

Steps Toward the Intracoastal Waterway: The Blake Surveys of 1843 and 1845

by Joe Knetsch

With the close of the Second Seminole War and the passage of the Armed Occupation Act of 1842, the settlement of southeast Florida became an object of interest to the United States Army. The main problem of settlement in this isolated region was how best to provide the necessary means of cheap and efficient transportation to those willing to make their homes in the territory. The road survey conducted by Colonel James Gadsden in 1825 had indicated that the yearly “freshets” on the rivers and streams emptying into the Atlantic Ocean would destroy most bridges. Additionally, ferries required ferrymen to operate them and there were too few settlers in the area to provide this means of transportation across these dangerous bodies of water. The only practicable solution was constructing a canal across the “Haulover,” which connected the Mosquito River with the Indian River, and thus provide a nearly continuous navigable waterway all the way to Cape Florida. To ascertain the feasibility of this project, General William Worth, then commanding in Florida, ordered Lieutenant Jacob Edmund Blake of the Topographical Engineers to conduct a survey of the proposed canal’s route.

On November 10, 1843, General Worth wrote to the head of the Topographical Bureau, Colonel John James Abert:

“On examination of the accompanying Sketch you will perceive that by a cut thro’ the little strip of Land at the *Haulover* (Fort Ann) which Seperates the Mosquito from Indian river lagoon, marked half a mile, but in fact Seven hundred & twenty yards, there will an uninterrupted batteaux navigation counting from *Bulows* Southwardly of 270 miles; thence from the Southern

Joe Knetsch is an historian with the Bureau of Survey and Mapping, Division of State Lands, Florida Department of Natural Resources. Knetsch has conducted extensive research in the history of state-owned lands and holds a doctorate in history from Florida State University and a master’s from Florida Atlantic University.

extremity of St. Lucia a slight detour by the Everglades entering the Miami sea reach, near Key Biscayne, the Inland passage around the cape to Key West. . . . this work which will afford, at small cost, immense facilities to the settlers now studying the Southern Atlantic coast of the Peninsula, tend to bring the public lands into market and it may be, in the future, greatly facilitate the transmission of military supplies in respect to time, expense and avoidance of hazardous navigation and the active energies of an enemy's cruisers."

If allowed to use the garrison in St. Augustine, he argued, the cost would only be about \$5,500. For this survey, Lieutenant Blake, with approval of Abert, might also have assistance from the staff of Captain MacKay's party of surveyors. In the future, he speculated, the cut between Matanzas and the Mosquito Rivers would extend this proposed system of navigation all the way to St. Augustine.¹ Worth, who had been encouraging settlement in Florida since 1841, thought the plan was well adapted to accomplishing the aim of the Armed Occupation Act, the settling of the frontier with sturdy pioneers willing to stay on the land and protect the more established settlements further north.

The man chosen to make the survey, which was then already in progress, was Lieutenant Blake, a Pennsylvania-born graduate of the Military Academy, class of 1833. Blake had already served in Florida during the Second Seminole War as an assistant topographical engineer during 1838 and 1839 and co-produced the well known "MacKay-Blake Map" of 1840. Prior to his appointment on General Worth's staff in 1842, he helped survey the boundary between the United States and Texas, the harbors on the eastern end of Lake Erie and on reconnaissance of the approaches to New Orleans. In early 1844, Worth appointed his trusted lieutenant to be in charge of surveys and improvements in the Florida territory. It was in this capacity that Blake began the 1845 survey which is a main focus of this article. He later served with distinction in the Mexican War at the Battle of Palo Alto. Unfortunately, on May 9, 1846, this promising young officer, at the time only 34 years old, was killed "by an accidental discharge of his own pistol."²

By December 12, 1843, the ill-fated young lieutenant had turned in his first survey report to his commander. Worth noted, in a letter to Colonel Abert, that this report was "preparatory" to asking for the

funding of his proposed project. He emphasized that the project would be for the public benefit, especially the settlers, “many already in occupation and others desirous of proceeding thither.” It would likewise be acceptable to the troops and “creditable to the army.” The only impediment, he stated, was the cost for the quantity of planking needed to build the revetment.³ Worth, it would appear, had little doubt that the project would be acceptable to Abert and others in Washington.

Blake’s first report was dated December 11, 1843, and began with the statement that the cutting of the canal would, “thus remove the great source of toil and difficulty experienced by all settlers and others passing from North to South by the inland route from Smyrna to the mouth of Indian River.” He properly noted that the force stationed at Fort Ann during the late Indian war varied from 800 to 1000 men whose primary task was to haul the materials of war over the haulover and reload the steamboats and other vessels for the trip down the Indian River to Fort Pierce and beyond. In justification of the projected canal, Blake wrote:

. . . from the large force so long employed there, the wagons, mules & necessary forage, together with the supplies for the troops, to say nothing of the necessity of the withdrawal of such a force from the fighting strength actually in the field, I hazard little in asserting that the expense of keeping up such a force to overcome the difficulty arising from the interposition of this narrow neck of land must have cost the Government in six months twenty times the expense of cutting a canal from one stream to the other. . .

He continued his justification by declaring: “Since the termination of the war this has been the general route for all settlers on Indian River, St Lucie, Key Biscayne & Lake Worth.” Together with the “dangerous nature” of the bar at Indian River, the heavy weather and the lack of pilots to guide settlers into the area, these all contributed to making “the inland communication preferable at all seasons.”⁴ Blake’s reasoning was fueled by the need to assist settlement and ease communications with southern Florida.

The size of the proposed canal was large enough to admit the passage of boats and scows drawing not more than three feet of water. Its overall length was to be 725 yards with an average depth of four feet, which would allow some of the normal siltration to take

place and still admit boats and scows drawing no more than three feet of water. Part of the canal's distance, approximately 300 yards, would be through soft sand, resembling quicksand, and would have to have a revetment to hold back the sand once it was excavated. This construction would require, "driving piles 8 inches square & 12 feet in length, at a distance of 12 feet apart, revetting the sides with two inch plank," and possibly even planking the bottom of the canal for this distance to prevent excessive build-up of sand on the bottom. Like Worth, he called for the use of the force available at St. Augustine to complete the canal and render the passage usable by potential settlers. He estimated the costs for the project at a little over \$4,100, but warned that if the force at St. Francis Barracks could not be used the costs could run as high as \$10,000.⁵

Blake, a student of the Military Academy and subject to some of its virtues as well as faults, estimated that the appropriation offered for the completion of this canal was too small. His projection that the project could cost as much as \$10,000 must have seemed excessive to many in Congress and his more politically aware superiors in Washington.⁶ Whatever the cause, the work on the canal was not allowed to continue in 1843. In the phrase of Captain William H. Swift, then in charge of the Topographical Bureau, "Your remarks upon the inadequacy of the appropriation for cutting a canal at the Haulover will also be submitted to the Chief Topogl. Engr. This work will also for the present be suspended."⁷ This was a rather terse dismissal of the young lieutenant's recommendations.

Blake was ordered to shift his attention to the railroad survey from Jacksonville or Palatka to Cedar Key, the route then being proposed by some Floridians. He was, however, allowed to examine alternatives to the cost figures he had given for the canal project. On September 20, 1844, Blake was notified by Swift to proceed, after having completed the railroad survey, "to make such examinations as will enable you to state the cost of constructing a Canal at the Haulover independently of any aid from the troops."⁸ The go-ahead to redo the cost estimates had been given and the justification for the resurvey had been approved, in principle. On March 3, 1845, Blake wrote to Abert that he had not radically changed the position of the proposed canal but had slightly increased the distance to be covered by about 150 yards to "guard against the formation of bars at either mouth." Most significantly, Blake found that the estimate of \$5,000, in addition to the \$1,500 already expended in his surveys, would be

adequate to construct this canal, in sharp contrast to the earlier estimate of \$10,000.⁹

The contrasts that are noted in Blake's estimates reflect a deeper contrast in the report filed in 1845, the transcription of which follows. What is significant about the new report is the number of changes in emphasis and attitude toward the area of southern Florida. Blake reported that the surveys of the Public Lands had recently been completed along part of the route to the south and that these had exposed numerous lakes and creeks. He further stated that although settlers from neighboring states had attempted to establish settlements thereon, these had, apparently, failed and there was "but little prospect of ever forming permanent and thriving settlements" in the area. He noted the numerous bars at the entrances of many rivers, Jupiter, New and Hillsborough, for example, "are all subject to sudden and frequent changes, sometimes entirely closed ... all unfit and unreliable for the purposes of navigation." He declared, also, that the territory was threatened by the "agonies of killing thirst" and, at other times, so wet as to prevent the transportation of goods necessary for survival. The large proportion of swamp and saw grass marshes noted on the Public Land surveys, he believed, came from the fact that the surveyors were frequently interrupted in their work by heavy rainfall which covered the land with water, "where it was previously difficult to find sufficient for drinking purposes." Drainage of the area was the only alternative and there were too few people to accomplish this needed task.

Blake's 1845 report also brought to light the reason behind some of the Public Land surveys, the fact that many Spanish land grants existed in the territory and they had to be segregated from lands opened to public settlement. These grants, Blake maintained, took up the most desirable lands, leaving little of worth for public settlement. Some, he noted, had been sold to other interested parties, and he used the example of Miami pioneer William English as one of the more notable. Thus, with poor lands available to the public and much of the land covered with water, Blake was not optimistic about permanent settlement of South Florida.

The young lieutenant, however, had learned that the political winds had changed, and the report obviously reflected this. Settlement was no longer the main justification for the canal, but the possible military necessity of protecting communication with the newly established fortification at Key West became a major focus of con-

cern. He also hit heavily upon the age old argument for the intracoastal system, the protection of shipping from attack and heavy weather. The wrecking interests were the only ones who benefited from the lack of an intracoastal waterway, he noted, and the benefits from such a canal would be in the national interest. In the final arguments for the canal, he conceded that southern Florida had not been given a flattering picture and that there was a need to experiment with "tropical and European fruits" to encourage greater settlement. For a final benefit, he graciously stated that the "boundless grazing facilities, and inexhaustible fisheries, render its improvements and speedy settlement of vast importance to the general prosperity of the country." Blake's changed attitudes and opinions of southern Florida, as exhibited in his reports of 1843 and 1845, make for an interesting study in national policy as it related to internal improvements and the Army's role in their construction. He also gives us glimpses of the frontier state of the territory and relative uncertainty of pioneer life in a southern Florida that has long since disappeared.

A final word about the Haulover canal's history is in order. While preparing to carry out the policy of forcing the Indians of Florida to remove or fight, the Army assigned Lieutenant Horatio G. Wright to supervise the construction of a shallow canal through the Haulover to facilitate the movement of supplies to southern Florida, where the fighting, if it came to that, would most likely take place. The canal constructed by Wright's command was eight feet wide on the bottom and 12 feet at top with a usable depth of about two feet. As historian George Buker has noted: "It was no coincidence that the Haulover Canal was designed for the small boat operation used by the Army in its earlier Indian struggles along the Florida coast."¹⁰ During the Third Seminole war, the canal was used frequently for hauling men and materials to South Florida.

The Army did not maintain the canal after the conclusion of the war and there was little population along the shore to keep it in good repair during the Civil War or immediately thereafter. Reports from engineer J. Francis LaBaron showed that the canal, on his trip of 1869, had silted in heavily and it was with difficulty he used it for his small vessel. In his later trip of 1878, he found that local interests had deepened the canal and it admitted boats of 11 foot beam and drawing about one to two feet of water. After the founding of the Florida Coast Line Canal and Transportation Company, which constructed the remainder of the Intracoastal canal, the Haulover remained us-

able for most vessels plying the Indian River trade.¹¹ By 1892, the settlements along the Indian River were such that a project was initiated for clearing a channel five feet deep and 75 feet wide throughout the Indian River for the improvement of steamboat traffic. The Haulover canal, however, was continually maintained by the private interests of the canal company.¹² Since the Federal government obtained the Intracoastal Canal in 1930-31, the Haulover has been maintained by the Army Corps of Engineers in conjunction with the Florida Inland Navigation District.

Report on improving the communications between St. Augustine and Key Biscayne, J. Edmd. Blake, 1st. Lt. Topo. Engs., 1845

Report on cutting a Canal at the Haulover at Fort Ann, with remarks on the Inland communication between St. Augustine and Cape Florida.

In November 1843 a survey of the neck of land separating the waters of Indian River and Mosquito Lagoon, at a point generally known as the Haulover, was directed to be made by Brigr. Genl. W. J. Worth, commanding the 9th Military Dept., in order to determine the practicability of connecting those waters by a Canal, the survey was immediately made and a favorable report thereon presented in the following December, the estimated cost of the canal being \$4,185, based on the supposition that the work could be performed by such a force as could be spared for the purpose taken from the troops in garrison at St. Augustine. Without such assistance it was estimated that the cost of construction would not be far from \$10,000. Near the close of the Congress then in session \$1500 was appropriated for this work, an amount considered altogether inadequate for the object proposed. Although asked, authority was not granted to make such disposition of the force then in garrison, and the numerical strength of companies in service having subsequently been reduced to the lowest practicable peace establishment, the proposed plan of construction failed in consequence. At a later period a detailed survey was ordered by the Topographical Bureau and an estimate required based on the necessity of completing the work without the aid of the

troops. In accordance with these latter instructions a resurvey was made in February last, the position of the proposed cut slightly changed with regard to the direction of the channels in Indian River and Mosquito Lagoon, and the nature of the ground and the relative height of the water in the two Rivers more carefully observed and studied. I have in consequence become by recent and continued observation that a mere cut is all that is necessary to connect the two rivers, the revetment of the sides and bottom of that portion passing thro the sand as proposed in my report of the 11th December 1843 can consequently be dispensed with.

The sections on the Map accompanying this report will show the nature of the ground thro' which the cut is to be made, composed of rock (hard coquina) shell and sand; so much of the cut forming the water way of the canal passes thro' a mixture of sand and water, the latter rendering its removal somewhat tedious and more costly. The width has been increased from 10 to 15 feet, the depth remaining the same. To provide for a navigation requiring a greater depth than 4 feet is not deemed desirable, indeed it may be considered doubtful if such a proposition would not prove to be impracticable, owing to the general shallowness, except at enormous if not incalculable expense.

I submit herewith an estimate for the construction of the canal;

4400 C. Y. rock, 75 cts.	\$3,300
6000 C. Y. sand 15 cts.	900
3900 C. Y. sand & water 25 cts	<u>975</u>
	\$5,175
Clearing out the channel to deep water at the two termini	1,000
Contingencies &c. &c.	<u>325</u>
	\$6,500

of which \$1500 already appropriated remains untouched, having a balance of \$5000 required to complete the work, and thereby opening an uninterrupted batteau communication extending over a distance of 2 1/2 degrees Latitude, separated from the Atlantic Ocean by a distance seldom exceeding half a mile.

The necessity of opening a direct communication from St. Augustine to Cape Florida either by land or improving the Lakes and sounds forming nearly a continuous boat navigation between the two places has frequently been suggested and repeatedly commanded the

attention of the Territorial Legislature. Its importance, at all times great, has been materially enhanced by the steps now taking by the Genl. Government to fortify Key West, the advanced Post of the United States. In 1825 a survey of a route for a Road from St. Augustine to Cape Florida was made by Col. Gadsden and the subject ably discussed in his report thereon. Doubts were then expressed whether the country over which the road should pass, particularly the southern portion, would ever be sufficiently populated to render such a road necessary, and even when constructed, the inducements to individuals to keep up the necessary ferries would scarcely ever be adequate. Experience has fully proved the correctness of these views, and little doubt can longer exist of the superior advantages to be anticipated in opening the water communication.

The surveys of the public lands have lately been extended as far South as Cape Florida, residents of other neighboring States have from time to time made efforts to locate themselves on the banks of the several Lakes and creeks, yet notwithstanding material and, so requisite in a country passing from a state of war to peace, has been gratuitously advanced by the Military authorities as far as the means at their disposal would warrant, there exists at present but little prospect of ever forming permanent and thriving settlements. The bars at the several entrances from the Atlantic, at Indian River, Gilberts, Jupiter, Hillsborough and New Rivers &c. &c. are all subject to sudden and frequent changes, sometimes entirely closed, at others slightly deepening, but all unfit and unreliable for the purposes of navigation. To reach these lands from St. Augustine or the more Northern settlements, it is necessary to cross a country devoid of roads, streams without bridges, no habitations or pioneer settlements, at one time the country so dry that you are threatened with all the agonies of killing thirst, at another, so wet that transportation of the necessary supplies and immediate wants of a new settlement is almost impossible, and altogether beyond the means of the ordinary emigrant. Two routes are still open for selection, the one to brave the Atlantic in open boats at the imminent risk of destruction in crossing the bars near the destined place of settlement, in attempting which serious losses, enough to dishearten the enterprising settler, have already frequently occurred, or to take the inland passage by the lakes and creeks which may be navigable, and hauling canoes and supplies by bodily strength alone over such places as may not possess the requisite depth of water. This is a hard alternative, but it is

the only safe and practicable one left. With a view to bring this subject in a proper manner to the consideration of the Government, I have prepared a map exhibiting the different communications on the proposed routes, making (in red ink) such places as it would be necessary to open or deepen to secure at all times a continuous inland batteau navigation.

The Map exhibits the surveys lately completed by the deputy surveyors; the large proportion of swamp and saw grass marshes depicted thereon may be attributed to the fact that the surveyors were interrupted in their labors by showers of rain which immediately covered with water ground where it was previously difficult to find sufficient for drinking purposes. The canals requisite to open these communications will have an important bearing upon the drainage of the country, it is impracticable with any hopes of future profit for a single individual to perfect a system of drainage which would render his lands available for agricultural purposes, these canals would constitute the main drains to which communications might be opened by individual settlers to secure their own lands, and in every instance each successive settler performing his proportion of the general system. Without improvement to these channels it is utterly hopeless to anticipate the settlement of the Southern portion of Florida, even were the lands to be given by the Government to those disposed to settle there, a proposition which at first sight may appear startling, but the more it is considered, I feel convinced, the more favorably will it be received.

The better portions of land in this section of country adapted to agricultural purposes are already covered by old Spanish grants and have become the property of the original grantee or others who have purchased their interest, such as English's settlement on the Miami, the grants of Gomez, Hanson, Fleming & others not marked on the Map. The holders of these extensive grants would willingly give small lots, or dispose of them at a mere nominal price to industrious and enterprising settlers, and by this means enhance the value of the remaining portion of their property. This course of proceeding necessarily depreciates the value of the public lands, immeasurably inferior in quality, if not entirely worthless, and less favorably located, rendering their sale and subsequent location hopeless while subjected to the two fold withering operation of inferiority in quality and situation. The mere loss of dollars and cents in giving away, either to individuals or to the State of Florida, this portion of the public

domain, or disposing of it at a mere nominal price, will be nothing when considered in connection with the National policy of occurring its speedy settlement, and connecting our important Military works at Key West and the entire Florida reef with the back and settled portions of the country. As it now stands, without improvement to its avenues of approach, I feel confident that for years to come, if ever, it will not refund to the Treasury the original cost of Survey.

This section of country is accurately described by Col. Gadsden in his report of 1825, more recent experience, personal observation and frequent conversations with others the best acquainted with the localities satisfy me of the general correctness of his views.

“The whole country South of the Mosquito offers but feeble allurements to an agricultural population, and this opinion is somewhat strengthened by the fact of there being no evidences within that distance of old Indian settlements, scattering hunting camps alone indicate the purposes to which that district had been hitherto appropriated. The only land fit for cultivation is on the immediate margins of the Rivers and Inlets, inconsiderable as to extent, and of a light sandy soil, barely sufficient to raise the ordinary subsistence in grain for small families, whose energies may be directed to other than agricultural objects. The resources of this southern district of Florida are limited to ranges for stock of cattle, to wrecking and the fisheries, objects in themselves opposed to a dense population and only inviting to that class of adventurous emigrants who attach little value to roads, and would prefer in their neighborhood communications making use of the water channels provided by nature. These channels are in the chain of inlets and Lakes which extend with but partial interruptions the whole length of the coast from St. Augustine to Cape Florida.”

By inspecting the Map illustrative of and accompanying this Report, it will be seen that Matanzas and Halifax Rivers are separated by a distance not exceeding 12 miles, the intervening country being low and flat and but slightly elevated above the waters in the two rivers, and in wet weather being altogether under water. Mosquito River is again separated from Indian River at the Haulover by a narrow strip of about 1/2 a mile in extent, the communication is again uninterrupted until you reach the head of a small creek falling into Jupiter Inlet and separated only by a distance of 2 miles from Lake Worth, this latter obstacle being in fact passable at high water;

at the Southern termination of Lake Worth 22 miles in length there is another long obstruction of 11 miles, again consisting of low wet marshy land over which boats have passed in high stages of water; thence to New River Inlet the communication is open requiring at this latter point a cut of 2 miles in extent to connect with Snake Creek, and thence by Biscayne Bay to Cape Florida. At this point commences a wide and extensive navigations between the Islands bordering the Eastern Coast of Florida and the reef of rocks extending at a distance of from 3 to 5 miles from the main land from Cape Florida to the Tortugas, protected by this reef from the swell of the Atlantic and force of the Gulf Stream, passing several keys on which settlements have been made, all possessing an importance from their connection with the wrecking interest and the fisheries. It is on this reef that such a vast amount of property is annually lost to the United States, the entire distance from Cape Florida to Key West being in all seasons of the year and in all weathers studded with vessels connected with the wrecking interest.

Although by no means a flattering opinion is advanced of the peculiar formation and qualifications of the Southern section of Florida, I would not be understood as condemning every effort that may be made to multiply and increase settlements thereon. On the contrary, this section of country is entitled from many grave and weighty considerations to the fostering care of the Government, the necessity of an uninterrupted communication between the more Northern settlements and the extensive Military works in the course of construction at Key West, together with the reasonable claims of its inhabitants to the benefits anticipated from a frequent and regular transmission of the mail to and from the intervening settlements and Islands on the route must be apparent to every one. Moreover tho' the land is unsuited for the production of corn, grain and the immediate wants of the settler, the climate, in some degree, supplies the deficiencies of its peculiar soil and renders it valuable as a nursery, in time, for tropical and European fruits, and with the constantly progressive improvements in agricultural science, the probable discovery of its applicability for other staples, its boundless grazing facilities, and inexhaustible fisheries, render its improvements and speedy settlement of vast importance to the general prosperity of the country. It has yet to pass thro' the costly ordeal of experiment and the most serious obstacle that the bold and energetic operator will have to contend with is the almost impossible task of sending to market the precarious

fruit of his anxious labors. The peculiar character of its natural productions, such as oranges, lemons, limes, bananas, & tropical fruits in general will not admit of extensive land transportation. This fact together with the impracticability of keeping up the bridges on a road annually subjected to destruction by floods, and fire from the woods, and the sparse population rendering it difficult to support the requisite ferries over the larger streams, leave no doubt as to the superior advantages of opening a water communication throughout, rather than attempting the construction of a road, costly in the first outlay and requiring extensive annual repairs.

As these several obstructions in the general line have never been submitted to instrumental examination, I have no means of arriving at a safe estimate of the cost of construction; the cuts are longer than have generally been reported and other routes might possibly be found available on closer examination; the intervening land is in all cases represented as low and easy of removal and little more than the displacement of sufficient earth to form the body of the canal, say 15 feet wide and 4 feet deep, would be necessary.

It is believed that the total cost of opening the entire communication from St. Augustine to Cape Florida, a distance of 300 miles, would not exceed \$50,000; an appropriation of \$1500 would be sufficient to collect the necessary data on which to base a more accurate estimate.

All of which is respectfully submitted,
J. Edmd. Blake
1st. Lieut. Topl. Engs.

Col. J. J. Abert
Chief Topl. Engs.
Washington D. C.
St. Augustine, Florida
July 20th. 1845.

[Letters Received by the Topographical Bureau of the War Department, 1824-1865. Record Group 77, Roll 4. B — August 1825 - December 1849. Microcopy No. 506. National Archives, Washington.]

Endnotes

1. Clarence E. Carter. *The Territorial Papers of the United States: Volume XXVI, The Territory of Florida, 1839-1845*. Washington: National Archives, 1962. 780. [Hereafter Territorial Papers and page number. All quotations will be found in Volume XXVI.]

2. George W. Cullum. *Biographical Register of the Officers and Graduates of the United States Military Academy*. Boston: Houghton, Mifflin and Company, 1891. 558-59. The register lists him as Jacob E. Blake, however, he almost always signed his official letters as J. Edmd. Blake.

3. *Territorial Papers*. 802-03.

4. *Territorial Papers*. 803-04.

5. *Territorial Papers*. 805-07.

6. For a good discussion of the conflicts the officers of the Topographical Bureau often faced when estimating costs of projects and the reactions to these, see Todd Shallat's discussion of the Chesapeake and Ohio canal project in his article, "Building Waterways, 1802-1861: Science and the United States Army in Early Public Works." *Technology and Culture*. 31(January 1990): 28-38.

7. *Territorial Papers*. 947-48. Letter dated August 19, 1844.

8. *Territorial Papers*. 965-66.

9. *Territorial Papers*. 1023.

10. George E. Buker. *Sun, Sand and Water: A History of the Jacksonville District U. S. Army Corps of Engineers, 1821-1975*. Jacksonville: U. S. Army Engineer District, 1981. 116.

11. Buker. 116-17.

12. Aubrey Parkman. *History of the Waterways of the Atlantic Coasts of the United States*. Washington: U. S. Army Water Resources Support Center, 1983. 83.