadsden County reports about 31 miles of sand-clay road, built 30 feet in width. These are principally the natural sand-clay roads graded and drained. Sand-clay is hauled and used as the surfacing material where needed. These roads cost on an average in this county \$350 per mile. The county convicts are used on the roads. The county does not pay a road tax and has issued no bonds for road improvement. Revenue for road improvement is derived from a \$4.00 capitation tax. All citizens subject to this tax who fail to pay the same are required to work the roads 8 days per year. The county has a road superintendent who supervises road construction. The road equipment is valued at from \$4,000 to \$5,000. The number of miles of all public roads in the county is estimated at something over 500. The total amount expended on public roads and bridges in 1910 was \$16,000.

#### HAMILTON COUNTY.

Hamilton County has completed 4 miles of sand-clay roads, 15 feet wide, 8 inches thick at the center and 4 inches at the edges, costing \$750 per mile. The county pays a 3-mill road tax, which amounted in 1910 to about \$5,848.

The total number of miles of all public roads in the county is estimated to be 300. The road materials of this county include sand-clay and pebble phosphate. The total expenditure on public roads and bridges in 1910 was approximately \$10,000.

#### HERNANDO COUNTY.

In that section of Hernando County covered with a sand-clay formation this material forms a good foundation for roads and all that is necessary is grading and provision for drainage. A road tax of  $3\frac{3}{4}$  mills is assessed, which amounted in 1910 to \$5,040. The roads have heretofore been worked by paid laborers, but beginning about the first of the year 1911 the convict system was inaugurated. The number of miles of public roads in the county is about 150. The road materials of this county include sand-clay, limestone, and phosphate. The total amount expended on public roads and bridges of the county during 1910 was \$4,146.50.

#### HILLSBORO COUNTY.

Hillsboro County has built 125 miles of crushed stone and shell roads. Some pine straw roads have been built for temporary use at a cost of about \$40 per mill road tax, which amounted in 1910 to \$3,137. For the year 1909 a 3-mill tax is 12 feet wide, 8 inches in center, and 6 inches at the edges for the first 18 miles. The cost of this part of the road was \$3,800 per mile. The last two miles were built 12 feet wide, 11 inches in the center, and 7 inches at the edges. The cost of this part of the road was about \$4,500 per mile. All road work is let by contract, the contractor furnishing all material. The county in 1903 issued bonds for \$400,000 for road improvement. In addition to this a 4-mill road tax is levied, which amounted in 1910 to \$67,154.40. The county has a road engineer who prepares all bids and specifications. The road money is spent under the direct supervision of the County Commissioners. The county is now purchasing a complete new road equipment, which will cost approximately \$5,000. The equipment now on hand, consisting of graders, shovels and supplies, is valued at about \$1,000. Commencing with January, 1911, the convict system of labor will be tried on the public roads. The county has approximately 500 miles of public road. The road materials of this county include sand-clay, limestone and marl, shell, and phosphate rock. The total expenditure on roads and bridges during 1910 was, on new surfaced roads, \$80,411.38; on steel bridges, \$17,013.25; on wood bridges, \$4,936.52, and on the repair of roads and bridges, \$45,102.23; a total of \$147,463.38.

#### HOLMES COUNTY.

Holmes County has some natural sand-clay roads. The county pays a 2-mill road tax, which amounted in 1910 to \$3,137. For the year 1909 a 3-mill tax was levied, which amounted to \$5,696.59. The roads are worked by the citizens under the 8-day system. The total amount expended on roads and bridges in 1910 was \$4,588.65.

#### JACKSON COUNTY.

Jackson County lies almost wholly within the red hill section of western Florida and has natural sand-clay roads, which require little more than grading. The roads are worked by the citizens under the 8-day system and the money derived from the hire of the county convicts is applied to the road fund. The estimated total number of miles of all public roads in the county is 400. The

road materials of Jackson County include sand-clay and limestone. The total expenditure on public roads and bridges in 1910 was about \$3,000.

#### JEFFERSON COUNTY.

With the exception of the southern extremity, the roads of the greater part of Jefferson County have a natural sand-clay foundation, thus making the cost of the improvement of roads comparatively slight. The county pays a 1-mill road tax which amounted in 1910 to about \$2,361. The receipts from the hire of county convicts are applied to the road fund. This amounted to about \$1,000 in 1910. The roads are worked under the 8-day system by citizens subject to road duty or a fine of \$3.00. The roads are also worked by laborers employed by the County Commissioners. The total expenditure on public roads during 1910 was \$2,326.41.

#### LAFAYETTE COUNTY.

Lafayette County pays a 2-mill road tax which amounted in 1910 to \$4,625.63. The roads are worked by laborers employed by the County Commissioners. The number of miles of public roads in the county is approximately 1,000. The road materials of this county include sand-clay and limestone. The total amount expended on public roads and bridges during the year 1910 was \$1,130.71.

#### LAKE COUNTY.

Lake County has completed approximately 70 miles of sand-clay roads and 107 miles of pine straw roads. The clay road is built 9 feet wide, 6 inches thick in the center and 4 inches at the edges, at an average cost of about \$500 per mile. The pine straw roads are built for \$30 to \$50 per mile. The county paid in 1910 a 5-mill regular road tax, which amounted to \$14,316. District number four pays in addition to this regular tax a 3-mill tax, which amounted to \$1,876. The road equipment consists of road rollers, scrapers, and mules. The county convicts are hired out and the proceeds are applied to the road fund. Sand-clay is the chief road material of this county. The total expenditure on roads and bridges in 1910 was \$18,443.37.

#### LEE COUNTY.

Lee County has completed 20 miles of shell and marl roads. These roads are built 10 feet wide, 8 inches in the center and 6 inches at the edges. The average estimated cost of the marl road is given as \$1,500 per mile. The county pays a 3-mill road tax, which amounted in 1910 to \$7,297. The county convicts are worked on the roads and paid laborers are employed by the County Commissioners as well. The road equipment consists of mules, plows, scrapers, shovels and picks. The county has no road engineer, all roads being constructed under the supervision of the County Commissioners. The road materials of this county include marl, shell, and sand-clay. The total expenditure on public roads and bridges in the county for 1910 was \$14,947.48.

#### LEON COUNTY.

The roads of the northern half of Leon County have a natural sand-clay foundation and are built at little expense other than that of grading. About 150 miles of graded sand-clay roads have been built in this county. The cost varies from \$100 to \$500 per mile, depending upon the amount of grading and the distance that the clay must be hauled. A 3-mill tax for road improvement has

been levied for 1911. The returns from the hire of convicts, amounting to about \$3,000 are applied to the road fund. A county road supervisor is employed. The county's road equipment consists of road grader, mules, and general equipment, valued at \$6,000. The total expenditure on roads in 1910 was \$12,-227.52.

#### LEVY COUNTY.

Levy County has a total of about 7 miles of improved roads, including 3 miles of sand-clay road near the town of Williston, and 4 miles of shell road leading from the mainland into the town of Cedar Keys. The county pays a road tax of 1 mill which in 1910 amounted to \$2,829. The Williston and Gulf Hammock districts levied each a special tax of 5 mills, and the Inglis and Lebanon districts 3 mills for the year 1911 for road improvement. The county convicts are leased out and the receipts are applied to the road fund. The receipts from this source amounted in 1910 to \$2,562.16. The county has approximately 425 miles of public road. The road materials of this county include sand-clay, shell and limestone. The total expenditure on public roads and bridges during 1910 was \$3,163.36.

#### LIBERTY COUNTY.

Liberty County pays a 4-mill road tax, which amounted in 1910 to \$5,223. The work on roads is let out by contract, and each County Commissioner superintends the construction of roads within his respective district. The total number of miles of public road is reported to be 236. The county road equipment consists of one road grader, valued at \$125. The road materials of this county include sand-clay and limestone. The total expenditure on the roads and bridges in 1909 was \$4,879.49. The amount expended in 1910 was approximately the same.

#### MADISON COUNTY.

Madison County reports about 21 miles of road surfaced with sand-clay. A tax of 3 mills is assessed for the road improvement, which amounted in 1910 to \$8,209. The County Commissioners supervise road construction in their respective districts. The county's road equipment consists of a road grader, engine, scrapers, water tank, and general supplies, and is valued at about \$4,000. The roads are worked under the 8-day system and also by paid labor. The convict system of labor was tried about six years ago, but at that time was found unsatisfactory because the county was not able to keep a sufficient number constantly employed. The road-making materials of this county include sand-clay and limestone. The total amount expended on roads and bridges of the county during 1910 was about \$6,500.

#### MANATEE COUNTY.

Manatee County has about 2 miles of marl road in addition to 6 miles of crushed stone road in the cities of Palmetto, Bradentown, and Sarasota. The marl road is 12 feet wide, 8 inches thick at the center, and 6 inches on the edges, and was built at a cost of \$2,000 per mile. Bonds for road improvement have been issued to the amount of \$250,000. The funds are spent under the supervision of the County Commissioners. The road materials of this county include marl, limestone, and clay.

## MARION COUNTY.

About 150 miles of sand-clay roads and 97 miles of crushed stone roads have been completed in Marion County. The roads are built 10 feet wide and vary in cost from \$1,600 to \$3,000 per mile, depending upon the availability of material and the distance of hauling. The county pays a 4-mill road tax, which amounted in 1910 to approximately \$20,626. The county has a road superintendent. The county's road equipment consists of a traction engine, roller, scraper, mules and wagons, valued at \$5,000. About 20 convicts are worked on the roads. All above this number are hired out and the receipts are applied to the road fund. The county has approximately 1,000 miles of public roads. The chief road materials are limestone or marl, flint, sand-clay, and phosphate. The total expenditure on roads and bridges during 1910 was between \$40,000 and \$50,000.

## MONROE COUNTY.

Monroe County has 3.2 miles of road surfaced with crushed stone. This road, which is partly within the city of Key West, is 30 feet wide, was built of the native oolitic limestone, and cost \$3,800 per mile. The county does not pay a special road tax, all road improvement being paid for out of the general fund. The road equipment consists of picks, shovels, and general supplies and is valued at \$200. Formerly the roads were worked by paid laborers. At the present time, however, the county convicts are worked on the roads. Limestone is the chief road material. The total amount expended on public roads and bridges in 1910 was about \$800.

## NASSAU COUNTY.

Nassau County has under special legislative act issued interest-bearing certificates to the amount of \$60,000 for the improvement of roads and bridges within the county. The work of grading the roads in various parts of the county is now in progress. The county pays a regular road tax of 2 mills. This tax amounted in 1910 to \$5,128. In road districts one, two, and three a special 5-mill tax has been levied, which amounts to about \$6,793 additional. The total amount of hard surfaced road in the county at the present time is 20 miles, surfaced with shell, 15 feet wide, and 6 to 8 inches thick at the center. Of this amount 10 miles is in good condition while 10 miles is in need of repair. The roads throughout the county now being graded will be surfaced with shell. The county buys this shell and pays 3½ cents per bushel for live shell and 3 cents per bushel for dead shell. All road improvement is done under the direction of the County Commissioners and all road money is expended under their supervision. The county also has a road engineer. The road equipment consists of a steam roller, shovels, picks, axes, etc. The county does not work convicts on the roads, all work being done by paid laborers. The road materials of this county include sand-clay and shell. The total amount expended on public roads and bridges in 1910 was about \$15,000.

## ORANGE COUNTY.

Orange County reports 16 miles of marl road, 10 to 16 feet wide, 8 inches thick in the center, and 6 inches at the edges, built at a cost of \$2,000 per mile; 90 miles of sand-clay roads, 10 to 12 feet wide, 8 inches thick in the center, and 6 inches at the edges, built at a cost of \$1,000 per mile, and 35 miles of pine straw

roads, 10 feet wide, the straw being placed 18 inches thick, at a cost of \$40 per mile. The county pays a 6-mill road tax, which in 1910 amounted to \$36,106. A road superintendent is employed who looks after road construction. The county has a complete road equipment valued at \$8,450. The roads are worked by county convicts. The estimated total of all public roads in the county is 250 miles. The road materials of this county include marl and sand-clay. The total expenditure on public roads and bridges for 1910 was about \$30,000.

#### OSCEOLA COUNTY.

Osceola County reports 8 or 10 miles of marl road. The road tax in this county for 1910 was 6 mills, which amounted to \$16,517.71. A road supervisor is employed. The public roads are worked by laborers, the county convicts not being used. The total expenditure on roads for 1910 was \$18,000.

#### PALM BEACH COUNTY.

Palm Beach County has completed a marl road from West Palm Beach south to the county line, a distance of about 45 miles. In addition to this main road there are approximately 13 miles of completed cross roads. The county has now in course of construction a marl road from West Palm Beach to Stuart, at the north end of the county, a distance of about 39 miles. The surfacing material for roads being built near Delray costs 45c per cubic yard at the pit in Dade County, 50c freight, and 45c drayage for the first one-half mile, and 20c more for each additional half mile. The road is 8 feet wide, and the surfacing material is 8 inches thick. The cost of the road in addition to grading is thus approximately \$1,500 per mile for the first one-half mile with an added cost of \$216 for each additional half mile. The county has issued bonds for \$200,000 for road improvement. The general road tax is 3 mills. In addition to this a special road tax of 3 mills is assessed. The road money is spent under the supervision of the County Commissioners. The county has a road engineer. The road equipment consists of camp outfit and one seven-ton road roller, and is valued at about \$3,900. The county convicts were worked on the roads in 1910. The new road work, however, is let out by contract. The total expenditure on public roads and bridges in 1910 was \$40,400 out of the road fund, and \$110,000 out of the bond fund, or a total of \$150,400.

#### PASCO COUNTY.

Pasco County reports a total of 18 miles of improved road with  $1\frac{1}{2}$  miles of road to be surfaced with crushed stone under construction. Of the 18 miles of completed road 4 miles is surfaced with sand-clay, 10 feet wide, 6 inches at the center and 4 inches at the edges, at a cost of \$1,000 per mile; 11 miles of pine straw, 6 feet wide, at a cost of \$40 per mile and 3 miles of crushed stone, 12 feet wide, 6 inches at the center and 4 inches at the edges, at a cost of \$4,500 per mile. The road tax of 1 mill assessed in the county amounted in 1910 to \$2,312.50. In addition a special 5-mill tax was assessed, which applies to all the county, and amounted to \$11,562.51. The county has a road equipment valued at about \$175, consisting of graders, shovels, and minor tools. All road work is done by laborers employed by the County Commissioners. Convicts are leased out and the receipts which amounted in 1910 to \$2,705.58, are not applied to the road fund. The road materials of this county include limestone, sand-clay, and flint.

## POLK COUNTY.

Polk County reports 127 miles of improved roads. Of this 18 miles have been surfaced with marl, 12 feet wide, 6 inches in the center, and 3 inches at the edges, at a cost of \$1,500 per mile; 54 miles with sand-clay, 10 feet wide, 6 inches in the center, and 4 inches at the edges, at a cost of \$800 per mile, and 55 miles with pine straw, 12 feet wide, at a cost of \$40 per mile. The county pays a 4-mill road tax, which amounted in 1910 to \$26,613. There are no special road tax districts and the county is not bonded for road improvement. All road money is spent under the supervision of the County Commissioners who supervise the construction of roads within their respective districts. The county has a road equipment consisting of scrapers, steam roller, 3 double teams, and other smaller tools. The county convicts are worked on the roads. The estimated total number of miles of all public roads in the county is 700. The road materials include sand-clay, limestone or marl and phosphate. The total expenditure on public roads and bridges in 1910 was about \$25,000.

## PUTNAM COUNTY.

Putnam County has issued bonds for the improvement of roads to the amount of \$100,000 and for the building and repair of bridges, \$55,000. The county has built or has in process of construction 65 miles of sand-clay roads. Of this amount approximately one-half is now completed. The road is built 9 feet wide, 9 to 10 inches in the middle, and 6 to 8 inches at the edges. The cost varies from \$850 to \$1,600 per mile, depending upon the distance the clay has to be hauled. In addition to the sand-clay roads the county has 10 miles of shell road, two miles built of shell from DeLeon Springs and two miles of oyster shell from the east coast; also 12 miles built of gravel from Interlachen. The gravel road is considered very good and the cost is about the same as for the sand-clay. The county paid in 1910 a road tax of  $2\frac{1}{4}$  mills, which amounted to \$6,827.23. The road money is spent under the supervision of the County Commissioners and the Bond Trustees. The county's road equipment consists of a road roller, graders and shovels, and is valued at about \$3,500. The receipts from the lease of the county convicts are applied to the general fund and not to the road fund. The roads are worked by paid laborers. The total number of miles of public roads in the county is estimated to be 500 or 600. The road materials include sand-clay, shell, and gravel. The total amount expended on roads during 1910 was about \$60,000, and on bridges about \$9,000, a total of \$155,000.

## SANTA ROSA COUNTY.

Santa Rosa County reports 50 miles of graded sand-clay road with an additional 8 miles now under construction. The county owns its road surfacing material. A 3-mill road tax was assessed in 1910, which amounted to \$10,440. The road equipment consists of graders, plows, mules, and tents, and is valued at about \$2,000. The roads are worked by the county convicts and also by laborers employed by the County Commissioners. The roads are worked to some extent also by the citizens of the county under the 8-day system. The number of miles of all public roads in the county is approximately 250. The chief road materials of this county are sand-clay and shell marl. The total expenditure on public roads and bridges in 1910 was about \$15,000.

## ST. LUCIE COUNTY.

St. Lucie County has completed 14 miles of improved roads. Of this number 2 miles have been surfaced with marl, 9 feet wide, 9 inches in the center and 7 inches at the edges, at a cost of \$1,800 per mile; 10 miles with shell placed in the wheel tracks, at a cost of \$500 per mile, and 2 miles with crushed stone, 9 feet wide, 10 inches in the center and 7 inches at the edges, at a cost of \$2,000 per mile. The county paid in 1910 an 8-mill road tax, which amounted to about \$18,121. A bond issue of \$200,000 has been voted. County convicts are leased out and the receipts from their hire are applied to the road fund, which in 1910 amounted to about \$1,000. All road work is let by contract and contractors employ free labor for road work. The number of miles of all public roads in the county is about 200. The road materials of this county include marl, shell, and coquina. The total expenditure on public roads and bridges during the year 1910 was about \$15,000.

## ST. JOHNS COUNTY.

The total amount of surfaced roads in St. Johns County is 28 miles. Of this number 16 miles are surfaced with shell and 12 miles with pine straw. In addition 28 miles of sand-clay road are in process of construction. The county convicts are worked on the roads. The total number of miles of public road is estimated at 160. The total expenditure on public roads during 1910 was not given.

## SUMTER COUNTY.

Sumter County has completed 5 miles of road surfaced with marl and 30 miles surfaced with sand-clay. The roads in each case were built 12 feet wide, 14 inches thick in the center and 10 inches at the edges. The marl roads cost \$800 per mile, the sand-clay \$700 per mile. The marl road, however, is considered a more serviceable road. An abundance of road surfacing materials occur in the county, such as marl, clay and limestone. The county does not own any road materials, but the citizens owning property along the road being built have furnished free of charge all materials needed. The county pays a road tax of 2 mills which in 1910 amounted to about \$3,502. The county's road equipment consists of spades, road roller, shovels and picks, valued at \$200. The roads are worked by laborers employed by the County Commissioners. It is estimated that there are about 400 miles of public roads in the county. The total expenditure on public roads and bridges in 1910 was approximately \$3,800.

## SUWANNEE COUNTY.

Suwannee County has surfaced 4 miles of road with clay, and 8 miles with crushed stone. Of the crushed stone road 4 miles are within the city limits of Live Oak. The county in 1910 paid a 1½-mill road tax, which amounted to \$4,019. The road equipment consists of a steam road roller, picks and shovels, valued at \$2,500. The number of miles of public road in the county approximates 1,000. The road materials of this county include sand-clay and limestone. The total amount expended on public roads and bridges in 1910 was about \$7,000.

## TAYLOR COUNTY.

The only surfaced roads in Taylor County are in and near the town of Perry. About three or four miles are now in process of construction and are being built 30 feet wide within the city limits, and 20 feet wide beyond the city limits. The average thickness of the surfacing material is 6 inches in the center,

and 4 inches at the edges. This road is built at the rate of 45c a square yard, or about \$5,180.85 per mile for the country roads. The material used is crushed stone. The public roads in this county are worked by the citizens under the 8-day system. The county is not bonded for road improvement and does not pay a road tax. The money derived from the hire of county convicts, amounting in 1910 to \$3,000, is applied to the road fund. The road materials of this county include limestone and sandy clays. The total expenditure on public roads and bridges in 1910 was about \$3,000.

#### VOLUSIA COUNTY.

Volusia County has built about 75 miles of shell marl roads. The roads are built from 8 to 10 feet wide, 6 inches thick in the middle and 4 inches thick at the edges. The cost of this type of road is from \$2,500 to \$3,000 per mile. The county has also completed from 50 to 60 miles of pine straw roads. These roads are built 8 feet wide and cost from \$35 to \$40 per mile. The county in 1910 assessed a special 6-mill road tax, which amounted to \$35,774. The roads are worked by the county convicts. The total number of miles of public roads in the county is estimated to be approximately 250. The road materials include shell and marl. The total expenditure on roads and bridges in the county during the year 1910 was about \$33,000.

#### WAKULLA COUNTY.

Wakulla County reports no hard surfaced roads in the county. The roads are worked under the 8-day system. The total number of miles of public roads in the county is about 100. The expenditure on roads and bridges for 1910 was about \$600.

#### WALTON COUNTY.

Walton County has completed 3 miles of sand-clay roads. The county in 1910 assessed a road tax of  $2\frac{3}{4}$  mills, which amounted to about \$8,743. The roads are worked by the citizens of the county. Sand-clay and shell-marl are the chief road materials of this county. The total mileage of roads within the county is from 150 to 200. The expenditure on roads and bridges during 1910 was approximately \$8,000.

#### WASHINGTON COUNTY.

Washington County has now in process of construction a 16-mile sand-clay road between the county seat, Vernon, and the town of Chipley, near the north line of the county. Of this road 4 miles were completed in 1910, at a cost of \$800 per mile. The first mile of this road was built under the supervision of the office of public roads of the U. S. Department of Agriculture, and is 16 feet wide. The remaining 15 miles will, however, be 12 feet wide. The principal work and expense in the construction of this road is the clearing of the right of way, bridging streams and providing for drainage. The surfacing material lies at or near the surface and only in a few instances will material have to be hauled. The county's road equipment is valued at \$1,500 and consists of wagons, mules, plows, axes, shovels, and general tools. The roads have heretofore been worked by the citizens under the 8-day system, but commencing January, 1911, the convicts were placed on road construction. The county has assessed a 3 mill tax for roads, which amounted in 1910 to \$9,106. The total mileage of roads within the county approximates 500 miles. The expenditure on public roads and bridges in 1910 was about \$10,000.

# DATA ON PUBLIC ROADS IN FLORIDA COLLECTED BY THE STATE GEOLOGICAL SURVEY, 1910

| County          | Area of land surface<br>(square miles) | Population<br>(Census 1910) | Total assessed valuation<br>of property. | ROAD REVENUES.                                |                                                                                         |                                           | Estimated total mileage<br>of all public roads. | Improved Roads, Mileage, Dimensions and<br>Cost, Exclusive of Graded Dirt Roads.                                                                        |                       |                                                             |                                                           | Estimated value of county<br>road equipment. | Total expenditures on roads<br>and bridges, 1910, exclu-<br>sive of statute labor. |
|-----------------|----------------------------------------|-----------------------------|------------------------------------------|-----------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-------------------------------------------------------------|-----------------------------------------------------------|----------------------------------------------|------------------------------------------------------------------------------------|
|                 |                                        |                             |                                          | Road tax, regu-<br>lar and special<br>(mills) | Amount of regu-<br>lar, special and<br>district taxes<br>assessed for<br>roads in 1910. | Other funds or<br>equivalent in<br>labor. |                                                 | Surfaced roads: as-<br>phalt (a); brick (b);<br>cement (c); gravel<br>(g); marl and crushed<br>stone (m); straw (st);<br>sand-clay (s-c) shell<br>(sh). | Width of road (feet). | Thickness of surfac-<br>ing material at<br>center (inches). | Thickness of surfac-<br>ing material at<br>edge (inches). | Cost per mile.                               |                                                                                    |
| Alachua .....   | 1,283                                  | 34,305                      | \$6,522,699                              | { 3-reg. }                                    | \$30,919 55                                                                             | { Hire of convicts }                      | 900†                                            | 111 s-c.....                                                                                                                                            | 12                    | 8                                                           | .....                                                     | \$ 800.                                      | \$24,000 00                                                                        |
| Baker .....     | 585                                    | 4,805                       | 1,225,752                                | { 5-district }                                | 2,451 50                                                                                | { \$6,000 }                               | 500†                                            | 1/4 s-c.....                                                                                                                                            | 7                     | 6                                                           | .....                                                     | 30.                                          | 4,399 00                                                                           |
| Bradford .....  | 552                                    | 14,090                      | 2,583,320                                | 2                                             | 9,041 62                                                                                | Hire of convicts .....                    | 500-600                                         | 7 st.....                                                                                                                                               | 7                     | 6                                                           | 2                                                         | 700                                          | 1,000 00                                                                           |
| Brevard .....   | 972                                    | 4,717                       | 2,241,781                                | 3 1/2                                         | 3,964 98                                                                                | Hire of convicts .....                    | 250†                                            | 20 m.....                                                                                                                                               | 7                     | 6                                                           | 2                                                         | 1,700                                        | 1,019 93                                                                           |
| Calhoun .....   | 1,067                                  | 7,465                       | 1,585,995                                | 2 1/2                                         | 12,531 74                                                                               | Statute labor .....                       | 250                                             | .....                                                                                                                                                   | .....                 | .....                                                       | .....                                                     | .....                                        | 3,967 17                                                                           |
| Citrus .....    | 612                                    | 6,731                       | 1,575,910                                | { 7-reg. }                                    | 6,504 38                                                                                | { Hire of convicts }                      | 150                                             | { 35 m..... }                                                                                                                                           | 10-12                 | 7-8                                                         | 4-5                                                       | 750.                                         | 4,500 00                                                                           |
| Clay .....      | 622                                    | 6,116                       | 1,585,617                                | { 1-district }                                | 8,713 82                                                                                | { \$2,000 }                               | 200†                                            | { 25 s-c..... }                                                                                                                                         | 12                    | 8                                                           | 4                                                         | 1,000.                                       | 3,000 00                                                                           |
| Columbia .....  | 792                                    | 17,689                      | 2,904,608                                | { 2 1/2-reg. }                                | 31,332 81                                                                               | Statute labor .....                       | 150                                             | { 3 sh..... }                                                                                                                                           | 20                    | 6                                                           | 2                                                         | 1,500.                                       | 3,400 00                                                                           |
| Dade .....      | 2,305                                  | 11,933                      | 4,336,569                                | { 5-district }                                | 34,692 55                                                                               | { Bond issue }                            | 175                                             | { 1/4 s-c..... }                                                                                                                                        | 15                    | 8                                                           | 2                                                         | 1,000.                                       | 138,200 27                                                                         |
| DeSoto .....    | 3,755                                  | 14,200                      | 4,476,117                                | 8                                             | 33,775 26                                                                               | { \$75,000 }                              | 650†                                            | 145 m.....                                                                                                                                              | { 9..... }            | 6                                                           | .....                                                     | 1,000.                                       | 39,866 55                                                                          |
| Duval .....     | 822                                    | 75,163                      | 20,278,733                               | 7                                             | 7,569 98                                                                                | { Convict labor }                         | 505                                             | .....                                                                                                                                                   | { 16..... }           | 8                                                           | .....                                                     | 1,600.                                       | 40,354 90                                                                          |
| Escambia .....  | 668                                    | 38,029                      | 11,258,420                               | 3                                             | 5,848 77                                                                                | Convict labor.....                        | 1000                                            | 15 s-c.....                                                                                                                                             | 16-18                 | 12-14                                                       | 10                                                        | 8,000.                                       | 4,406 21                                                                           |
| Franklin .....  | 731                                    | 5,201                       | 1,261,664                                | 6                                             | 4,368 79                                                                                | { Bond issue }                            | 30                                              | { 18.1 m..... }                                                                                                                                         | 15-16                 | 14                                                          | 10                                                        | 7,500.                                       | 16,000 00                                                                          |
| Gadsden .....   | 500                                    | 22,198                      | 2,271,756                                | .....                                         | 67,154 40                                                                               | { \$1,000,000 }                           | 500                                             | { 33.1 sh..... }                                                                                                                                        | 15                    | .....                                                       | .....                                                     | 9,240.                                       | 10,000 00                                                                          |
| Hamilton .....  | 508                                    | 11,825                      | 1,949,593                                | 3                                             | 3,137 25                                                                                | { Convict labor* }                        | 150                                             | { 5 2 c..... }                                                                                                                                          | 15                    | .....                                                       | .....                                                     | 15,000.                                      | 4,146 50                                                                           |
| Hernando .....  | 475                                    | 4,997                       | 1,344,246                                | 3 1/4                                         | .....                                                                                   | Statute labor.....                        | 1000†                                           | { 8 5 b..... }                                                                                                                                          | 15                    | 12                                                          | 10                                                        | 18,538.14                                    | 4,588 65                                                                           |
| Hillsboro ..... | 1,309                                  | 78,374                      | 16,788,601                               | 4                                             | .....                                                                                   | and                                       | 400                                             | { 0 4 a..... }                                                                                                                                          | 15                    | .....                                                       | .....                                                     | 1,000.                                       | 3,000 00                                                                           |
| Holmes .....    | 435                                    | 11,557                      | 1,568,625                                | 2                                             | .....                                                                                   | Statute labor.....                        | 1000†                                           | { 6 5 g..... }                                                                                                                                          | 20-25                 | 14                                                          | 4                                                         | 9,000.                                       | 147,463 38                                                                         |
| Jackson .....   | 963                                    | 29,821                      | 3,479,255                                | .....                                         | .....                                                                                   | { Hire of convicts }                      | 400                                             | { 115 s-c..... }                                                                                                                                        | 10                    | 12                                                          | 3                                                         | .....                                        | 4,588 65                                                                           |
| Jefferson ..... | 593                                    | 17,210                      | 2,361,420                                | 1                                             | 2,361 42                                                                                | { Statute labor }                         | 350†                                            | { 4 g..... }                                                                                                                                            | 10                    | 14                                                          | 4                                                         | .....                                        | 3,000 00                                                                           |
|                 |                                        |                             |                                          |                                               |                                                                                         | { Hire of convicts }                      |                                                 | 25 sh.....                                                                                                                                              | 30                    | .....                                                       | .....                                                     | 350.                                         | 10,000 00                                                                          |
|                 |                                        |                             |                                          |                                               |                                                                                         | { Statute labor }                         |                                                 | 31 s-c.....                                                                                                                                             | 30                    | .....                                                       | .....                                                     | 750.                                         | 4,146 50                                                                           |
|                 |                                        |                             |                                          |                                               |                                                                                         | { \$100,000 }                             |                                                 | 4 s-c.....                                                                                                                                              | 15                    | 8                                                           | 4                                                         | .....                                        | 4,146 50                                                                           |
|                 |                                        |                             |                                          |                                               |                                                                                         | { Convict labor* }                        |                                                 | .....                                                                                                                                                   | .....                 | .....                                                       | .....                                                     | 5,000.                                       | 147,463 38                                                                         |
|                 |                                        |                             |                                          |                                               |                                                                                         | Statute labor.....                        |                                                 | { 75 m..... }                                                                                                                                           | .....                 | .....                                                       | .....                                                     | 3,800.                                       | 4,588 65                                                                           |
|                 |                                        |                             |                                          |                                               |                                                                                         | { Hire of convicts }                      |                                                 | { 25 sh..... }                                                                                                                                          | 12                    | 8                                                           | 6                                                         | .....                                        | 3,000 00                                                                           |
|                 |                                        |                             |                                          |                                               |                                                                                         | and                                       |                                                 | { 25 s-c..... }                                                                                                                                         | .....                 | .....                                                       | .....                                                     | .....                                        | 147,463 38                                                                         |
|                 |                                        |                             |                                          |                                               |                                                                                         | Statute labor.....                        |                                                 | .....                                                                                                                                                   | .....                 | .....                                                       | .....                                                     | .....                                        | 4,588 65                                                                           |
|                 |                                        |                             |                                          |                                               |                                                                                         | { Hire of convicts }                      |                                                 | .....                                                                                                                                                   | .....                 | .....                                                       | .....                                                     | .....                                        | 3,000 00                                                                           |
|                 |                                        |                             |                                          |                                               |                                                                                         | { Statute labor }                         |                                                 | .....                                                                                                                                                   | .....                 | .....                                                       | .....                                                     | .....                                        | 3,000 00                                                                           |
|                 |                                        |                             |                                          |                                               |                                                                                         | { Hire of convicts }                      |                                                 | .....                                                                                                                                                   | .....                 | .....                                                       | .....                                                     | .....                                        | 3,000 00                                                                           |
|                 |                                        |                             |                                          |                                               |                                                                                         | { \$1,000 }                               |                                                 | .....                                                                                                                                                   | .....                 | .....                                                       | .....                                                     | .....                                        | 3,000 00                                                                           |
|                 |                                        |                             |                                          |                                               |                                                                                         | Statute labor.....                        |                                                 | .....                                                                                                                                                   | .....                 | .....                                                       | .....                                                     | .....                                        | 3,000 00                                                                           |

|                  |        |         |             |                |            |                        |         |               |       |      |     |              |       |                |
|------------------|--------|---------|-------------|----------------|------------|------------------------|---------|---------------|-------|------|-----|--------------|-------|----------------|
| Lafayette .....  | 1,202  | 6,710   | 2,312,816   | 2              | 4,625 63   | { Hire of convicts }   | 1000    | 170 s-c ..... | 9     | 6    | 4   | 500.         | 500   | 1,130 71       |
| Lake .....       | 1,128  | 9,509   | 2,863,242   | { 5-reg. }     | 16,192 78  | { \$2,189 50 }         | 200     | 1107 st ..... |       |      |     | 40.          | 500   | 18,443 37      |
| Lee .....        | 4,641  | 6,294   | 2,432,628   | { 3-district } | 7,297 88   | Convict labor .....    | 250     | 20 m .....    | 10    | 8    | 6   | 1,500.       | 500   | 14,947 48      |
| Leon .....       | 730    | 19,427  | 3,334,000   |                |            | { Hire of convicts }   | 450†    | 150 s-c ..... |       |      |     | \$100-\$500. | 6,000 | 12,227 52      |
| Levy .....       | 1,133  | 10,361  | 2,829,908   | 1              | 2,829 90   | { \$3,000 }            |         | { 4 sh .....  | 12    |      |     |              |       | 3,163 36       |
| Liberty .....    | 725    | 4,700   | 1,305,936   | 5              | 6,529 68   | { \$2,562 16 }         | 425     | { 3 s-c ..... |       |      |     |              | 125   | 4,879 49       |
| Madison .....    | 693    | 16,919  | 2,736,333   | 3              | 8,208 99   | Statute labor .....    | 238†    | 21 s-c .....  | 12    | 8    | 6   | 2,000.       | 4,000 | 6,500 00       |
| Manatee .....    | 1,275  | 9,550   | 2,821,813   |                |            | Bond issue, \$250,000  | 500†    | 2 m .....     | 10    |      |     | 2,300.       | 5,000 | 40,000 00      |
| Marion .....     | 1,640  | 26,941  | 5,156,713   | 4              | 20,626 85  | Convict labor .....    | 1000    | 197 m .....   |       |      |     |              | 200   | 800 00         |
| Monroe .....     | 1,125  | 21,563  | 2,517,686   |                |            | Convict labor .....    | 260†    | 150 s-c ..... | 30    |      |     | 3,800.       |       | 15,000 00      |
| Nassau .....     | 645    | 10,525  | 2,564,165   | { 2 }          | 11,921 65  | Bond issue, \$60,000   |         | 3.2 m .....   | 15    | 6-8  |     |              |       |                |
|                  |        |         |             | { 5-district } |            |                        |         | 20 sh .....   | 10-16 | 8    | 6   | 2,000.       | 8,450 | 30,000 00      |
| Orange .....     | 1,315  | 19,107  | 6,017,685   | 6              | 36,106 11  | Convict labor .....    | 250     | 90 s-c .....  | 10-12 | 8    | 6   | 1,000.       |       |                |
| Osceola .....    | 1,827  | 5,507   | 2,752,951   | 6              | 16,517 70  |                        | 275†    | 35 st .....   | 10    | 18   | 18  | 40.          |       | 18,000 00      |
| Palm Beach ..... | 2,809  | 5,577   | 5,334,724   | { 3-reg. }     | 32,008 34  | { Bond issue }         |         | 10 m .....    |       |      |     | 1,500.       |       |                |
|                  |        |         |             | { 3-spec. }    |            | \$200,000              |         | 58 m .....    |       |      |     | { 2,500. }   | 3,900 | 150,400 00     |
|                  |        |         |             |                |            | { and convict labor }  |         |               |       |      |     | { 3,000. }   |       |                |
| Pasco .....      | 750    | 7,502   | 2,312,502   | { 1-reg. }     | 13,875 01  | { Hire of convicts }   | 250†    | { 3 m .....   | 12    | 6    | 4   | 4,500.       | 175   | 4,418 13       |
|                  |        |         |             | { 5-spec. }    |            | { \$2,705 58 }         |         | { 4 s-c ..... | 10    | 6    | 4   | 1,000.       |       |                |
| Polk .....       | 1,967  | 24,148  | 6,653,369   | 4              | 26,613 47  | Convict labor .....    | 700     | 11 st .....   | 6     | 3    |     | 40.          |       |                |
|                  |        |         |             |                |            |                        |         | 18 m .....    | 12    | 6    | 3   | 1,500.       | 4,000 | 25,000 00      |
| Putnam .....     | 772    | 13,096  | 3,034,324   | 2½             | 6,827 20   | Bond issue, \$155,000  | 500-600 | 54 s-c .....  | 10    | 6    | 4   | 800.         |       |                |
|                  |        |         |             |                |            |                        |         | 55 st .....   | 12    |      |     | 40.          |       |                |
| Santa Rosa ..... | 1,528  | 14,897  | 3,480,204   | 3              | 10,440 61  | Convict labor .....    | 250     | { 10 sh ..... |       |      |     | 850.         | 3,500 | 155,000 00     |
| St. Johns .....  | 960    | 13,208  | 3,611,044   | 2½             | 9,027 11   | Convict labor .....    | 160     | 40 s-c .....  | 9     | 9-10 | 6-8 | 1,600.       | 2,000 | 15,000 00      |
| St. Lucie .....  | 1,368  | 4,075   | 2,277,673   | 8              | 18,221 38  | { Hire of convicts }   | 140-200 | 12 g .....    | 30    |      |     | 1,000.       | 100   |                |
| Sumter .....     | 599    | 6,696   | 1,751,190   | 2              | 3,502 38   | { Bond Is. \$200,000 } | 400     | 50 s-c .....  | 15    | 12   | 6   | 2,000.       |       |                |
| Suwannee .....   | 689    | 18,603  | 2,679,487   | 1½             | 4,019 23   |                        | 1000    | 16 sh .....   | 6     | 12   |     | 150.         |       | 15,000 00      |
|                  |        |         |             |                |            |                        |         | 12 st .....   | 9     | 9-10 | 7   | 1,800.       | 200   | 3,800 00       |
| Taylor .....     | 1,100  | 7,103   | 2,349,362   |                |            |                        |         | 4 m .....     | 12    | 14   | 10  | 500.         |       |                |
|                  |        |         |             |                |            |                        |         | 5 m .....     | 12    | 14   | 10  | 700.         | 2,500 | 7,000 00       |
| Volusia .....    | 1,281  | 16,510  | 5,962,428   | 6              | 35,774 56  | { Hire of convicts }   | 200     | 30 s-c .....  |       |      |     |              |       |                |
| Wakulla .....    | 601    | 4,802   | 816,117     |                |            | { \$3,000 }            | 250     | 4 m .....     | 20    | 6    | 4   | 5,180.       |       | 3,000 00       |
| Walton .....     | 1,384  | 16,460  | 3,179,489   | 2¾             | 8,743 79   | Convict labor .....    | 100     | 4 s-c .....   | 8-10  | 6    | 4   | 2,750.       |       | 33,000 00      |
| Washington ..... | 1,425  | 16,403  | 3,035,511   | 3              | 9,106 53   | Statute labor .....    | 150-200 | 150 st .....  | 8     |      |     | 35.          |       | 600 00         |
|                  |        |         |             |                |            | { Statute labor }      | 500     | 3 s-c .....   |       |      |     |              |       | 8,000 00       |
|                  |        |         |             |                |            | { Convict labor* }     |         | 4 s-c .....   | 12    |      |     | 800.         | 1,500 | 10,000 00      |
| Total .....      | 54,861 | 752,619 | 177,723,981 |                | 573,385 60 |                        | 17,954  |               |       |      |     |              |       | \$1,080,949 03 |

\* Beginning in 1911.

† From Bulletin 32, Office of Public Roads, 1907.

‡ The expenditure on roads was not reported for Duval, Manatee and St. Johns Counties.







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