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HEADQUARTERS CORPS OF ENGINEERS,
Washington, D. C., January 25, 1868.

SIR: In compliance with the following resolution of the Senate of the United States of March 11, 1867, viz: "*Resolved*, That the Secretary of War be, and he is hereby, directed to detail an officer of the engineer corps of the army for the purpose of surveying Bayou Manchac, connecting with the Amite river, and leading into Lake Maurepas and Lake Pontchartrain, and report the cost of opening said streams with bayous to first-class steamboat navigation," referred to these headquarters "to detail an officer and for report," I beg leave to transmit herewith a copy of the report of Brevet Brigadier General M. D. McAlester, major of engineers, the officer charged with the survey, &c.

The views of General McAlester are concurred in. The maps referred to in the report will be transmitted as soon as they can be copied.

Very respectfully, your obedient servant,

A. A. HUMPHREYS,
Brigadier General of Engineers, Commanding.

Hon. E. M. STANTON,
Secretary of War.

UNITED STATES ENGINEER OFFICE,
New Orleans, Louisiana, December 30, 1867.

GENERAL: By engineer department letter, dated Washington, March 12, 1867, I was ordered, in addition to my other duties, as soon as practicable, to cause a survey to be made of Bayou Manchac, connecting with the Amite river, and leading into Lake Maurepas, and Pass Manchac, connecting Maurepas and Lake Pontchartrain, and to submit a plan and estimate of the cost of opening said stream and bayous to first-class steamboat navigation; the project to include the opening of the head of Bayou Manchac, in the Mississippi river, and connecting the navigation of that river with the streams and lakes mentioned.

In pursuance of these orders, I assigned First Lieutenant I. K. Hezlep, corps of engineers, to the duty of conducting the field-work of the examination and survey about the 20th of April last, (he having returned from Fort Morgan on the completion of the operations under his superintendence at that place,) supplying him with the necessary instructions, verbal and written, for the purpose. Copies of his report and estimates, and accompanying maps, with profiles, sections, &c., marked A, are herewith submitted.

The completion and transmittal of this report has been delayed by the death of Lieutenant Hezlep, of yellow fever, which took place on the 13th of August last, and before the estimate could be fully completed, (as to the cost of the locks, flood-gates, &c.,) and by the subsequent suspension of all engineering operations under my charge in this vicinity, on account of the yellow fever epidemic.

Lieutenant Hezlep's report is respectfully referred to for a very full description of the features and peculiarities of the channels and waterways surveyed, their tributaries or branches, the country adjacent, and the soil to be dealt with. In connection with the difficulties and cost of establishing and maintaining the proposed continuous channel for navigation between the Mississippi river and Lake Pontchartrain, the

following considerations, resulting from the floods to which the Mississippi is annually subject, should also be borne in mind, viz:

1. The liability to extensive deposits in and in front of the river entrance of the proposed Bayou Manchac canal, incidental to a shifting of the river bed towards the west bank, necessitating proportional excavations as the floods gradually subside.

2. Incidental to the liability of the river to shift its bed towards its easterly bank, the tendency of the waters to cut away the river bank where the junction is made, undermining the flood-gates and locks, and converting the canal into a crevasse, flooding and damaging not only the canal and the proposed channel-way to Lake Maurepas, but the neighboring country and plantations.

3. The liability to crevasses in the Mississippi levees above and below the Bayou Manchac, causing the flooding of the proposed channel and canal, and of all the swamps and bottoms between the reverse slope of the river and Lake Maurepas.

The great crevasse of 1862, which occurred in the vicinity of Bayou Manchac, and between it and Baton Rouge, caused the water to rise in these swamps and bottoms to a line two and one-half miles from the river, and to a level 22 feet above the normal level of the water surface in the proposed channel and canal. (See map A for high-water line and mark of the crevasse.)

The second and third dangers are liable to be realized during the progress of excavations and constructions connected with the proposed Bayou Manchac canal navigation, to the injury of important parts of the work, and perhaps the total destruction of others. The power of Mississippi floods is too great to admit of control to the extent of obviating the first and second liabilities. The danger resulting from the third might be guarded against by means of levees on both sides of the proposed channel-way, extending from near Lake Maurepas to the vicinity of the Mississippi levee. These are not, however, included in the project and estimates. The expense entailed by any flooding of the excavations and constructions in the proposed canal during their progress, though they might be very great, are of so indefinite a character as not to admit of estimates.

The dimensions of the largest first-class steamboats now employed on the Mississippi are as follows: Great Republic, 330 feet long, 95 feet beam, six to seven feet draught, loaded; Richmond, 340 feet long, 86 feet beam, six to seven feet draught, loaded; but as boats of the peculiar construction adapted for river navigation cannot be trusted on Lake Pontchartrain, much less on the Mississippi sound, I have taken the steamboats of the "Morgan line," plying between this city and Mobile through Lake Pontchartrain, Mississippi sound, and Mobile bay, as specimens of "first-class steamboats," such as are alluded to in the order directing the survey, these being in every sense first-class steamboats, with side wheels, and so constructed as to navigate the Mississippi river, as well as the other waters named, with safety and efficiency. The largest of these is the "Mary," 235 feet long, 60 feet beam over all, (including the guards necessary for side wheels,) and six feet six inches draught for ordinary loads. Vessels drawing more than six feet six inches find difficulty in navigating the lakes and portions of the sound.

On this basis I have assumed the locks to have in the clear 250 feet length, 65 feet width, and the channel-way between the locks and Lake Pontchartrain to have a width at the bottom of 45 yards, the depth of water at extreme low water being seven feet, which width will permit boats to pass each other readily at low speed. The arrangement of

gates for locks so wide, sufficiently strong, and admitting at the same time of easy and rapid manipulation, will present considerable difficulty, but possibly the difficulty may be overcome by adopting gates of heavy construction and of great strength, moved by auxiliary machinery; otherwise the boats might be reduced in width to 30 feet or 35 feet by substituting screw propellers or stern wheels for side wheels; but with such modifications they could not be classed as "first-class steamboats."

PROJECT.

Proposed channel from Lake Pontchartrain to Bayou Crocodile.—The reverse slope of the bank of the Mississippi river at the locality of Bayou Manchac terminates at Bayou Crocodile, and the surface of the ground bordering the proposed channel from Lake Pontchartrain to the latter bayou is essentially level, admitting water throughout its extent, corresponding in level (during the absence of floods) with tide-water in the lakes. It is therefore proposed to make the excavations in this portion of the channel necessary to give it a depth, at lowest water, of at least seven feet, and a width of at least 45 yards, by means of floating dredging machines, similar to those used for excavating the numerous canals through the swamps intervening between the settled portions of the city of New Orleans and Lake Pontchartrain. Excavations will be necessary at the following named localities only: the bar at the Pontchartrain end of Pass Manchac, the bar at the Maurepas end of Pass Manchac, the bar at the mouth of Amite river, cut-offs and widenings of Amite river at 83 different points between its mouth and New river; the channel of Amite river, known as New river, (see map, where this channel is also marked as the locality of "Set. No. 2" of Lieutenant Hezlep's cross-sections,) and Bayou Manchac from its junction with Amite river to Bayou Crocodile, amounting to 2,518,897 cubic yards, as estimated by Lieutenant Hezlep. (See his report.)

Bayou Crocodile to Mississippi river.—That part of the proposed channel line comprised between Bayou Crocodile and the Mississippi river is marked by so much of old Bayou Manchac as lies upon the reverse slope of the Mississippi river bank. At low water on the bayou (during absence of floods in the Amite) depths of water varying between 0 and three feet six inches are found above the mouth of Bayou Crocodile, to a point 1,650 yards from it. Above this point the bayou is dry, except during seasons of floods in the Amite, (when the water backs up the bayou a mile or two further,) and crevasses in the Mississippi levees occurring in the vicinity. (During the crevasse of 1862 it contained three feet depth of water at its head just outside the levee.) The bayou is closed (and has been, according to the reports, since the time of General Jackson) by a dam in continuation of the levee. The bottom of the bayou at its head is 13 feet 6 inches above low-water mark in the Mississippi, and floods in the latter exceeding that height would send water through the former channel-way in the absence of the dam now closing it.

It is evident, therefore, that the conditions of the case are such (see, also, Lieutenant Hezlep's report) that the section of the proposed channel here in question must be in all respects a canal. And as there are no intermediate sources at higher levels whence water can be had for its service, the canal must have a single level, supplied at one end, corresponding to extreme low water, to serve for navigation at such stages of water. Furthermore, although lowest water level in the Mississippi river—as adopted in this report from observations hitherto—is two feet and three-quarters of an inch higher than extreme low water in the pro-

posed channel-way, comprised between Bayou Crocodile and Lake Pontchartrain, (corresponding to low tide in the latter,) the difference between the levels is liable at some time in the future to diminish. At all events, the low-water level in the river is variable, while that of tide-water is essentially constant. It will be judicious, therefore, to place the canal level at the level of low tide-water, as shown at Bayou Crocodile, establishing the canal bed at a level (continuous between this point and the river) seven feet below the tide-level named. It should be noted that the ordinary tide oscillations felt in the lakes, averaging about four-tenths of a foot, (see Humphrey's and Abbot's report, page 106,) are not perceptible at this point, being overcome by the wind and the long tortuous channel intervening. Communicating directly with this level, a lock is proposed to be placed in the main channel near the river. As the river attains higher levels under the influence of floods, other locks corresponding to these levels must be brought into requisition. These additional locks it is proposed to place in auxiliary side canals communicating with the main canal at a point between the lowest lock of the flight (the one first named) and the river. The total excavation for these canals, main and auxiliary, is estimated at 6,840,732 cubic yards.

Locks.—The maximum oscillations of the Mississippi at Baton Rouge and Donaldsonville are respectively found by adding 0.5 foot (see table, page 170, Humphrey's and Abbot's report) to 34.3 feet, and 27 feet, (see table, page 109, Humphrey's and Abbott's report,) and amount to 34.8 and 27.5 feet respectively. Interpolating on the supposition that the surface planes of the river have a uniform slope between these two points, the maximum oscillation at the head of Bayou Manchac is found to be 32.98 feet. Correcting this result by information obtained from intelligent persons residing in the immediate vicinity, I have assumed, for the purposes of this report, 32 feet as the amount of the oscillation at the latter point. Adding two feet for difference of level between low water in the river and the canal, there results 34 feet for the total lift between low water in the canal and high water in the river. This lift it is proposed to overcome by four locks of nine feet lift each, thus allowing a margin of two feet for floods higher than hitherto recorded. The lowest lock, or lock No. 1, is to be placed in the main canal as above stated. In order that the navigation may remain uninterrupted during all stages of the river, the other three locks are to be placed in three branching side canals, as illustrated by Fig. 3, (see map.) Lock No. 1 would alone be used for all stages of the river not more than nine feet above tide-water. The river rising more than nine feet above tide-water, flood-gate No. 1 (see Fig. 3) is to be introduced, and lock No. 2 brought into use in connection with lock No. 1. When the flood reaches a height of 18 feet and more, (referred to tide-water,) flood-gate No. 2 is to be placed in position, and lock No. 3 used in connection with locks Nos. 1 and 2. For heights exceeding 27 feet, flood-gate No. 3 is to be used, and all four of the locks. Fig. 3 fully illustrates the plan proposed, and the use of the locks and flood-gates for all stages of water. The still water backing into the bayou and canal from floods in the Amite will not interfere with the working of the lock and flood-gate system.

The interior horizontal dimensions of the locks will be, as before stated, as follows: 250 feet long, 65 feet wide; their interior depth will be 18 feet; their upper and lower gates will be 18 feet high. It is proposed for obvious reasons to construct the locks of timber, founding them upon areas of piles driven about six feet apart, measured in lines parallel and perpendicular to the axis of the locks.

It is proposed to construct the locks essentially like the "Vallette floating dock," (a description of which, by Lieutenant D. W. Payne,

corps of engineers, is appended,) since the strains to be resisted are essentially the same in the two cases. The principal modifications would consist in dispensing with the sides, ends, and backheads appertaining to the dock's hold, bringing the bottom of the hold up in contact with the deck of the dock, increasing the strength of all the stanchions employed in the sides, and introducing diagonal braces.

It is estimated that each lock foundation (including the usual accessories) will require 13,000 piles, each from 20 to 35 feet in length; and that the superstructure (including the capping of the piles) will require 3,975,200 feet of timber, board measure.

Flood-gates.—Owing to the loose and treacherous character of the soil and substrata to be dealt with, the establishment of flood-gates of adequate strength and stability will be an engineering problem of the greatest difficulty. Three flood-gates at least will be required, each 65 feet wide. Flood-gate No. 1 is to be 45 feet high, (reaching four feet above high water,) and must be able to sustain a head of water of 25 feet, (deducting nine feet, the lift of lock No. 1, from 34 feet, the total maximum lift.) Gate No. 2 must have a height of 34 feet, and sustain a head of water of 16 feet. Flood-gate No. 3 will be 25 feet high, and must resist a head of seven feet.

Whatever the character of gates adopted, the abutments and foundations supporting them should be of the most substantial character; and as the treacherous nature of the substrata renders the use of heavy masonry hazardous and enormously costly, it is proposed to employ timber alone (swamp cypress) for this purpose, with piles for foundations.

It is proposed to form flood-gate No. 3, and the lower section of each of the others, by means of a caisson, similar and similarly manipulated to the one used for closing the entrance of the Brooklyn navy yard dry dock, the vertical sections of which are rectangular, and the horizontal ones two equal curves joining at their ends with their convexities outwards; the caisson to be 25 feet high, so that when sunk into position the top shall be seven feet higher than the top of the corresponding lock. The remaining 18 or 20 feet of gate No. 1, and 9 or 11 feet of gate No. 2, it is proposed to form by means of several open-built beams, having an outline corresponding to the horizontal section of the caissons superposed flatwise on the latter and on one another—the caissons to be floated and sunk into position, where they will rest on the foundation at the bottom of the canal and against the abutments. The beams to be superposed as the river rises by means of derricks or cranes established on top of the abutments, and placed also with their ends resting against the abutments, where the pressure of the water will retain them, their flotation being neutralized by adequate weights placed on the uppermost one. The average number of piles estimated for the flood-gates is 300 each.

Estimate.

SURVEY.

For finally locating and laying out the entire work..... \$10,000 00

CLEARING GROUNDS READY FOR WORK.

For felling trees on space occupied by the channel, and on space 20 yards wide, on either side, 900 acres, at \$5 per acre..... 4,500 00
Clearing drift-wood out of Bayou Manchac, 8 miles, at \$200 per mile..... 1,600 00

EXCAVATIONS.

Bars in Lake Pontchartrain and Maurepas, Amite river, and Bayou Manchac, between Lake Maurepas and Bayou Crocodile, 2,518,897 cubic yards, at 25 cents per yard.....	\$629,724 25
Canal and side canals between Bayou Crocodile and Mississippi river, 6,840,732 cubic yards, at 30 cents per yard.....	2,052,219 60

LOCKS.

For each lock 13,000 piles purchased, prepared, driven, and trimmed ready for the reception of the timber of the superstructure, are estimated to cost \$7 each, amounting to.....	91,000 00
For the superstructure, (including capping of piles and gates,) 3,975,200 feet, board measure, of timber, purchased, delivered, framed, and built into the lock, (including all carpenter and joiner work,) is estimated to cost 4 cents per foot, amounting to.....	159,008 00
4 locks, at \$250,008 each.....	1,000,032 00

FLOOD-GATES.

For 3 flood-gates, 900 piles, driven and completed, at \$7 each, (\$6,300;) 21,600 feet, board measure, of sheet piling, (plank 12 feet long and 4 inches thick,) at 4 cents per foot, (\$864;) 3 caissons containing 175,500 feet, board measure, of timber, carpenter, joiner, calker, iron, and painter's work, included, at 4½ cents per foot, (\$7,897 50;) grillage complete, 260,000 feet, board measure, of timber, at 4 cents per foot, (\$10,400;) 6 abutments complete—2 of them 45 feet high, 2 of them 36 feet high, and 2 of them 27 feet high—total height of 216 feet, containing 1,101,600 feet, board measure, (facing, backing, and ties,) at 4 cents per foot (\$44,064,) and open-built beams complete, forming the portions of flood-gates Nos. 1 and 2, superposed on the caissons for the total height of 31 feet, 63,180 feet; board measure, at 4½ cents per foot, (\$2,843;) aggregate cost ready for use.....	72,368 60
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AUXILIARY MACHINERY.

Machinery for manipulating and handling lock-gates and flood-gates, estimated.....	30,000 00
Grand aggregate.....	<u>3,800,444 45</u>

The above estimates are very close, and are more likely to prove too small than too great, especially those relating to the excavations. The very lowest rates at which ordinary levee embankments can now be made in this vicinity is 33 cents per yard, although the embankments and corresponding excavations whence the earth is taken are in very near proximity, and the soil to be dealt with quite dry. Much of the proposed canal excavation will require the earth to be elevated through considera-

ble heights, and transported over considerable distance; and much difficulty will arise from the presence of water in the lower portions of the excavation.

Of all the channel ways forming connection or partial connection between the Mississippi river and the lakes and sound, the one proposed is least favorable, in all respects, for extension and improvement as proposed. On account of the greater oscillations of the Mississippi river, and the greater width of the reverse slope of the river bank at the point of junction, and the greater length to be improved, the cost, both of its improvement and preservation, will be vastly greater than many other and much preferable lines that are available; and the liability to accidents leading to interruptions of navigation, and even the destruction of the work, far more imminent. The channel proposed, when completed ready for navigation, will be less useful and convenient than many others that might be selected, since it will present about 75 miles of intricate navigation between the river and Lake Pontchartrain, which cannot be accomplished at a speed exceeding five miles per hour, the whole time required for the passage, including locking, being about 16 hours.

A canal connecting the lake directly with the river, at almost any point between Bonnet Carré bend and the city of New Orleans, would, in all respects, be preferable. (See map marked B.) At several such points the canal would not exceed six miles in length, and for more than half this length the depth of the excavation would not exceed nine feet.

Were it a question of merely connecting the river with Mississippi sound, and its branches and inlets, a canal connecting the river with Lake Borgne, between the Chalmette line of fortifications and English Turn, (see map B,) would be still more advantageous and feasible in all respects. There are at least two bayous heading within three miles of the river, and affording 7 to 16 feet of water thence to Lake Borgne, which latter affords 8 to 10 feet of water from the bars at the bayou mouths to the sound.

As an example of these several preferable connections, I caused to be made a survey of the line connecting the river, at a point about midway between Carrollton and Camp Parapet, with "the new canal," at a point near Metairie ridge, (Bayou Metairie, see map marked C,) with estimates of the cost of completing the entire connection between the river and the lake, according to the requirements specified, viz: width, 45 yards; depth of water, seven feet, and suitable locks and flood-gates.

The difference of level between high water in the river and low tide in the lake is about 17 feet, (see Humphreys's and Abbot's Report, pp. 109, 113, and 170,) and but two locks and one flood-gate will, therefore, be required.

Estimate.

SURVEY.

Laying out and marking the work \$3,000 00

CLEARING GROUND.

Clearing trees from 30 acres of ground, at \$5 per acre..... 150 00

EXCAVATION.

1,030,344 cubic yards of excavation, at 25 cents per yard... 257,586 00

LOCKS.

Two locks complete, at \$250,008 each..... \$500,016 00

FLOOD-GATES.

For one flood-gate complete, including foundation, abutments, and the caisson..... 19,187 16

AUXILIARY MACHINERY.

Machinery for manipulating locks, gates, and flood-gates, estimated 6,000 00

Total 785,939 16

The "new canal" is at present about 60 feet wide, and has six feet of water, and terminates at the "new basin," a little less than one mile from the river. It is owned by the State of Louisiana, (having lately reverted to it,) and is leased to private parties for a term of years, one of the terms of the lease requiring that the lessees widen and deepen the canal. Some progress has been made in widening it to 100 feet, and deepening it to about nine feet. To remove the cypress stumps requires the excavation to be nine feet deep in the first instance. After the removal of these, which is usually done with Osgood's excavator, there is no difficulty in obtaining, say, 16 feet depth with the same machine. All similar excavations in the swamps bordering the lakes, and the low ground bordering the river, are made by this machine.

It is set up on a scow which floats in the water, with which the excavations fill as fast as they are made.

Supposing the proposed connection to be made at any point below Bonnet Carré bend, the locks and flood-gates could be entirely dispensed with by terminating the canal at a point, say, 45 yards from the crest of the levee or river bank, and providing facilities, say, cranes or platforms on wheels, worked by steam, for transferring freights rapidly between boats in the two waters. By this arrangement any boats or vessels now on the river and the shallow tide-water of the lakes and sound, or which may be hereafter introduced, could be brought to the point of transfer and exchange cargoes.

The great cost and risk attending any device for connecting the waters of the Mississippi river continuously with those of the lakes would also, by this arrangement, be avoided.

Very respectfully, your obedient servant,

M. D. McALESTER,

Brevet Brigadier General, Major of Engineers.

Brevet Major General A. A. HUMPHREYS,

Brigadier General and Chief of Engineers, Washington, D. C.

NEW ORLEANS, Louisiana, July 31, 1867.

SIR: In compliance with your letters of instructions dated New Orleans, Louisiana, April 22 and 29 and May 8, I have the honor to report that I proceeded with a surveying party to Bayou Manchac on the 24th day of April, and made an examination and survey of that bayou, the

Amite river, and of the bars at the mouth of the Amite river, and at the east and west ends of Pass Manchac.

The object of the survey being to ascertain as near as practicable the amount of excavation necessary in order to render the streams mentioned navigable for steamers of the first class, (those of the Morgan line between this city and Mobile being taken as a standard,) it was assumed that the channel should be at least 45 yards wide at the bottom, with a depth of seven feet, the banks having a slope of one on one, and the calculations which follow are based upon this assumption.

Cross-sections of the bayou were taken every fifty yards; the "0" of vertical measurement being taken at low water at the section, unless the channel is dry at low water; horizontal measurements in yards, vertical in feet.

The sections were arranged in five sets, each set of sections being continuous. Set No. 1 extending from the Mississippi river to the Amite river; set No. 2 covering that portion of the Amite known as New river; set No. 3 the bar at the mouth of the Amite river; sets Nos. 4 and 5 the bars at the west and east ends of Pass Manchac, respectively. The sets and sections were numbered from the Mississippi eastwardly.

The work progressed favorably and was finished on the 20th of May, 1867. The water being high and the current rapid in the Amite river, in consequence of the spring flood, some of the measurements given relating to that river are necessarily inaccurate, but the errors are small and it is thought compensating.

The bayou for a distance of eight miles from the Mississippi river (to Bayou Crocodile) is filled with logs, growing trees, and undergrowth, and is dry at low water to within a mile of this point. To the Crocodile it has an average width of about 20 yards; from this point to Ward's creek it has an average width of 30 yards, but it is obstructed by falling and leaning trees, logs, &c. From Ward's creek to the Amite it has been cleaned out and is navigated by a small steamer, there being a depth of seven feet nearly all the way up at low water.

At low water the current in the Manchac is dependent entirely upon the winds, high easterly winds backing the water up the Amite causing it to flow up the Manchac.

The Manchac has three tributaries, which carry into it the drainage of a large portion of the country extending from Baton Rouge above down to New river landing below. Of these the Crocodile is the most important, being the outlet of Spanish lake which receives all the drainage from Bayous Brand and Paul. It is at high water about 25 yards wide at the water surface; at low water it is dry for part of its length. The next inlet below is Bayou Fountain, which drains a large portion of the high land and of the land between Baton Rouge and the head of the Manchac. Along the river Ward's creek is the least stream of any importance which flows into the Manchac, and it at low water discharges but little water. None of these tributaries are high enough to supply reservoirs to feed the canal proposed.

At the junction of the Manchac with the Amite river a bar has formed some 20 yards wide and extending down the river for 50 yards. There are but three feet of water on this bar when the river is at its lowest stage. From this point down to what is known as New river, and from New river to Lake Maurepas, the Amite river is generally over 45 yards wide and from 12 to 25 feet deep at low water. New river is of an average width of 38 yards, and is very crooked and deep.

The bayou Manchac and Amite river are bordered throughout their whole length by heavy forests, with the exception of a few plantations

and landings. In many places the trees overhang the bank both of the river and the bayou so as to render navigation difficult and dangerous even for small steamboats. In the highlands are found pine, ash, and oak; in the swamps, cypress, gum, white oak, &c.

The soil along the Manchac is a stiff clay, growing firmer as you leave the Mississippi river, the coarser materials being deposited near the Mississippi bank. The banks of the Manchac have a reverse slope similar to that of the Mississippi, there being, however, a greater fall in the same distance. Along the Mississippi the average reverse slope of the natural bank is about seven feet in the first mile, while along the bayou the average reverse slope is about three feet in the first hundred yards. At the mouth of the Manchac the soil becomes mixed with sand, but the proportion is small and does not in any way obstruct the channel by forming bars; and, in fact, at the points where shallow water could be expected, the banks are in places from 12 to 15 feet high, and stand almost perpendicular.

The high water of the spring backs up the Manchac so as to give in many places below Bayou Crocodile a depth of 20 feet and over, overflowing a large portion of the country on the south side; and falling rapidly a very rapid current is formed, rendering navigation extremely difficult.

The slope back from the Mississippi along the Manchac is most rapid for the first two miles, when it becomes more gradual. In order to make the estimate of the excavation more accurate, avoiding the error of assuming the slope from the Mississippi to the Crocodile as uniform, a line of levels was run from the head of the Manchac to its junction with the Crocodile, and the following results obtained:

Difference of level of natural bank of Mississippi in first two miles and a half is eight feet five inches; between this point and the Crocodile, (where the direction of current at low water is dependent entirely upon the direction of the wind and the rise and fall of the Amite,) eleven feet three inches; making a total of 19 feet eight inches.

Difference of level between extreme high water in Mississippi of 1862 and extreme low water in the bayou at the Crocodile, 34 feet and three-fourths of an inch. The extreme fall of the Mississippi river being 32 feet nearly, this gives the difference of level between low water in the Mississippi and in the Manchac at two feet and three-fourths of an inch.

As there is no body of water near the Manchac which can be used as a reservoir to supply locks for different levels in the canal, it must be excavated down low enough to give the required draught of seven feet at low water, which places the bottom of the canal, nine feet below the low-water line of the Mississippi river, or 37 feet seven inches below the natural bank of the Mississippi, at the crest of the channel bank.

To overcome this rise, at least four locks will be required, placed in four different side canals, a project for which is appended:

Amount of excavation required and the estimate of the cost of the same.

*From Mississippi river to Bayou Crocodile, 6,295,394 cubic yards, at 30 cents per yard.....	\$1, 888, 618 20
Side canals for locks, 545,338 cubic yards, at 30 cents per yard.....	163, 601 40
*From Bayou Crocodile to Amite river, 1,903,520 cubic yards, at 25 cents per yard.....	475, 880 00

* In all cases where the canal follows the existing natural channel-way the curvature of the latter is deducted in estimating the excavation for the canal.

New river, 96,783 cubic yards, at 25 cents per yard....	\$24, 195 75
Points of Amite river 464,000 cubic yards, at 25 cents per yard.....	116, 000 00
Bar at mouth of Amite, 9,668 cubic yards, at 25 cents per yard.....	2, 417 00
Bar at west end of Pass Manchac, 24,077 cubic yards, at 25 cents per yard.....	6, 019 25
Bar at east end of Pass Manchac 20,849 cubic yards, at 25 cents per yard.....	5, 212 25
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	2, 681, 943 85
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Timber and lumber for one lock.

Thirteen thousand piles, 20 feet to 35 feet long, one foot in diameter; 3,125,200 feet of 12-inch by 12-inch timber, board measure; 600,000 3-inch plank for sheeting and gates; 250,000 feet, 12-inch by 12-inch timber, gates.

The cost of a project for opening a canal from near Camp Parapet, on the Mississippi river, just above Carrollton, to the point near the Metairie ridge, where the new canal crosses it, and of widening and deepening "the new canal" from that point to Lake Pontchartrain, is as follows:

	Cubic yards.
For canal 300 yards long, 17 feet 1 inch deep and 24 yards wide, for locks at low water.....	50, 820
For canal 200 yards long, 9 feet 4 inches deep and 24 yards wide, for lock at high water.....	16, 874
For canal from Camp Parapet to foot of slope, 1½ miles, 45 yards wide and from 17 feet 1 inch to 8 feet 6 inches deep.	560, 340
For canal from foot of slope to new canal at Metairie ridge, 45 yards by 8 feet 6 inches, and widening and deepening new canal thence to lake Pontchartrain	402, 310
	<hr/>
	1, 030, 344
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1,030,344 cubic yards of excavation, at 25 cents per yard....	\$257, 586
	<hr/>

In opening either of these canals an item of some importance must be considered, the deposit in the lakes of the sediment from the Mississippi river. This will be constantly going on, and will be accompanied with considerable expense.

Very respectfully, your obedient servant,

J. K. HEZLEP,

First Lieutenant Corps of Engineers.

Brevet Brig. Gen. M. D. MCALESTER,

Major of Engineers.

NEW ORLEANS, LOUISIANA,

June 18, 1867.

SIR: I submit herewith a description of the Valette floating dock at Algiers, the largest one in the river. Dimensions: length of hold, 260 feet; length of outriggers, 50 feet; depth of hold, 10 feet; breadth of