DECIDED Dec. 23, 1974

IN THE

Supreme Court of the United States

NO 48, ORIGINAL

October Term, 1970

STATE OF MISSISSIPPI, Plaintiff,

v.

STATE OF ARKANSAS, Defendant.

REPORT OF SPECIAL MASTER

CLIFFORD O'SULLIVAN
Senior Circuit Judge
Special Master

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To the Chief Justice and Associate Justices of the Supreme Court of the United States:

This is an original action brought in the Supreme Court of the United States by the State of Mississippi against the State of Arkansas to resolve a dispute as to the true boundary line between those states. The undersigned was appointed Special Master to hear the relevant proofs and make report to the Supreme Court.

In the area involved, the Mississippi River forms such interstate boundary and the river was such boundary at the time these states were, respectively, admitted to the Union in the first half of the nineteenth century. It is not disputed that the river has migrated westerly approximately one-half mile from its location in the years 1823

and 1830 — the years that the first Government Land Office surveys were made of the litigants' respective boundary lines in this area. Mississippi claims that the river's westward migration was the consequence of the caving of its western bank (the Arkansas side), and the gradual depositing of alluvial accretion on its eastern bank (the Mississippi side), thereby forming what is known as a point bar. Arkansas claims that such westward movement was the product of an avulsion whereby the river suddenly and violently jumped its western bank and found a new course on the mainland of Arkansas, and carved therefrom a piece of such mainland, forming an island in the river on its eastern side which, with accretions thereto, is identified as Luna Bar. It is Arkansas' claim that this avulsion occurred as a single and sudden event between the years 1871 and 1872. If the migration of the river came about by the gradual movement claimed by Mississippi, the land identified as Luna Bar became and remains a part of the State of Mississippi. If, however, the westward movement of the river came about in 1871 from an avulsion, as claimed by Arkansas, the interstate boundary remains substantially as it was immediately before the claimed avulsion of 1871, and Luna Bar and accretions thereto are a part of Arkansas. In 1935 the United States Corps of Engineers dug a new channel for navigation in the relevant area, identified as Tarpley Cut-Off. After this became the main navigation channel, the old course of the river fell into disuse.

The area of contest will be more clearly disclosed by examination of Plaintiff's Exhibit 1, [Appendix A] attached hereto. This exhibit shows Luna Bar lying to the east of that part of the river identified as Spanish Moss Bend. Prior to the creation of the Tarpley Cut-Off, Spanish Moss Bend was the thalweg, or the deepest part, of the

navigable river — going around the westerly side of Luna Bar. The extent of the westward migration of the river is disclosed by examination of two black lines proceeding through Luna Bar, agreed to be the meander lines of the river in 1823 and 1830, respectively. Those who prepared Exhibit 1 in 1935 located the interstate boundary line as being in Spanish Moss Bend, and portray Luna Bar as being a part of the State of Mississippi. The delineations and identifications on this map substantially sustain the contentions of Mississippi in this litigation. Exhibit 1 is entitled "Refuge Ark-Miss 1939" and is identified as being the product of the War Department, Corps of Engineers, and recites that it was "Prepared under the direction of the President, Mississippi River Commission." None of those who made the underlying surveys and prepared Exhibit I appeared as witnesses in this case. I emphasize that this exhibit was completed and became an official record of the Corps of Engineers years before contest over the correct interstate boundary came into existence. Experts called by Arkansas made no attempt to expose any fault in Exhibit 1, or to impair its corroborative worth, other than to say they considered it to be erroneous. I consider it as very strong, though not conclusive, evidence supporting the claims of Mississippi. A witness called by Mississippi, Austin B. Smith, prepared Exhibit 2 [Appendix B] which is substantially a duplicate of Exhibit 1. Attached to Exhibit 2 is an appendix setting out the exact courses and distances of the line that the plaintiff claims is the correct interstate boundary. Such Exhibit 2 and its appendix are attached as part of this report.

The cause of the western migration of the Mississippi River is a question of fact, resolution of which will be dispositive of this lawsuit. This question has twice been

resolved in private litigation in favor of the claim of Mississippi. In *Anderson-Tully Company* v. *Walls*, 266 F. Supp. 804 (N.D. Miss. 1967), the late Judge Claude F. Clayton of the United States Court of Appeals for the Fifth Circuit, then a District Judge, wrote an extensive and able opinion setting out the applicable law and resolving whatever issues of fact were presented by the evidence. He found that Luna Bar was initially alluvial land created by gradual accretion to the Mississippi side of the river. The law is undisputed that if such is the case, the land so formed becomes, and remains, a part of the state upon whose side of the thalweg of the river the accretion took place. If in this process the river's thalweg moves, the new location of the thalweg becomes the interstate boundary. It is agreed that construction of Tarpley Cut-Off in 1935 was a man-made avulsion and, as such, did not effect any change in the interstate boundary. Judge Clayton's decision was not appealed.

The brief of the State of Mississippi correctly states the applicable rules as follows:

> "Both states agree to the legal principle that when a navigable river constitutes the boundary between two states, the middle of the main channel of the stream constitutes that boundary. This 'middle of the main channel' has been variously defined as the thalweg or the sailing channel, being that channel customarily followed by navigation.
>
> "Both states also recognize the rule of law that where the course of a boundary stream changes through the operation of the gradual processes of erosion and accretion, that the state boundary follows the stream and remains in the varying center of the navigable channel.
>
> "Both states, we understand, also concede that

> where a boundary stream suddenly abandons its old bed and seeks a new one, such change, termed in the law 'avulsion', works no change in the boundary, but in such instance the boundary remains fixed in the middle of the old navigable channel when it last ceased to be a flowing stream."

Arkansas concedes the validity of the foregoing and in its brief here, observes:

> "The evidence presented by the State of Mississippi certainly raises a presumption that the thalweg of the Mississippi River migrated westward, erasing the intervening land, thereafter forming accretions to Carter Point, Mississippi."

With this concession, and it is a correct one, the burden was on Arkansas to overcome the evidence supporting Mississippi's position and establish that the final position of the Mississippi River in Spanish Moss Bend was the product of an avulsion — a sudden "jumping" of the river to establish, enter, and thereafter to flow in a new channel. Arkansas' concession of a presumption that Luna Bar came into being as a result of accretion was recently reasserted by the Supreme Court of Arkansas in the case of *Pannell* v. *Earls,* 483 S.W. 2d 440, 442 (1972), where the Court said:

> "A riparian owner of land in Arkansas who undertakes to prove Arkansas title to land on the east shore of the Mississippi River, has a considerable burden in proving that the land was severed from Arkansas by sudden avulsion. This is true because there is a strong presumption in favor of the permanency of land boundary lines. See Wyckoff v. Mayfield, 130 Or. 687, 280 P. 340 (1929), 9 C.J. §300. Furthermore, *when land lines are altered by the movement of a stream, the weight of authority, both state and federal, appears to recognize a strong presumption, founded on long experience and observation, that*

> *the movement occurs by gradual erosion and accretion rather than avulsion.* United States Gypsum Co. v. Reynolds, 196 Miss. 644, 18 So. 2d 448 (1944); Darthmouth College v. Rose, 257 Iowa 533, 133 N.W. 2d 687 (1965); Kitteridge v. Ritter, 172 Iowa 55, 151 N.W. 1097; Bone v. May, 208 Iowa 1094, 225 N.W. 367." (Emphasis supplied.)

The earlier case of *Arkansas Land and Cattle Co.* v. *Anderson-Tully Co.,* 452 S. W. 2d 632 (1970), involved the same issue as is before me. It was an action by an Arkansas land owner to quiet title to most of the land known as Luna Bar. The defendants, claiming that Luna Bar was in Mississippi, moved to dismiss the suit on the ground that the Arkansas Court was without jurisdiction of the subject matter. The trial court in Chicot County, Arkansas, took extensive evidence on the conflicting claims and sustained the motion of the defendants on the ground that Luna Bar was in fact in Mississippi and that the Arkansas court was without jurisdiction. The Supreme Court of Arkansas reversed the trial court by a four to three decision on the ground that the trial court should reconsider whether the Mississippi claimant to Luna Bar had clearly met its burden. It considered that such court had failed to give adequate consideration to the testimony of one James P. Spillers, an expert called by Arkansas. The majority opinion of the Arkansas Supreme Court recites Spillers' position[1] to be:

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[1] At the trial before the undersigned Special Master, the witness Spillers testified that the avulsion which caused the Mississippi River to "jump" to a new channel severing Luna Bar from the mainland of Arkansas, was a single event occurring some time between 1871 and 1872. In the Arkansas trial, as recited by the majority for the Arkansas Supreme Court, Spillers said that the change in the river channel was accomplished, by avulsion, over a period of twelve years from 1862 to 1874. This theory does not fit the sudden avulsion now claimed.

> "[T]he formation of Luna Island could only have been the result of an avulsion of the Mississippi River *between 1862 and 1874* rather than of the gradual process of erosion and accretion, and that the island is a remnant of the Arkansas mainland to which there have been accretions." 452 S.W. 2d at 639. (Emphasis supplied.)

Such majority opinion ends with a remand to the trial court "for further proceedings." Such cause was pending in the Arkansas trial court when this suit was started as an original action in the Supreme Court. A stay of the Arkansas proceedings was granted until the decision here is rendered, it being agreed that:

> "The Supreme Court of the United States is the only forum to settle this dispute, fix the boundary line between the states, and determine finally the rights of the parties. See *Florida* v. *Georgia,* 17 How. 478 (1855); *Oklahoma* v. *Texas,* 258 U.S. 574, 66 L.Ed. 771, 42 S.Ct. 406 (1922); *Texas* v. *Florida,* 59 S.Ct. 563, 306 U.S. 398, 83 L.Ed. 817, 121 ALR 1179 (1939)." (Orig. brief of Miss. in S. Ct. p 12).

In all of the trials which involved the basic question as to the location of Luna Bar, Arkansas relied upon two general lines of proof. First, there was testimony by foresters produced by Arkansas purporting to establish that there was evidence of timber growth on Luna Bar of such antiquity that such bar must at one time — an ancient time — have been a part of the mainland of Arkansas, and that after its violent separation therefrom, accretions then expanded Luna Bar to its present size. With some variations and additions, testimony as to the vegetation and the trees and the evidence of their antiquity was repeated to me as Master. Most of this evidence was before Judge Clayton in the United States District Court, and before the Chancellor in

the trial in Arkansas. Of this Judge Clayton said:

> "Defendants [Arkansas] made an earnest effort to refute the forestry evidence offered by plaintiff [Mississippi]. Within the area involved here their witnesses had located and taken pictures of eight trees (a sycamore, ash, pecan, mulberry, hackberry (2), box elder and sweet gum), which were claimed to be of such sizes and ages as to be incompatible with the theory of plaintiff as to the age of the bar and the development of the forest growth thereon, since it takes about 50 to 70 years for the pioneer forest to mature before the secondary species takes hold. The existence of hardwood trees on the bar was established by other witnesses for the defendants. However, the ages of these trees which could be established from a ring count was consistent with plaintiff's theory and the location of the other trees in the disputed territory is not at all inconsistent with the progressive development of a forest on lands such as those in dispute here. It must be borne in mind, as aforementioned, that there always is some overlapping between pioneer and secondary species and between secondary and tertiary or climax species. It is not at all unusual, especially where openings occur in a pioneer forest through logging operations or otherwise, for seeds of the secondary and tertiary species to be washed in, take hold, and grow.
>
> "In sum, the weight of the evidence as to vegetation is that the bar is overwhelmingly composed of the pioneer species, but with scattered isolated trees of the secondary group, and an occasional young tree of the climax species." 266 F.2d at 810.

The Supreme Court of Arkansas said:

> "Considerable significance is accorded by both parties to findings of foresters as to vegetation, its

> age and history. We agree with the chancellor that no weight can be accorded to this testimony because it and the interpretations given it are in such conflict that it is inconclusive. It would not be possible to say, on the present record, that a chancellor's finding on this important factor was against the preponderance of the evidence. If the trial court's findings had rested on this factor, we could only affirm its decree." 452 S.W. 2d at 640.

I was not persuaded that the evidence before me was of such additional weight as to impair the quoted findings of Judge Clayton. I think it is right to set out here the findings of fact that were made by the Arkansas Chancellor.

> "1. The area occupied by Luna Bar was within the boundaries of Sections 9 and 16 owned by appellant when the United States Government Survey dated January 13, 1825, and certified June 18, 1823, was made.
>
> "2. Luna Bar appeared in the river sometime between the year 1862 and the years 1872-74.
>
> "3. The thalweg, or sailing channel, of the Mississippi River lay west of Luna Bar for more than 40 years prior to 1961.
>
> "4. That the proof is insufficient to show that the Mississippi River 'land jumped' and left Luna Bar isolated from appellant's lands remaining in Sections 9 and 16 on the mainland.
>
> "5. That the thalweg or sailing channel west of Luna Bar existing from 1872/74-1935 came into existence, by reason of erosion and accretion." 452 S.W. 2d at 634.

The majority opinion in the Supreme Court of Arkansas went on to say:

> "We find ample testimonial support for the first

> two of the chancellor's findings listed above. As a matter of fact there seems to be little controversy on these points. Insofar as the other findings are concerned the critical question depends upon location of the river channel between 1861 and 1872/74 and the means by which any change of location was accomplished." 452 S.W. 2d at 635.

The testimony at the hearing before me relevant to vegetation and age of trees was, as far as I can tell, reasonably comparable to the earlier cases. Mississippi presented forestry experts who described the forest on Luna Bar as one predominantly made up of pioneer species of trees with small scattered areas of secondary and climax trees. The age of the trees as given by these witnesses is consistent with the first appearance of growth on Luna Bar as depicted by the early Mississippi River Commission Charts. These charts showed Luna Bar to be a barren sand bar, with no vegetation.

Arkansas took the position that the stand of trees on Luna Bar was composed of second generation trees that had sprouted from stumps that had been killed off by flooding and deposits of alluvium that covered the ring collar of these once live trees, killing only the tops. However, Arkansas' forestry experts did concede that an actual forest does not have to follow a set timetable and that trees of the secondary and climax species can begin to grow along with those of the pioneer species. At the current hearing several pieces of wood were identified as, together, constituting a tree stump that one of Arkansas' forestry witnesses said had been found "in place" on part of Luna Bar. That is to say, it was dug out of what was claimed to be its place of growth as a living tree. Part of the stump was given to a nuclear physicist, Dr. Iddings of the faculty of Loui-

siana State University, who, by letter admitted in evidence, said:

> "The wood sample you have recently made available to me (identified as mulberry from island) has been dated using the method of Noakes, et al. The age of the wood is 555 plus or minus 180 years."

I point out that Dr. Iddings made no attempt to support Arkansas' claim that the involved wood was in fact taken from a tree that had its place of birth and growth in the soil of Luna Bar. One of Mississippi's experts was recalled and pointed out that at the point where this stump was allegedly found in 1972, the elevation of Luna Bar was at least 10 to 15 feet above what it was in 1882. Therefore, a tree of the antiquity of the one in question would have been deep in the undersoil of Luna Bar and not on its surface at the recent time of its claimed removal from Luna Bar. It was the position of Mississippi that various stumps found on Luna Bar and Spanish Moss Bend had been brought there by flood waters. Its position in such regard was sustained by the courts heretofore considering the matter. I do likewise.

At the hearing before me, Mississippi produced various experts to sustain its position. Dr. Charles R. Kolb is Chief of the Geology Branch of the Waterways Experiment Station. He is a resident of Vicksburg where the Research Laboratory of the United States Corps of Engineers is located. He presented an impressive academic background —a graduate of Louisiana State University, a Bachelors Degree in Science with a major in geology and a minor in soil mechanics. He took additional studies at Purdue University, the University of California at Berkley, at George Washington University in Washington, D.C. He obtained a B. S. Degree from LSU in 1948 and his M. S. in 1950 after

working at various jobs having to do with geology. He got his Ph. D. from LSU in 1960. Substantially all of his studies and work were in the science that is controlling here. His present position as Chief of the branch of the U. S. Corps of Engineers at Vicksburg, having primarily to do with the Mississippi River Delta, gives strength to his qualifications to express an opinion in the contest before me. His research extended back to, and included, materials having to do with the history of the Mississippi River from the beginning of the 19th Century — historic maps, former geological studies of the area, and his own on-the-ground examination. This witness' testimony reduced to its essentials, was that Luna Bar was formed in keeping with the geological history of the Mississippi River Delta which he described as a meandering alluvial stream. He said:

> "A stream such as the Mississippi and many other alluvial streams, if you straighten it, will begin to develop a sinuous pattern in very short order. It will begin to cut at one bank and to fill at the point opposite that bank." [Tr. 266]

Supported by drawings made from his studies of the Mississippi River, he further said:

> "It [the flowing water of the river] cuts at that concave bank [the Arkansas side of the river] you see there and it builds at the Point Bar. [Luna Bar was identified as a point bar.] In other words, there are accretions that form at that Point Bar and as it builds out the opposite bank, the concave bank, retreats toward the left [the Arkansas bank]." [Tr. 267]

There was no disagreement that over the history of this area the force of the Mississippi was always against the Arkansas bank, which would be conducive to a caving away of such bank. The alluvium that accreted to what is identi-

fied on all the maps as Carter Point was not from the cavings of the Arkansas bank. The soil in the form of alluvium was carried downstream and was deposited at points below the area we deal with. The alluvium which attached to Carter Point would more likely come from cavings above it, carried down to Carter Point in the flow of the river. I see no point in attempting a full and scientific analysis of Dr. Kolb's testimony. His was a simple and clearly worded account of the formation of Luna Bar and was consistent with the changing course of the river and the alluvial deposits and accretions that formed the so-called "bars" throughout the alluvial delta of the Mississippi River. The word "bar" is a word of art in the relevant science and has over the history of the Mississippi River been applied only to formations that are the consequence of the accretive process described by the witness and, consistent with the law earlier set out, there is a presumption that such a formation as Luna Bar was an accretion to the side of the thalweg of the river upon which it forms. Perhaps because of their awareness of this, Arkansas avoided using the word "bar" and at all times referred to the area in question as Luna *Island.*

While on Exhibit 1 Luna Bar appears to be separated by a body of water or stream between the bar and the mainland of Carter Point, the existence of this was fully explained by Dr. Kolb to be the result of some scouring out of the alluvial formation at flood time[2]. It was shallow and not navigable. The records examined by Dr. Kolb establish that

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[2]Dr. Kolb in Plaintiff's Exhibit P-75 depicts the thread of maximum surface velocity during a flood stage of a river. Such velocity as shown is hard against the convex bend and as a direct result helps the river to shorten its course during such flood stages by way of neck cut-offs and chute cut-offs.

at all times before construction of Tarpley Cut-Off this pointway channel was shallow, whereas the deep and navigable part of the river was against the Arkansas side in Spanish Moss Bend.

As to the contention of Arkansas that Luna Bar came into being in 1872 as the result of an avulsion — a sudden and violent shift in the location of the deep or navigable part of the river — Dr. Kolb went on to say that while there have been avulsions in the Mississippi River Delta, they came about where the river cut through a neck of land, thus shortening its course. He said that what Arkansas' proofs claimed to be an "outside avulsion" was wholly unknown in the history of the river. He said:

> "One of the things I think I should stress in this business of outside avulsions * * * because many of the things I have to say are directed at this particular contention, if you will, of the State of Arkansas that Luna Bar was formed by what I would call an outside avulsion. I had to actually dream up the term because in my twenty-five years of experience with the river I don't know of a situation where the river actually left the main course and avulsively — suddenly — changed, went through the outside bend and then reentered that outside bend, lengthening its course. You see, when it does that it lengthens its course. All the avulsions I know of — and there have been literally hundreds, perhaps even thousands, throughout the Mississippi River — have all happened when the river shortened its course by cutting across through a bend, a neck, a narrow neck of land." [Tr. 268]

Dr. Kolb rather forcibly reiterated his contention in this regard as follows:

> "I said the words 'outside avulsion' is something, I guess, I coined. I don't remember anyone else using

> that, it isn't in the geologic literature. No one has ever conceived, to my knowledge, such a thing occurring." [Tr. 269]

He asserted that an outside avulsion was impossible.

Supportive of Mississippi's contention, Dr. Kolb's studies of geological and unchallenged government records disclosed that from the first time that the relative elevations of the Arkansas side of the river and that of Luna Bar were recorded, the Arkansas bank was 128 feet M.S.L., whereas until fairly recent times Luna Bar was much lower at 113 feet M.S.L[3]. This conflicts with Arkansas' claim that Luna Bar had a beginning as a piece of the mainland of Arkansas, separated from such mainland when the river avulsively formed a new channel leaving a piece of Arkansas mainland as an island in the river which then grew by accretion. The present elevation of Luna Bar is the result of gradual building which was still continuing as of 1925, but ceased, according to the M.R.C. Surveys, in the late 1930's.

Dr. Kolb included in his investigation a comprehensive study made by the late Dr. H. H. Fisk, then of the faculty of Louisiana State University, published in 1944. The eminence of Dr. Fisk as a geological authority upon the history of the river is not questioned. The study portrays the sinuous meanderings of the Mississippi River over many centuries. Some of this study was, of course, speculative, but was based upon unchallenged assumptions. Some of the

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[3] The first hydrographic survey of the Mississippi River in the area in question is Mississippi River Commission [M.R.C.] Chart 39, 1879-80, Plaintiff's Exhibit P-30. The references to elevation on this and later charts is in terms of Memphis Datum which is approximately 6.9 feet greater than Mean Sea Level. The change from Memphis Datum to M.S.L. occurred sometime after 1918.

portrayals of the Fisk study were plotted with the aid of soil borings disclosing the locations of so-called clay plugs, discussed below.

The position of Arkansas, in explaining how the Mississippi River was able to avulse into the position of Spanish Moss Bend in the year 1872, was that it then found an old, deep, but formerly abandoned channel on the Arkansas mainland which permitted the river to adopt it as a new channel then suddenly acquired. Using the Dr. Fisk study, Dr. Kolb testified that when a former channel is abandoned by the meanderings of the river, there are formed what Dr. Fisk identified as clay plugs, ranging from depths of 34 to 75 feet, occupying what had been the river's channel. Without this writer attempting geological exposition of Dr. Kolb's use of Dr. Fisk's study, the following exchange between Dr. Kolb and myself may be a fair summary of the significance of the reference to clay plugs:

> "THE MASTER: * * * Now, then, if at the time we begin this investigation when these two states became such, if this had been an avulsion after that, which reached over and embraced a part of Arkansas, then it is an important inquiry as to what is the nature of the soil in Luna Bar — if it is an entirely distinct species from that in Arkansas. That is what you are saying.
>
> "A. That is precisely what I am saying. In other words, this area here does not show a continuation of this plug that has now been cut off by outside avulsion. There is no such plug shown here on Luna Bar. This is essentially what I would like to show in the next two exhibits." [Tr. 314]

Dr. Kolb further summarized his rather extensive testimony as follows:

> "Could I summarize in this way: That all of the

geological studies that have been published and the one that was unpublished, indicate that Luna Bar is simply a part of accretionary topography attached to Carter Point and that it has been accretionary deposit throughout its history." [Tr. 316]

At the conclusion of his direct testimony, Dr. Kolb summarized his conclusions and gave the reasons he assigned in support of them:

"1. Luna Bar is one of the many detached Point Bars which form as a part of the normal accretion to Point Bars at migrating meander loops along the Mississippi.

"2. No avulsion of the course of the river was involved in its formation.

"3. The only avulsion which affected the Luna Bar area was the one which resulted from Tarpley Cut-off made by the Corps of Engineers in 1935. This avulsion fixed the boundary between Arkansas and Mississippi along the pronounced thalweg in Spanish Moss Bend west of Luna Bar.

"4. All published geologic studies which include Luna Bar indicate it to be a Point Bar deposit formed by normal accretion to a convex bend of the river.

"5. A study of available mass indicates that Luna Bar came into existence sometime between 1864 and 1872. The first location of Luna Bar was upstream and east of its present position. Accretions have continued to form on the west side of Luna Bar.

"THE MASTER: Doctor, will you go back: You said Luna Bar came into existence between what years?

"A. 1864 and 1872.

"6. The thalweg of the channel was west of Luna Bar and hard against the Arkansas bank throughout the history of active bend development.

"7. There is no evidence that an outside avulsion occurred which isolated a portion of Luna Bar and left it untouched by subsequent river migration. Arguments against such a possibility are:

(a) Outside avulsions are not known to occur on the Mississippi River and, to my knowledge, have not occurred on other meandering rivers.

(b) Avulsions always shorten rather than lengthen the path of the river. They are initiated during flood flows when the thread of greatest surface velocities hugs the convex rather than the concave side of the bend. Accretions to Point Bars lengthen the path of the river; avulsions shorten this path.

(c) An outside avulsion, if such were possible, would have required the free existence of a channel capable of carrying low water flow out of the main channel at one end and back into the main channel at the other. Such a channel would have had to be so well established and prominent that it would have been recorded on the maps of that time. No such channel is shown on existing maps. Moreover, the avulsion would have had to cross the prominent natural levee on the Arkansas bank and somehow reenter the Mississippi through this natural barrier.

(d) The outside avulsion at Luna Bar was supposed to have occurred between 1864 and 1872. The 1872 map shows a full channel with no middle bar at this point. The lower tip of the then recently formed Luna Bar was upstream of the area under contention, and a considerable distance upstream from the lower tip of the present Luna Bar.

"And finally,

(e) If an outside avulsion had occurred, it would have left behind a segment of the old flood plane which had once been the Arkansas bank. The eleva-

> tion of the flood plane here, or the Arkansas bank here, is on the order of 135 feet Mean Sea Level. Comparison of bank line and Hydrographs shows that in 1872 the area under contention was near the deepest part of a full flow channel, and from 1882 to 1913, Luna Bar had built to an elevation of only about 123 feet above Mean Sea Level." [Tr. 354-357]

No cross-examination of Dr. Kolb was attempted.

He was a qualified and impressive witness and I rely on his conclusions to support by factual findings hereinafter detailed.

Another witness called by Mississippi to support its contentions was Austin B. Smith, an engineer in private practice, presently living in Vicksburg, Mississippi. He described himself as a potamologist. His qualifications were challenged here as they were when he was a witness at the United States District Court trial and the hearing in the Arkansas Chancery Court. Both of these courts accepted him as an expert and such ruling was approved by the Supreme Court of Arkansas. I likewise recommend his acceptance as such in this case.

Austin B. Smith was a 1930 graduate of the University of Arkansas in Civil Engineering, with a minor in geology. Following graduation, Smith worked for a brief period for the Missouri Highway Department and beginning in August of 1930, the year of his graduation, he became connected with the United States Corps of Engineers at Vicksburg, Mississippi. In 1935 he went to work for the Mississippi River Commission and remained with them some thirty-five years, when in 1970 he elected to enter private practice.

Notwithstanding the failure of Mr. Smith to pursue the acquisition of further degrees — doctorates and the like

— as is the wont of recent times — in this writer's view his work experience presents values whereby to measure his relevant qualifications, at least equal to possession of further academic honors.

I set out in detail some of his work experience because of its special relevance to the technical problems of the case before me and because of my herein expressed confidence in its value in the resolution of this contest. He returned to Vicksburg in 1930 and was assigned to the Hydraulic Branch of the Corps of Engineers. He then went into the Soils Laboratory, and then into the field office at Lake Providence, Louisiana. There he worked on Hydraulic Surveys, dredging and other field activities such as revetment surveys and the construction of pile dikes. In 1933 he was transferred to the Vicksburg office of the U.S. Corps of Engineers in the dredging and navigation branch. In 1934 the Corps was engaged in enlarging the levees and in making cut-offs on the Mississippi. In 1935 he was transferred to the Mississippi River Commission. This Commission has jurisdiction of the Mississippi from Hannibal, Missouri, to the Gulf of Mexico. Smith was first an assistant to the Chief of Hydraulics, then became Chief of the Dredging and Navigation Branch.

He said that potamology is the science of rivers. In 1942 Smith was appointed to the first Potamology Board of the Mississippi River Commission. He was responsible for review of the specifications for the construction of the Memphis, Vicksburg, Greenville and Baton Rouge harbors. He was a Fellow of the American Society of Civil Engineers, a member of the Mississippi Society of Professional Engineers, the National Society of Professional Engineers, the Society of American Military Engineers, a member of the Permanent International Association of Navigation

Congresses and the American Congress of Surveying and Mapping and is listed in Who's Who in Engineering. He said he worked on the Mississippi River some 40 years and had become acquainted with every phase of action of the river such as cut-offs, bar building, bank cavings and sedimentation.

Aside from formal objection that Smith was not a qualified expert, no challenge was made by Arkansas to the correctness of the above recital of his experience.

The witness Smith went on to account for the formation of Luna Bar as an accretion to Carter Point, a large land mass lying to the east of Luna Bar and appearing on Exhibit 1, attached hereto. Smith's testimony was that over the years that followed 1823 and 1830, the force of the flow of the Mississippi in the involved area was against the Arkansas bank and there was much caving of the Arkansas bank with the consequent migration of the river westerly and a contemporaneous accretion to Carter Point on the Mississippi side and the ultimate formation of Luna Bar. On Exhibit 1 there appears a body of water between Carter Point and Luna Bar. Witnesses referred to this as a pointway channel in contrast to the main course of the river, which is called the bendway. Here the bendway is identified as Spanish Moss Bend. The witness Smith testified that the thalweg of the Mississippi was, at the time Spanish Moss Bend ceased to be navigable, along the dotted line around Luna Bar as shown on Exhibit 1, and that since the creation of the Tarpley Cut-off in 1935 the pointway on the east side of Luna Bar and the bendway on the west, Spanish Moss Bend, are filling up and are no longer navigable. He testified that the water appearing between Luna Bar and Carter Point was no doubt the result of some scouring out of the accreted sand bar and

that at various times in history Luna Bar was attached to Carter Point above the surface of the water by land. This is portrayed by Exhibit P-33, [Appendix C] attached hereto.

Smith's account of the migration of the Mississippi to the west, cutting away the river bank on the Arkansas side and the beginning and ultimate alluvial formation of Luna Bar, was in no sense a speculative theory. He supported his account of the caving of the Arkansas bank of the river by government records which recorded such cavings and the problems that they presented in protecting navigation of the Mississippi. Based upon his own study of government records and recorded Mississippi River history, he prepared an exhibit — Plaintiff's Exhibit 6. On this he showed the westerly line of the Mississippi River in 1823 at a time that the river formed the boundary between Arkansas and Mississippi, and showing the westerly migration of such line, as of various later dates to and including the year 1894. I mention again that the portrayals on the exhibit were not scientific speculations, but were his portrayal of what government, and other, records justified. The authenticity of the records consulted by Smith is not challenged. It was not claimed by Smith that the accretions to Carter Point were made by the material from the cavings in Spanish Moss Bend, but were from upstream caving at places such as Miller Bend and elsewhere, and these caved materials attached and accreted to Carter Point. In the early history of the river there was no such bifurcation of the river as appears on Exhibit 1 — the 1939 map prepared by the Corps of Engineers, and the so-called pointway immediately adjacent to Carter Point came into being, as set out above, as a result of some scouring out of the alluvial accretions to Carter Point.

Arkansas' position is that Luna Bar is made up of a piece of the mainland of Arkansas that was cut off therefrom by an avulsion that occurred as a single sudden event between the years 1871 and 1872, with some accretions to such severed piece of Arkansas. It is true that the most distinct evidence of the appearance of Luna Bar as an accretion to Carter Point appeared upon a map of 1872. However, the witness Smith produced a map identified as Lloyd's 1863 map, which shows point bar accretions attached to Carter Point. This is attached hereto—Pl. Ex. 17, [Appendix D] without its certification. Smith interpreted such disclosure as the genesis of the formation that later became Luna Bar. The witness Smith in his research also consulted documents in the New York Public Library and produced a series of documents identified by their publishers as:

THE

WESTERN PILOT,

CONTAINING

CHARTS OF THE OHIO RIVER,

AND OF THE

MISSISSIPPI

FROM THE MOUTH OF THE MISSOURI TO THE GULF OF MEXICO,

ACCOMPANIED WITH

DIRECTIONS FOR NAVIGATING THE SAME,

AND

A DESCRIPTION OF THE TOWNS ON THEIR BANKS, TRIBUTARY STREAMS, &c.

ALSO

A VARIETY OF MATTER INTERESTING TO ALL WHO ARE CONCERNED IN THE NAVIGATION OF THOSE RIVERS.

BY SAMUEL CUMMINGS.

CINCINNATI:

MORGAN, LODGE AND FISHER, PRINTERS.

1825.

Except one which is called James' River Guide, all of these show the forming of point bars along the meandering shores of the Mississippi. The entitlement of these documents, set out above, makes clear their purpose was to aid the river pilots in navigating the river. Whether the portrayed accretions had appeared above the surface is not stated, and more than likely they did not, but their existence would of course be a hazard to navigation. The river pilots were properly warned of their existence whether above or below the surface of the water. Attached hereto are plaintiff's Exhibits 7 to 11 without inclusion of their titles and certifications, [Appendices E, F, G, H, and I]. They indicate that they were published in Cincinnati, Ohio in the years 1825, 1834, 1841, 1847, and 1856. On some of them the location of Carter Point, the Mississippi land to which Luna Bar is an accretion, was identified by the witness Smith.

As a trier of the fact it is not necessary for me to totally destroy the validity of Arkansas' hypotheses. The burden of persuasion was upon Arkansas and the quite speculative character of the reasoning of its witnesses leaves me unpersuaded. I would come to this conclusion even if the burden of proof was not on Arkansas.

Smith also examined the disclosures of public records from 1872 to recent years and concluded that they supported Mississippi's other witnesses that the vegetation and trees on Luna Bar were consistent with its creation and development as an accretion to Carter Point. These maps depict Luna Bar as a sand bar, devoid of any vegetation. While his general testimony included, in part, his interpretation of the significance of the disclosures of his research, such interpretations were not impaired by cross-examination and were opposed only by the speculative hy-

potheses of Arkansas' witnesses Spillers and Durham, hereinafter discussed.

I find that Smith was a credible, qualified and persuasive witness, and he provided weighty support to Mississippi's contentions as to the correct present boundary line between Arkansas and Mississippi. In my opinion he successfully opposed Arkansas' contention that the westward movement of the Mississippi River was the product of an avulsion.

A witness produced by Arkansas claimed to have observed physical evidence[4] that proved that there were, in early times, human habitations on part of Luna Bar, indicating that Luna Bar came into being as a piece of the mainland of Arkansas, severed therefrom by an avulsion. It is my opinion and holding that contrary evidence overcame the probative worth of such testimony and if a factual issue was made as to whether there was such early human habitation upon the beginning of Luna Bar, I resolve it against the contention of Arkansas.

Having in mind the rule of law that the burden of proof is on a landowner who attempts to claim land by reason that such land was severed from his original tract by a "sudden avulsion," *Pannell* v. *Earls,* 483 S. W. 2d 440, 442 (1972), I move on to consider Arkansas' evidence offered to support its effort to meet such burden. Arkansas' principal witness in this regard was James P. Spillers.

Mr. Spillers has an impressive academic background.

---

[4]The witness claimed that on an earlier visit to Luna Bar he remembered seeing the ruins of a chimney, but was unable to locate it on a return visit some years later. At the hearing, however, the witness was not at all certain that this so-called chimney ever existed. The other evidence that he relied upon to base his assumption that Luna Bar had been inhabited was the pattern of certain trees he described as not being native to the area and generally placed near dwellings.

In 1948 after World War II service in the United States Marine Corps, he received a B.S. Degree in geology from the University of North Carolina. After a period of private employment, in 1950 he entered Louisiana State University as a teaching assistant to the then Director of the School of Geology at that school. In 1952 he received a Masters Degree in geology from Louisiana State. He then was employed by Humble Oil Company as a surface geologist and in 1954 was transferred to Hattiesburg, Mississippi, to open a geological office for Humble. While there he taught for three years at the University of Southern Mississippi. His subjects were field geology, stratigraphy and paleontology, a study of ancient life. He mentioned other studies and activities supportive of his presentation as an expert. His qualifications were not challenged.

The witness Spillers' conclusion was that between 1871 and 1872 the Mississippi River jumped or avulsed from the river bed where it has been flowing for many years over onto the then mainland of Arkansas, found an ancient water course and thereafter adopted it as the main navigable channel of the Mississippi River. In this process, a large piece of the mainland of Arkansas was left on the east side of the river's main watercourse. It became, with some accretions, what is decribed in Exhibit 1 as Luna Bar. Notwithstanding my own effort to find in Mr. Spillers' testimony an understandable explanation of the existence, on the mainland, of an old, abandoned water course into which the river in 1871 or 1872 moved, I remain unconvinced that there was any adequate proof of Mr. Spillers' hypothesis that there was such a watercourse to accomodate the westward shift of the river. There was testimony as to the distance the river had moved westward from its position in 1823 to its location after the claimed avulsion

of 1872. Though there was some small disagreement, all of the proofs tended to establish the western bank of the river had moved westerly some 2000 feet from its position in 1823. Thus, if such change was not the product of a gradual migration, the avulsive jump of 1871 had to be of the magnitude of close to one-half mile. Notwithstanding Mr. Spillers' finding of a record that indicated that there was a so-called "great flood" about the time of the claimed avulsion, other records appear to negative the importance of the claimed "great flood."

I set out Mr. Spillers' explication of his theory. It is as follows:

> "My contention is this: That through those several devastating floods, not only high water stage, but as it went down, through a period of time, it cut that channel out, it had many opportunities, and as it came into full floom, the thalweg changed in 1871. That is where we noticed it, that the new thalweg was there. I think some scouring and some assistance was had, and it could have been helped by some of the floods of 1868, and really got in there and tore it up, and this flood of 1871 is where the thalweg came through, sir. I believe that to be the case. All of the factual evidence that I find on the ground, leads me to no other conclusion." [Tr. 929]

Of great importance to me in testing the believability and probative worth of Mr. Spillers' testimony is his concession that he had never heard or read of the occurrence of such a cataclysm as he asserted occurred between 1871 and 1872. The following occurred during his cross-examination by Mississippi counsel.

> "Q. We have talked about a neck cut-off and a chute cut-off; what in nomenclature do they call the type of cut-off you say has happened where the

Mississippi River leaves its bank and goes overbank, leaves its bed and goes overbank, coursing around and coming back into its former bed? What kind of cut-off is that?

"A. That type would be re-occupying a previous existing channel.

"Q. I am not familiar with the term; is that an accepted term in geology or alluvial work?

"A. I have no knowledge as to that particular phrase, no, sir.

"Q. Dr. Kolb testified that he had to coin a word and he coined a word, what did he call it?

"A. Outside avulsion.

"Q. Outside avulsion. What do you call it?

"A. I call it merely the reoccupying of a pre-existing lower channel.

"Q. That, too, is a coined phrase by you?

"A. The river has at different times reoccupied channels, sir.

"Q. I said that, too, is a coined phrase by you?

"A. It is my phrase, yes, I will say that is coined.

"Q. You didn't find it in any literature written on the subject?

"A. The words 'recoccupied channel'?

"Q. That phrase to describe this avulsive process you have talked about?

"A. I haven't researched the literature with that particular thought in mind.

"Q. With the little non-research you have done, you have not run across that phrase before?

"A. Outside avulsion, no, sir.

"Q. The phrase you used?

"A. Reoccupied the channel; I have heard of re-occupying a channel, yes, sir; perhaps not in the manner I described.

"Q. Describing in avulsion?

"A. An avulsion is something that happens within a reasonably sudden period of time.

"Q. Let me ask you again, Mr. Spillers: In the literature have you heard your description of this process used to apply to an avulsive process?

"A. I cannot recall one, sir." [Tr. 951-953]

The foregoing supports the testimony of Mississippi's witness Dr. Kolb who said that there have been avulsions on the Mississippi by which its course was shortened, but there is no history of the river lengthening its course as Arkansas here claims.

Mr. Spillers gave extensive testimony of borings that he had made on the adjacent mainland of Arkansas and on Luna Bar. He argued that the soil found by these borings supported his theory. He testified at great length to expose the relevancy of his findings. While this writer understood the words he employed, their corroborative worth as support for what he was claiming for them remained unclear. Mississippi's evidence disclosed that over the period prior to 1871-72, the westerly or concave bank of the river in the area involved had been caving and that such caving was a cause of concern to the government and efforts were made by construction of artificial levees to slow the progress of the caving. This testimony was supported by historical documents. Mr. Spillers and another Arkansas witness denied that such caving occurred at Spanish Moss Bend prior to the claimed avulsion. These Arkansas witnesses admitted that such cavings along the concave sides of the many curves of the river did take place at numerous other places and they gave no adequate explanation as to why the concave side of the river's curve around Spanish

Moss Bend had been exempted from such traditional process of a meandering river.

I have set out above that the word "bar" has a special significance as applied to the changing direction of the Mississippi. The Corps of Engineers identified the land mass claimed by Mississippi as the product of alluvial accretion as Luna Bar. Mr. Spillers characterized such usage as an error and he, as well as other witnesses called by Arkansas, appeared careful to refer to this area as Luna *Island*. I think it right to mention that Mr. Spillers and another Arkansas witness Dr. Durham frequently combatted exhibits inconsistent with their own hypotheses by assertions that the portrayals of such exhibits were inaccurate or completely erroneous. This disagreement was not limited to exhibits which were prepared for this lawsuit but extended to ancient documents which supported Mississippi's claim.

Arkansas also produced a Dr. Clarence O. Durham, Jr. At the time of hearing he was Professor of Geology and Director of the School of Geoscience at Louisiana State University. He presented a distinguished academic background. In the main, he supported the hypotheses and conclusions of Mr. Spillers. Respectfully, I find the same inadequacies in the probative worth of his testimony as I do in that of Mr. Spillers. Like the latter, Dr. Durham conceded the absence of any reference, in the entire history of the Mississippi River, to such an avulsion as Arkansas relies on in this litigation. He asserted that over its history — ancient and modern — the river had "seesawed" back and forth in its location. Notwithstanding that the river's history contains the record of the establishment by alluvial accretions of point bars and avulsions by which the river shortened its course, such history did not con-

tain any record of the event asserted by him — a so-called "outside avulsion." Dr. Durham's recognition that his conclusion was a departure from the traditional action of the river appears in his cross-examination:

> Q. So from your studies and experience, * * * you would normally expect a concave bend to cave materially into the river and you would normally expect that material to be carried downstream and deposited on the next point below?
>
> "A. Yes, sir.
>
> "Q. You have indicated that this did not happen in our situation in Spanish Moss Bend and, therefore, your whole hypothesis, as I understand it, is based upon an abnormal situation?
>
> "A. That is correct." [Tr. 1022-1023]

He joined the witness Spillers in his conclusion, stating:

> "So it is my interpretation, just viewing the maps, that there was an abrupt shift in the western bank line of the western channel in a one-year interval. In association with this, the island came into being." [Tr. 989]

He, like the witness Spillers, found it necessary to resort to charging error in various of the historical records put in evidence. The speculative character of Dr. Durham's conclusion is further portrayed by this examination:

> "Q. So we have no evidence of a depression on the ground from the government survey notes; we have no evidence of an overbank situation with waters coursing through this so-called swale, how did this avulsion take place, then, Doctor?
>
> "A. I would assume that the high waters scoured out the channel there which had been abandoned on the western side.
>
> "Q. So we start with one basic assumption that

it had to be high water, overbank high water, but you have not been able to establish that?

"A. No, sir.

"Q. We start with the second assumption that there had to be a low swale or former channel, as you expressed it, and you haven't been able to establish that?

"A. I have not, but using the same approach I wouldn't have been able to establish the swale that I can see out there today, the second one over, because these surveyors were not really surveying the topography, they were merely laying out section lines." [Tr. 1033-1034]

A key assumption of the Arkansas position is the alleged availability — in 1871 — of a former abandoned channel probably far to the west of the then Arkansas bank of the river; that about a half mile of the Arkansas mainland was "scoured out" by the rushing water of the river which suddenly became the main navigable channel of the Mississippi River. I find that Arkansas' proof failed to justify a finding that there was such an abandoned channel.

Arkansas produced some government documents in support of its claim that there was no movement or caving of the Arkansas side of the river prior to 1872. The scale of some of these maps was such that a mile would be 1/32 of an inch — about the size of a pencil point. Casting doubt upon the occurrence relied upon by Arkansas is the total lack of any reference to it in the many documents which record the history of the river in the area involved. Arkansas offered evidence to sustain a claim that there had been some habitations on Luna Bar, at some uncertain past time. One such piece of evidence was an aerial photograph taken in 1930. An Arkansas witness, claiming special

skill in reading such photographs, stated that he could observe a path which led to a once existing building indicative of early habitation of Luna Bar. The writer, claiming no special skill in this regard, but possessed of normal vision, could not find what the expert saw, even with the aid of magnifying equipment furnished by the expert.

If the central core of Luna Bar had once been part of the mainland of Arkansas, supporting some human habitation, and there came in 1871 the dislocation of the magnitude claimed by Arkansas, it is hard to believe that such event would not have been recorded in the history of the area. There was none, however.

I have not attempted a complete review of the testimony before me. It added up to six volumes of testimony containing 1152 pages and there were introduced in evidence upwards of 200 exhibits, principally official maps going back more than a century and drawings made therefrom.

I am aware that as Special Master it is not my function to render a decision. My duty is to make a report containing such review of the evidence as I consider justifies my findings of fact. I do not consider that to make the findings I do, it is necessary to totally destroy the validity of Arkansas' contentions. The burden of persuasion was upon Arkansas. Initially Arkansas conceded that Mississippi had met its initial burden, aided as it was by the presumption that the change in the thalweg of the river was the product of accretion. The quite special character of the reasoning of Arkansas' witnesses leaves me unpersuaded that it has met its burden of proof. I make clear also that I would come to this conclusion even if the burden of proof was not on Arkansas, but was on plaintiff Mississippi.

FINDINGS OF FACT

Accordingly, I make the following findings of fact:

1) The thalweg of the Mississippi River is in the abandoned bed of the Mississippi River between the upstream end of Tarpley Cut-off around Carter Point to the downstream end of Tarpley Cut-off around Carter Point as of June 1935 and since.

2) That such is and was the boundary line between the State of Mississippi and Arkansas and that all land in the area here involved lying easterly of the above defined line was and is a part of the State of Mississippi.

3) That Luna Bar is entirely the product of the gradual westward migration of the Mississippi River and that such migration was accomplished by the gradual alluvial accretion to Carter Point.

4) That the body of water appearing on Exhibit 1, and lying adjacent to the westerly side of Carter Point, is a part of the State of Mississippi, having come into being by some scouring out of the alluvial deposits which had accreted to Carter Point. It was and is properly identified as the pointway of the river.

5) That Luna Bar was not the product of an avulsion occurring between the years 1871 and 1872, or at any other times.

RECOMMENDED DECREE

In accord with the foregoing, I recommend the entry of the following decree:

It is ordered, adjudged and decreed:

1. The boundary line between the State of Mississippi and the State of Arkansas in the area here involved is as follows:

In the abandoned bed of the Mississippi River

between the upstream end of Tarpley Cut-off around Carter Point, encompassing Luna Bar, to the downstream end of Tarpley Cut-off, as defined and identified in Plaintiff's Exhibit 2. The courses and distances of the above-described line are set out in Appendix B which is made a part of this decree.

2. That Luna Bar, depicted in Plaintiff's Exhibits 1 and 2, came into existence by accretion to Carter Point and is, and was, a part of the State of Mississippi.

3. The cost of this suit, including the expenses of the Special Master and the printing of this report, have been paid out of a fund made up of equal contributions of the State of Mississippi and the State of Arkansas and has been sufficient to defray all of the foregoing expense. Any costs and expenses incurred beyond the amount so contributed by the respective litigants shall be borne by the State of Arkansas.

The foregoing is respectfully submitted.

Special Master

CLIFFORD O'SULLIVAN

Port Huron, Michigan
March 15, 1973

APPENDIX A

[Mississippi's Exhibit No. 1 — REFUGE ARK.-MISS. 1939 Edition]

EX-1

WAR DEPARTMENT
CORPS OF ENGINEERS

ARKANSAS-MISSISSIPPI
REFUGE QUADRANGLE
GRID ZONE "C"

ARMY MAP SERVICE, U. S. ARMY, WASHINGTON, D. C., 101058
1-49 1944

Prepared under the direction of the President, Mississippi River Commission.
Horizontal control by Mississippi River Commission and Corps of Engineers, U. S. Army, Vicksburg District.
Vertical control by Mississippi River Commission and Corps of Engineers, U. S. Army, Vicksburg District.
Descriptions, elevations and geodetic positions of bench marks may be obtained from Vicksburg Engineer District, Vicksburg, Miss.
Topography by Corps of Engineers, U. S. Army, Vicksburg District, 1930, 1936 and 1939.
Revised by Corps of Engineers, U. S. Army, Vicksburg District 1936.
Revised by Mississippi River Commission, 1937 and 1939.
Political boundaries are shown according to best available information, and are subject to change except where established by court decision.
Townships in Arkansas based on 5th Principal Meridian.
Townships in Mississippi based on Choctaw Meridian.
Work under Flood Control Act shown as of December 1939.
Polyconic Projection, North American Datum.

Scale $\frac{1}{62500}$

4 Miles · 7000 Yards · 18000 Feet · 5 Kilometers

Contour interval 5 feet

Datum is mean gulf level at Biloxi, Mississippi. Elevations differ from mean sea level elevations as determined by the U. S. Coast and Geodetic Survey, by small fractions of a foot. Persons interested may secure elevations of bench marks as determined by the latest U. S. C. & G. S. adjustment, by applying to the U. S. Coast and Geodetic Survey.

FIVE THOUSAND YARD GRID COMPUTED FROM "GRID SYSTEM FOR PROGRESSIVE MAPS IN THE U. S." ZONE C. U. S. C. & G. S. SPECIAL PUBLICATION NO. 59

THE STATE GRIDS ARE INDICATED FOR MISSISSIPPI, ZONE WEST BY ..... TICKS. FOR ARKANSAS, ZONE SOUTH BY —.— TICKS OUTSIDE NEAT LINE AT 10,000 FOOT INTERVALS.

Additional copies may be procured from
The President, Mississippi River Commission
Vicksburg, Miss. 20 cents per copy

TRUE NORTH · MAGNETIC NORTH · 1°10′ · $6\frac{1}{2}°$

APPROXIMATE MEAN DECLINATION 1935
ANNUAL MAGNETIC CHANGE 2′ INCREASE

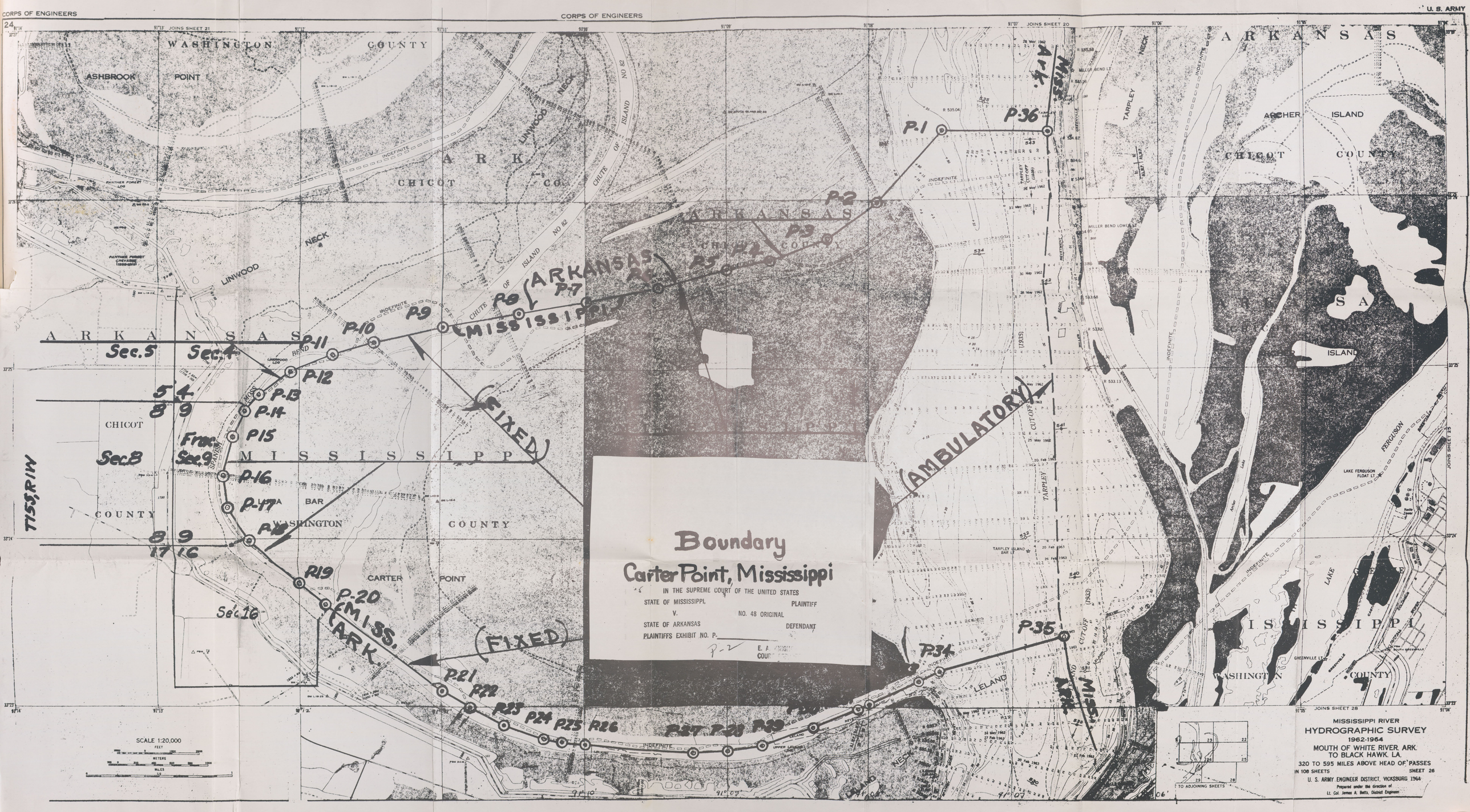
LEGEND

Levee		Levee mile post	LMP
Retards and dikes		Levee station	LS
Revetment		Towhead	TH
River Gage			

Distance below Cairo gage are shown at 5 Mile intervals.

ROUTES USUALLY TRAVELED
HARD IMPERVIOUS SURFACES
OTHER SURFACE IMPROVEMENTS
1939
U. S. ROUTE · STATE ROUTE

REFUGE ARK.-MISS.
EDITION OF 1939
N3315-W9100/15



Boundary
Carter Point, Mississippi

IN THE SUPREME COURT OF THE UNITED STATES

STATE OF MISSISSIPPI, PLAINTIFF

V. NO. 48 ORIGINAL

STATE OF ARKANSAS DEFENDANT

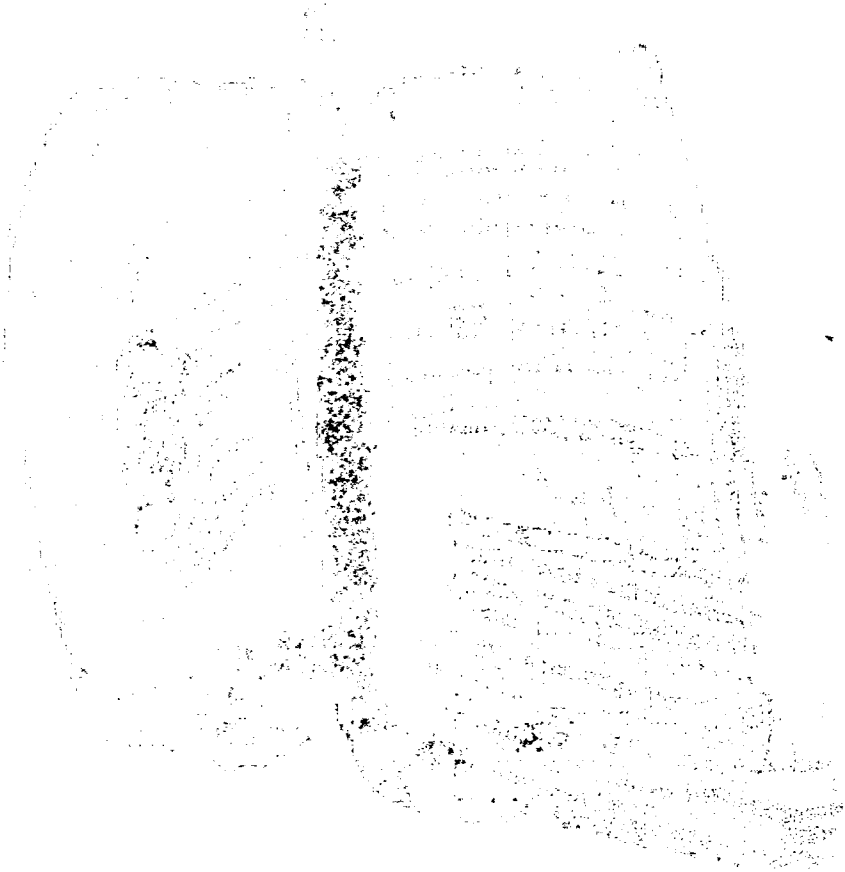
PLAINTIFFS EXHIBIT NO. P-2

E. A. [illegible]
COURT [illegible]

MISSISSIPPI RIVER
HYDROGRAPHIC SURVEY
1962-1964
MOUTH OF WHITE RIVER, ARK. TO BLACK HAWK, LA.
320 TO 595 MILES ABOVE HEAD OF PASSES
IN 108 SHEETS SHEET 26
U. S. ARMY ENGINEER DISTRICT, VICKSBURG 1964
Prepared under the direction of
Lt. Col. James A. Betts, District Engineer

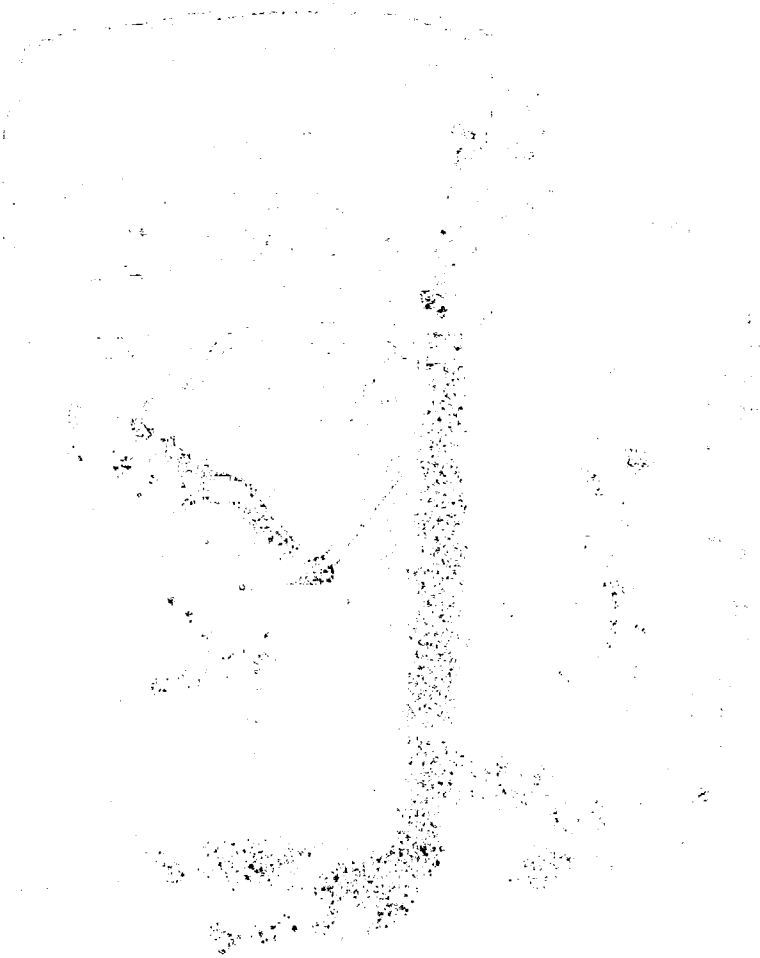
APPENDIX B

[Mississippi's Exhibit No. 2 — Mississippi River Hydrographic Survey 1962-1964 Sheet 26 with Appendix III of Mississippi's Exhibit No. 140]



APPENDIX B

[Mississippi's Exhibit No. 2 — Mississippi River Hydrographic Survey 1962-1964 Sheet 26 with Appendix III of Mississippi's Exhibit No. 140]



Thence southward to Point P-16, Lat. 33° 24' 23" and Long. 91° 12' 32";
Thence southward to Point P-17, Lat. 33° 24' 11.5" and Long. 91° 12' 30";
Thence southeasterly to Point P-18, Lat. 33° 24' 0.0" and Long. 91° 12' 21";
Thence southeasterly to Point P-19, Lat. 33° 23' 44.5" and Long. 91° 12' 0.0";
Thence southeasterly to Point P-20, Lat. 33° 23' 37" and Long. 91° 11' 49.5";
Thence southeasterly to Point P-21, Lat. 33° 23' 06" and Long. 91° 11' 0.0";
Thence southeasterly to Point P-22, Lat. 33° 23' 0.0" and Long. 91° 10' 48";
Thence southeasterly to Point P-23, Lat. 33° 22' 54" and Long. 91° 10' 34";
Thence southeasterly to Point P-24, Lat. 33° 22' 49" and Long. 91° 10' 18";
Thence eastward to Point P-25, Lat. 33° 22' 48" and Long. 91° 10' 10";
Thence eastward to Point P-26, Lat. 33° 22' 47" and Long. 91° 10' 0.0";
Thence eastward to Point P-27, Lat. 33° 22' 43.5" and Long. 91° 09' 14.5";
Thence eastward to Point P-28, Lat. 33° 22' 44" and Long. 91° 09' 0.0";
Thence northeasterly to Point P-29, Lat. 33° 22' 46.5" and Long. 91° 08' 45";
Thence northeasterly to Point P-30, Lat. 33° 22' 53" and Long. 91° 08' 24";
Thence northeasterly to Point P-31, Lat. 33° 23' 0.0" and Long. 91° 08' 04.5";
Thence northeasterly to Point P-32, Lat. 33° 23' 01.5" and Long. 91° 08' 0.0";
Thence northeasterly to Point P-33, Lat. 33° 23' 09.5" and Long. 91° 07' 40";
Thence northeasterly to Point P-34, Lat. 33° 23' 13" and Long. 91° 07' 31" (1956-57 live thalweg);
Thence northeasterly to Point P-35, Lat. 33° 23' 25" and Long. 91° 06' 39" at the foot of Tarpley Cut-off Channel.

APPENDIX III

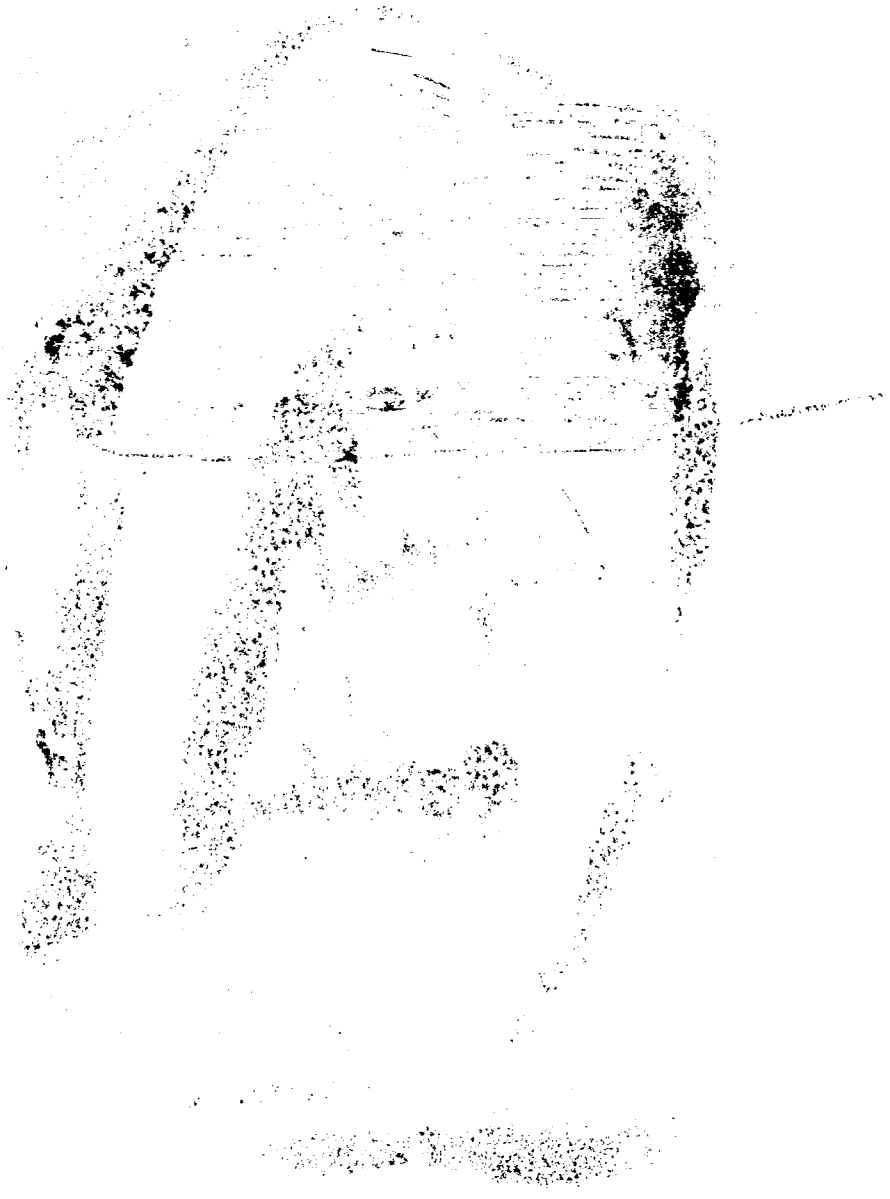
Arkansas-Mississippi State Boundary looping Carter's Point, including Luna Bar.

The following is a description, by geodetic positions (M.R.C. datum), of the Arkansas-Mississippi State Boundary looping Carter Point, Miss. west of Tarpley Cut-off Channel, including Luna Bar. This boundary, lying between Latitude 33° 22' 43.5" to 33° 26' 25" and Longitude 91° 06' 39" to 91° 12' 32", begins at the head of Tarpley Cut-off channel and runs westward, southward and eastward along the thalweg and last steamboat navigation course in the abandoned Spanish Moss Bend to the foot of Tarpley Cut-off channel.

The said Arkansas-Mississippi State Boundary is described as beginning at the head of Tarpley Cut-off Channel at Point P-36 at Latitude 33° 26' 24" and Longitude 91° 06' 46" (1963-64 Survey);
Thence west to Point P-1, Lat. 33° 26' 25" and Long 91° 07' 30";
Thence southwesterly to Point P-2, Lat. 33° 26' 0.0" and Long. 91° 07' 56";
Thence southwesterly to Point P-3, Lat. 33° 25' 47" and Long. 91° 08' 17";
Thence southwesterly to Point P-4, Lat. 33° 25' 40" and Long. 91° 08' 42";
Thence southwesterly to Point P-5, Lat. 33° 25' 36" and Long. 91° 09' 0.0";
Thence southwesterly to Point P-6, Lat. 33° 25' 30" and Long. 91° 09' 29";
Thence southwesterly to Point P-7, Lat. 33° 25' 25" and Long. 91° 10' 0.0";
Thence southwesterly to Point P-8, Lat. 33° 25' 21" and Long. 91° 10' 28";
Thence southwesterly to Point P-9, Lat. 33° 25' 16" and Long. 91° 11' 0.0";
Thence southwesterly to Point P-10, Lat. 33° 25' 10" and Long. 91° 11' 29";
Thence southwesterly to Point P-11, Lat. 33° 25' 06" and Long. 91° 11' 46";
Thence southwesterly to Point P-12, Lat. 33° 25' 00" and Long. 91° 12' 04";
Thence southwesterly to Point P-13, Lat. 33° 24' 52" and Long. 91° 12' 17";
Thence southwesterly to Point P-14, Lat. 33° 24' 46" and Long. 91° 12' 23";
Thence southward to Point P-15, Lat. 33° 24' 37" and Long. 91° 12' 28";

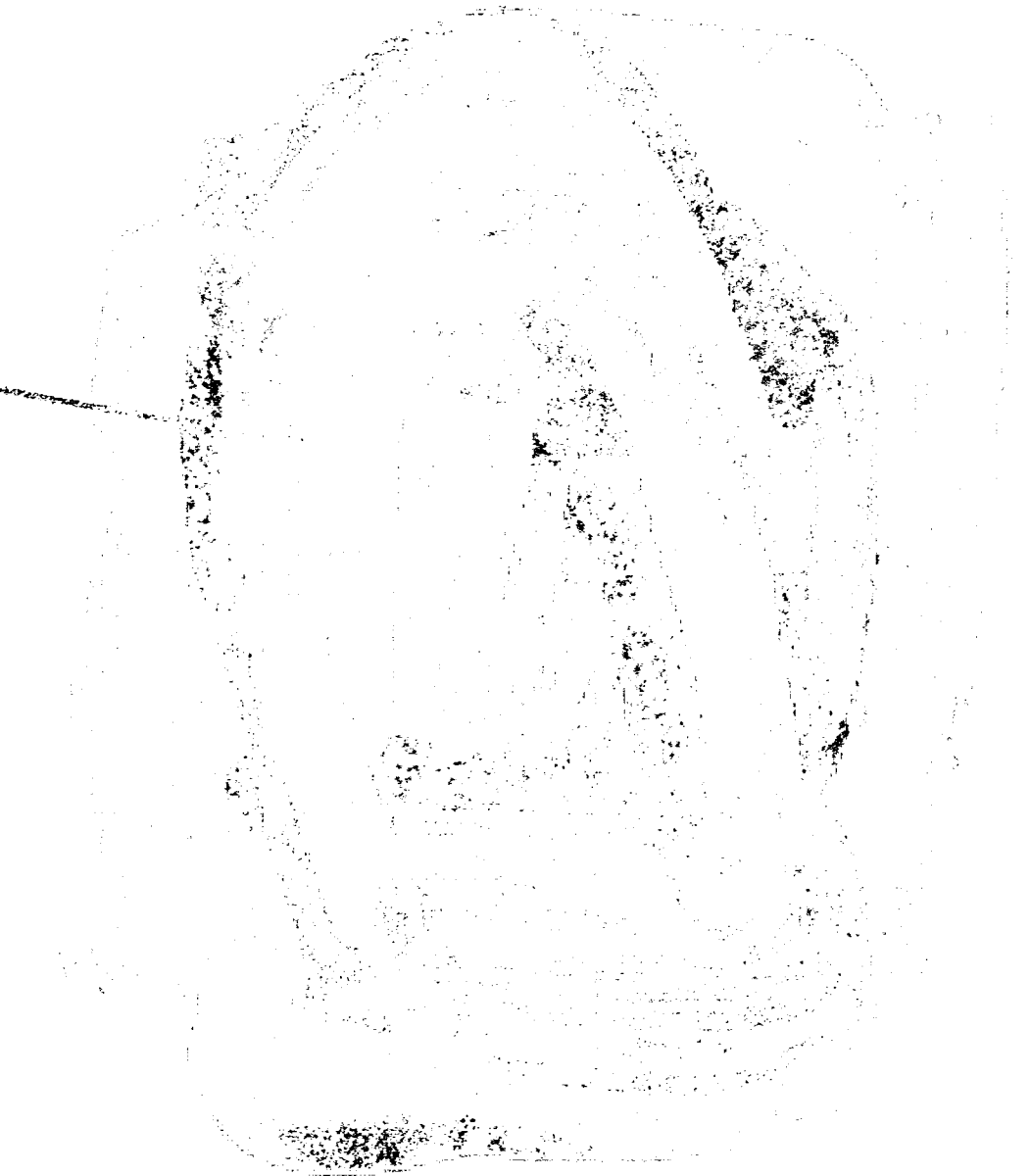
APPENDIX B

[Mississippi's Exhibit No. 2 — Mississippi River Hydrographic Survey 1962-1964 Sheet 26 with Appendix III of Mississippi's Exhibit No. 140]



APPENDIX C

[Mississippi's Exhibit No. 33 — Mississippi River Commission Chart No. 39]



IN THE SUPREME COURT OF THE UNITED STATES
STATE OF MISSISSIPPI, PLAINTIFF
V. NO. 48 ORIGINAL
STATE OF ARKANSAS DEFENDANT
PLAINTIFFS EXHIBIT NO. P-
E. A. KNIGHT COURT REPORTER
SURVEY OF
THE MISSISSIPPI RIVER
Made under the direction of the
MISSISSIPPI RIVER COMMISSION.
CHART No. 39.
1882
Projected from a Trigonometrical Survey
Made in 1879-'80.
SCALE—1:20 000.
Feet.
Metres.
Statute Miles.
INDEX CHART.
SCALE — 1 : 360,000.
Light outlines represent manuscript charts. scale 1 : 10,000.
Heavy outlines represent this published series.
CHART 38
CHART 39
CHART 40
AUTHORITIES.
Field and Office Work executed under the supervision of First Lieutenant SMITH S. LEACH, U. S. A., Secretary Mississippi River Commission, by the following Assistant Engineers:
Topography and Hydrography in 1881-'82, by J. A. Ockerson and G. Y. Wisner; Topographers, B. H. Colby, J. C. Quintus, L. C. Jones, N. B. Craig, F. Felkel, A. N. Darrow and O. W. Ferguson; Hydrographers, C. W. Clark and C. A. Russell; Ordinary Levels, F. B. French, R. C. Hoyer, J. C. Quintus and J. C. Cammack.
Secondary Triangulation by G. Y. Wisner. Geographical positions and primary elevations below Greenville from U. S. Coast and Geodetic Survey.
Precise Levels by J. B. Johnson.
Drawing under the direction of J. A. Ockerson; Projection, by B. H. Colby; Outline, J. T. Desmond; Topographical Signs, A. N. Darrow, J. A. Paige, G. W. Wood and F. Felkel; Lettering, A. N. Milner, F. B. Maltby and A. N. Darrow.
NOTE.
Elevations are referred to a plane 190.84 feet below the zero of U. S. Engineers gauge at Memphis, Tenn. The high water of 1858, which corresponds to a reading of 34.16 feet on above gauge, was 225 feet above this datum plane. The contour lines are five feet apart.
Soundings are expressed in feet and are reduced to a plane corresponding to the mean stage of water for the time when soundings were made on the part of the river taken from detail charts Nos. 86 and 87. This plane at Barnes Ldg., Miss., is 104.6 feet above the datum plane and has a slope of 0.22 feet per mile. The readings in feet on the gauge at Arkansas City, Ark., on the days of sounding the above described part, were as follows:
Oct. 17, 1882, 9.4 Oct. 21, 1882, 9.6 Oct. 24, 1882, 10.5
Oct. 25, 1882, 10.4 Oct. 28, 1882, 9.9 Oct. 30, 1882, 9.8
Oct. 31, 1882, 9.6
The mean of the above readings is 9.9 feet.
Dates in the river bed indicate the days on which soundings were made.
Bench marks indicated thus ○ are stone posts. The upper preceding figures indicate the number of stone line, and the number following is the elevation of the top of the stone.
The topography is not reduced to the stage of the soundings, but is plotted as taken.
ARKANSAS
MISSISSIPPI
ASHBROOK POINT
GREENVILLE
CHUTE

IN THE SUPREME COURT OF THE UNITED STATES
STATE OF MISSISSIPPI, PLAINTIFF
NO. 48 ORIGINAL
STATE OF ARKANSAS DEFENDANT
PLAINTIFFS EXHIBIT NO. P #17
E. A. KNIGHT
COURT REPORTER

LLOYD'S MAP of the LOWER MISSISSIPPI RIVER FROM ST. LOUIS TO THE GULF OF MEXICO.

COMPILED FROM GOVERNMENT SURVEYS IN THE TOPOGRAPHICAL BUREAU,
WASHINGTON, D. C.

Revised and corrected to the present time, by CAPTAINS BART. and WILLIAM BOWEN, Pilots of Twenty Years' experience on that River.

Exhibiting the Sugar and Cotton Plantations, Cities, Towns, Landings, Sand Bars, Islands, Bluffs, Bayous, Cut-offs, the Steamboat Channel, Mileage, Fortifications, Railroads, &c. along the River.

Price, in Sheets, Colored, 50 Cents per Copy. Pocket Edition, $1.00. . . . . . . Mounted on Rollers and varnished, $1,00. Pocket Sheet Edition sent by Mail on receipt of Price. Mounted Edition sent by Express.

J. T. LLOYD, Publisher. **1863.** 164 Broadway, New York.

Scale—5 Miles to an Inch.

☞ *The public are cautioned against another "Lloyd," by which name he hopes to deceive the public with spurious "Lloyd's Maps." This man's maps are engraved coarsely on wood and very erroneous. He follows us with an imitation of every Map we issue. A Map of the Southern States issued by him, has* FARMINGTON *in the place of* CORINTH, *Mississippi, and the latter place omitted from his map altogether.*

EXPLANATION.

County Seats	⁙
Towns and Villages	∷
Landings	○
Plantations—Sugar Plantations commence at Red River or letter S going South; all above letter S, going North, are Cotton.	▯
Railroads	━━━
Mines ∴ Forts	✕
Wagon Roads	‐‐‐
The Squares or Townships are 6 miles square.	
Sand Bars	▨
High-water Channel	───
Low-water Channel	━━━

The figures in the River denote the distances from N. Orleans to St. Louis, and are 5 miles apart.

The distance from the Gulf to N. Orleans is 94 miles.

READY.

LLOYD'S STEEL PLATE COUNTY MAP of the United States and Canadas—colored, in sheets 50 cts.; on rollers, and varnished..........$1 00

LLOYD'S TELEGRAPH, EXPRESS, AND RAILROAD MAP of United States and Canada, from official information, costing $100,000, ready 1st June, 1863—in sheets, 50 cts.; on rollers, & varnished, 1 50; or with a Gazeteer, alphabetically arranged, giving a list of Railroad Stations and Telegraph Offices, with an extra Map of Eastern States on a large scale..........$5 00

LLOYD'S STEEL PLATE MAP of the Southern States—colored *in States*..........25c.

Same, colored *in Counties*, with Gazetteer of Southern Country printed on the back, 50 cts.; on rollers, and varnished..........$1 00

LLOYD'S MAP of the Hudson River, from Surveys to 1863, showing every man's house and name, with Gazetteer, and descriptive sketch of towns, population scenery, &c, on back of sheet edition, 50c.; mounted and varnished..........$1 00

LLOYD'S STEEL PLATE COUNTY MAP of Virginia, 25cts.; on rollers, and varnished..........$1 00

LLOYD'S STEEL PLATE MAP of Kentucky and Tennessee, 50c.

" " " " Missouri..........25c.

LLOYD'S NEW P. O. DIRECTORY OF THE U. S. AND CANADAS, UP TO MARCH 4, 1863.

None will be printed only those subscribed for. If you wish a copy, order early. 380 pages at only 50 cents a copy,—worth $2. Sent by mail, anywhere, free of postage, on receipt of price, and *guarantee a safe delivery*. Write your name plainly and number of your P. O. box, and you will receive a copy by return mail.

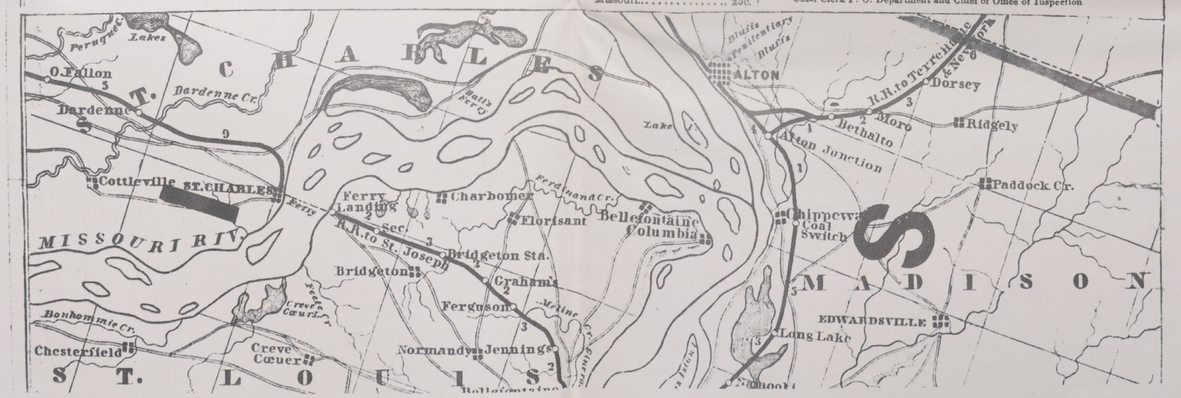
Compiled by the Assistant Chief Clerks of the different P. O. Departments. Contains the names of nearly **10,000 new Post Offices** in the United States and Canadas, since 1859, when the *last* P. O. Directory was published; also contains all the new Postal laws of the U. S. and foreign countries to date, and the rates of postage to foreign countries, besides valuable information to every letter writer and business man: the whole arranged alphabetically in *States, Counties*, and *Post Office names*. Warranted reliable, or money refunded. This is the only Post Office Directory of Canada ever issued, and, being compiled from official sources, may be relied on as correct.

Price 50 cents, sent by mail on receipt of money. The list of Post Offices in the Southern States is complete only to June, 1861, when the mail communications between the North and South stopped; but, as there never were many changes in the South, it may be considered as almost perfect.

P. O. DEPARTMENT, WASHINGTON, D. C., Feb. 10, 1863.

The Post Office Directory of the United States for 1863, which is published by Mr. J. T. LLOYD, 164 Broadway, New York, was compiled by a gentleman of ability, well fitted for such a duty, having been in the P. O. Department some years. I believe the book accurate

WM. A. BRYAN,
Chief Clerk P. O. Department and Chief of Office of Inspection



APPENDIX D

[Mississippi's Exhibit No. 17 — Lloyd's Map of the Lower Mississippi River 1863]

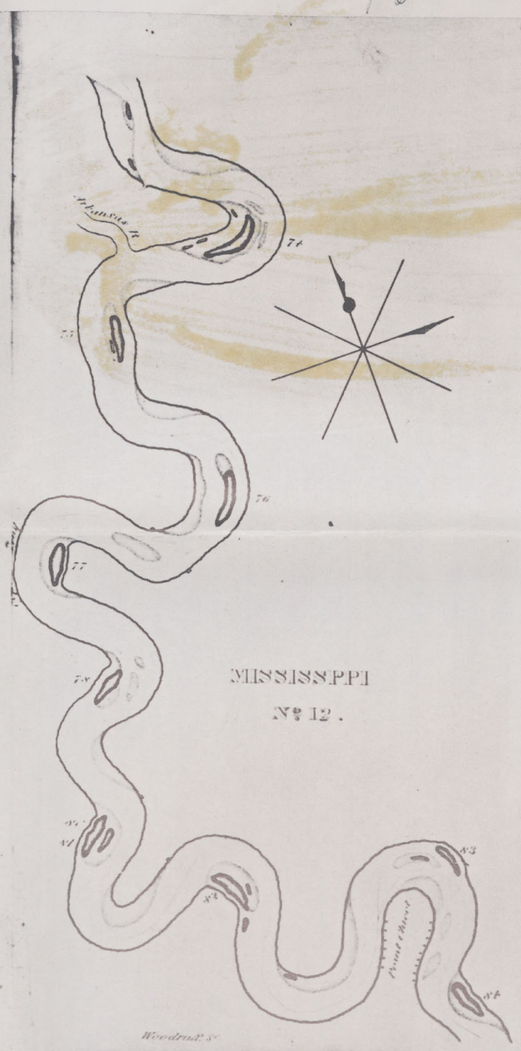
APPENDIX E

[Mississippi's Exhibit No. 7 — The Western Pilot by Samuel Cumings, 1825]

No. 64 Lies nearest the right shore, there is a large bar makes up from the head of No. 64—channel to the left, and near to the left shore until nearly up with its foot, then steer short over for the foot of the island, and pretty close to the small island below, (to avoid a bar on the left opposite,) and when past it keep over for the left shore again.	7	505
No. 65, Is a small island, pretty close to the right shore.—Channel to the left; when up with its head keep over to the right near its foot, to avoid a large bar at the point on the left.	5	510
No. 66, With a smaller island along side of it, lies immediately below a right hand point, and connected by a large bar—channel to the left, in the bend.	6	516
Nos. 67 and 68, Lie just below a left hand point, and are connected by a large sand bar. Channel to the right of both, in the bend; at a middling stage of water, you may pass between them which is much nearest.	7	523
No. 69, Lies just below a right hand point; channel to the left, and when past it, keep over to the right shore again. You may pass to the right of 69 at high water.	7	530
No. 71, And another island alongside of it, are just below a right hand point, and are connected by a large bar; channel to the left, in the bend, and as you approach the left hand point below, incline to the right again.	6½	536½
Montgomerie's Landing, right side. This is the principal landing for all who are bound up the Arkansas. The proper mouth of White River, is nearly 4 miles below Montgomerie's landing, but it may be entered at little more than two miles at high water, by taking the right of No. 72 or White river island. There is a bayou or gut, about 5 miles up the White river, which communicates with the Arkansas about 25 miles from its mouth, with a current setting alternately from the one river to the other, as the flood in either may chance to predominate.—Keep to the left from Montgomerie's landing, and when up with the left hand point opposite the foot of No. 72, cross over towards the right shore, to avoid a bar below it, on the left, and when past it keep well to the left again, to avoid a very large bar on the right below.	10	546½

Directions for Map No. 12.—Mississippi River.

The towhead on the large bar on the right, is about the middle of the river; channel to the left, and when up with the left hand point below, incline over towards the right shore, near a small towhead on the lower extremity of the bar, to avoid a large bar on the left.



IN THE SUPREME COURT OF THE UNITED STATES
STATE OF MISSISSIPPI, PLAINTIFF
V. NO. 48 ORIGINAL
STATE OF ARKANSAS DEFENDANT
PLAINTIFFS EXHIBIT NO. P-12
E. A. KNIGHT
COURT REPORTER

No. 74, Just below a right hand point. There is a large bar makes up from the head of No. 74, and to the left of it; channel to the left.	14	580½
River Arkansas, right side. This beautiful river is about 360 yards at its mouth; it is said to be about 1500 miles in length; and takes its rise in the Mexican mountains, about north lat. 40° in the vicinity of the water of the River Platte on the one hand, and those of Rio del Norte on the other.	5½	566
No. 75, or Ozark Island, Is about two miles below the mouth of Arkansas river; channel to the right.	10	576
No. 76, Channel either side: the right is nearest, and the left is probably rather deepest. If you take the right keep well towards the island after you have passed its head, to avoid the shore bar on the right of it. About two miles below the foot of No. 76 is a large middle bar; channel to the left; you may pass to the right at a tolerable stage of water. There is seven feet water to the right when the bar is just bare. After passing this bar you enter the Cypress bend.	8½	584½
No. 77, close to the left shore, Channel to the right.	8½	593
No. 78, lies pretty close to the right shore, Immediately below a right hand point. There are large bars to the left of No. 78, with channels through them; but the safest channel is to the left of all, in the bend; and when nearly up with the left hand point below keep well over towards the right shore.	7½	600½
No 80 and 81, Lie just below a right hand point, and are connected by a large bar. Channel to the left in the bend, and when past the islands keep well to the right, to avoid a large bar round the left hand point below.	8½	609
No. 82, Lies close under a right hand point; channel to the left. You may take the right at a tolerable stage of water, by keeping close to the right hand point above. After passing No. 82, incline towards the right shore; here you enter the Spanish Moss Bend.	12½	621½
Point Chicot settlement, on the right. Keep near the right shore until you are nearly up with the head of the middle bar above the island, on the left. then keep towards the middle bar, and pass pretty close to the foot of No. 83, to avoid the bar on the right opposite to the island. Keep nearest the left shore below, to avoid the bar on the right.	7½	629
No 84, Channel to the right, and then incline towards the left again.		

IN THE SUPREME COURT OF THE UNITED STATES
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STATE OF ARKANSAS DEFENDANT
PLAINTIFFS EXHIBIT NO. P-12
E. A. KNIGHT
COURT REPORTER

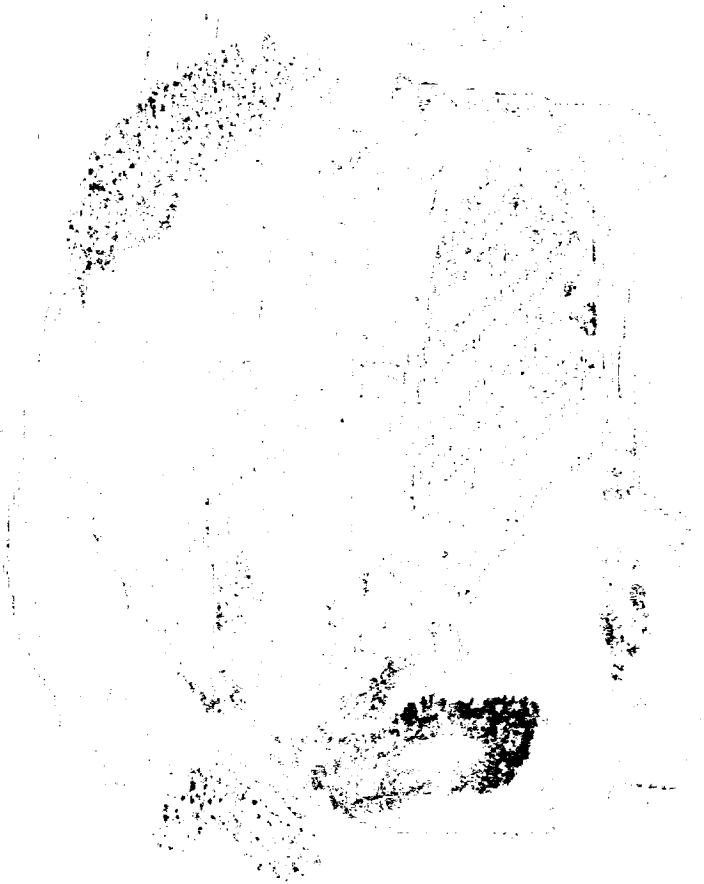
No. 78 lies pretty close to the right shore,	8½	593
Immediately below a right hand point. There are large bars to the left of No. 78, with channels through them; but the safest channel is to the left of all, in the bend; and when nearly up with the left hand point below, keep well over towards the right shore.		
Nos. 80, and 81,	7½	600½
Lie just below a right hand point, and are connected by a large bar. Channel to the left, in the bend; and when past the islands, keep well to the right, to avoid a large bar round the left hand point, below.		
No. 82,	8½	609
Lies close under a right hand point. Channel to the left. You may take the right at a tolerable stage of water, by keeping close to the right hand point above. After passing No. 82, incline towards the right shore. Here you enter the Spanish Moss Bend.		
Point Chicot Settlement, on the right.	12½	621½
Keep near the right shore, until you are nearly up with the head of the middle bar, above the island, on the left, then keep towards the middle bar, and pass pretty close to the foot of No. 83, to avoid the bar on the right, opposite to the island. Keep nearest the left shore below, to avoid the bar on the right.		
No. 84.	7½	629
Channel to the right; and then incline towards the left again.		

Directions for Map No. 13.—Mississippi River.

As you approach the left hand point below No. 84, keep towards the right shore. At the right hand point below, keep well over to the left, to avoid the bar of No. 85, at the point; and when past it, keep towards the right shore again.		
Nos. 86, and 87,	16	645
Are connected by a large bar. Channel to the left of both. At a good stage of water you may pass to the right of both, by keeping close to the right hand point, above.		
No. 88,		
Lies close to the left shore. Channel to the right. This is Matthew's Bend.		

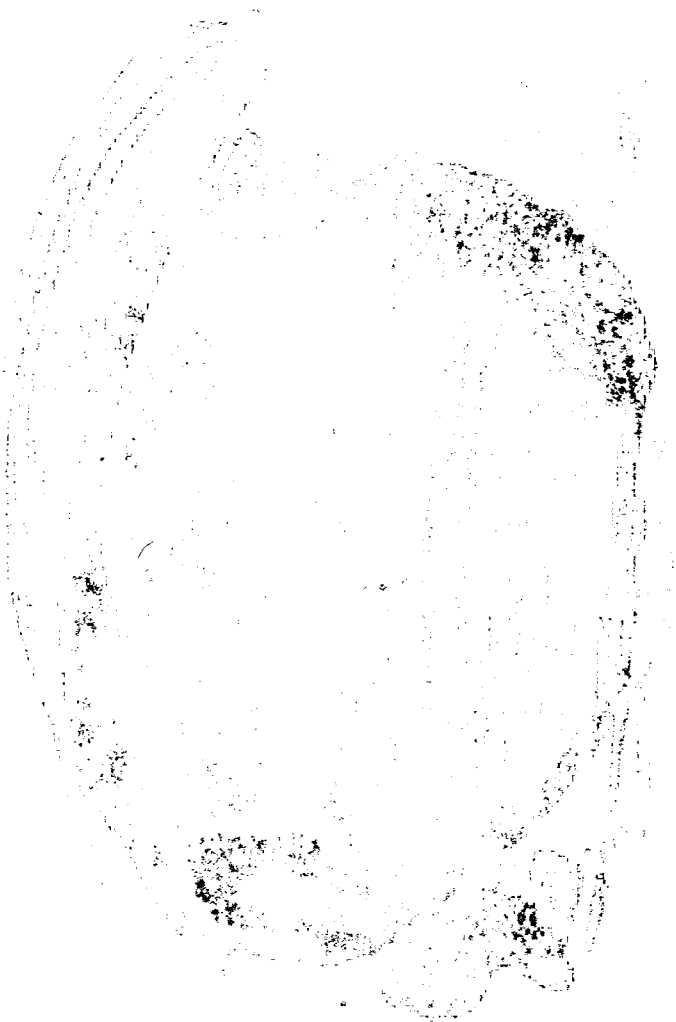
APPENDIX F

[Mississippi's Exhibit No. 8 — The Western Pilot by Samuel Cumings, 1834]



APPENDIX G

[Mississippi's Exhibit No. 9 — The Western Pilot by Samuel Cumings, 1841]



atmosphere absorb the water to such a degree, that in many seasons it may be forded many hundred miles below the mountains. Some of its tributaries are so impregnated with salt, as to render even the waters of the main stream unpotable. The alluvial earth along its banks contains so much salt, that cattle are said sometimes to be killed by eating it. To the distance of about 400 miles from its mouth, it has many lakes and bayous. In the spring floods, steam boats can ascend it nearly to the mountains.

LITTLE ROCK, OR ACKROPOLIS, is situated about 300 miles, by the course of the river, and about 120 by land, above the mouth of the Arkansas. It is a military post, and the seat of government for the territory. It stands on the south bank, on a very high stone bluff, and has been ironically named *Little Rock*, from the prodigious size and masses of rock about it. The situation is healthy and pleasant, and being the metropolis, a considerable village has grown up here. It has a court house, jail, and a printing office, from which is issued a weekly newspaper.

No. 75, or Ozark Island,

Is about two miles below the mouth of Arkansas river. Channel to the right.

No. 76,—— 10 684

Lies rather nearest the left shore. In dead low water the deepest and safest channel is to the left of it. At the foot of 76 is the landing for Lake Bolivar, on the left. If you take the right, keep well towards the island, after you have passed its head, to avoid the shore bar on the right of it. About two miles below the foot of No. 76, is a large middle bar. Channel to the left—you may pass to the right at a tolerable stage of water. There is seven feet of water to the right when the bar is just bare. After passing this bar, you enter the Cypress bend.

No. 77,—— 10 694

Lies close in shore under the left hand point in the head of Cypress bend, and nearly two miles below Catfish point. This point is on the left, opposite the last mentioned middle bar.

No. 78,—— 10 704

Lies pretty close to the right shore, under the right hand point at the foot of Cypress bend. Opposite 78, on the left, there is a large bar with willows on it. There is generally as much water to the right of this towhead bar, as there is to the left, and sometimes more. If you run to the right of the bar, give the head of the island 78 a pretty good birth, then go in a little towards the point on the island, then over towards the left shore. There are two channels to the left of the bar; one goes square in to the left shore, at a house opposite the chute of 78, and keeps down very close to the shore, the other channel goes in to the left shore, a little above the towhead bar. The bend on the left is called Choctaw Bend, and when up with the main point at the foot of it, cross over to the right into Yellow bend.

Nos. 80 and 81,—— 8½ 712½

Lie just below a right hand point, and are connected by a large bar. Channel to the left, in the bend; and when past the islands, keep well to the right, to avoid a large bar round the left hand point, below.

No. 82,—— 10 722½

Lies close under a right hand point. Channel to the left. You may take the right at a tolerable stage of water, by keeping close to the right hand point above. After passing No. 82, incline towards the right shore. Here you enter the Spanish Moss bend.

COLUMBIA, right side.—— 15 737½

This is the seat of justice for Chicot county, and the town is in or a little below the middle of Spanish Moss bend.

Point Chicot Settlement, on the right.—— 4 741½

Keep near the right shore, until you are nearly up with the head of the middle bar, above the island, on the left, then keep towards the middle bar, and pass pretty close to the foot of No. 83, to avoid the bar on the right, opposite the island. Keep nearest the left shore below, to avoid the bar on the right.

Bachelor's Bend,

Is the bend on the left, commencing at the foot of Chicot island. This bend is full of splendid cotton plantations, owned principally by young Bachelors, from whence it derived its name.

No. 84, or Physic Island,—— 9 750½

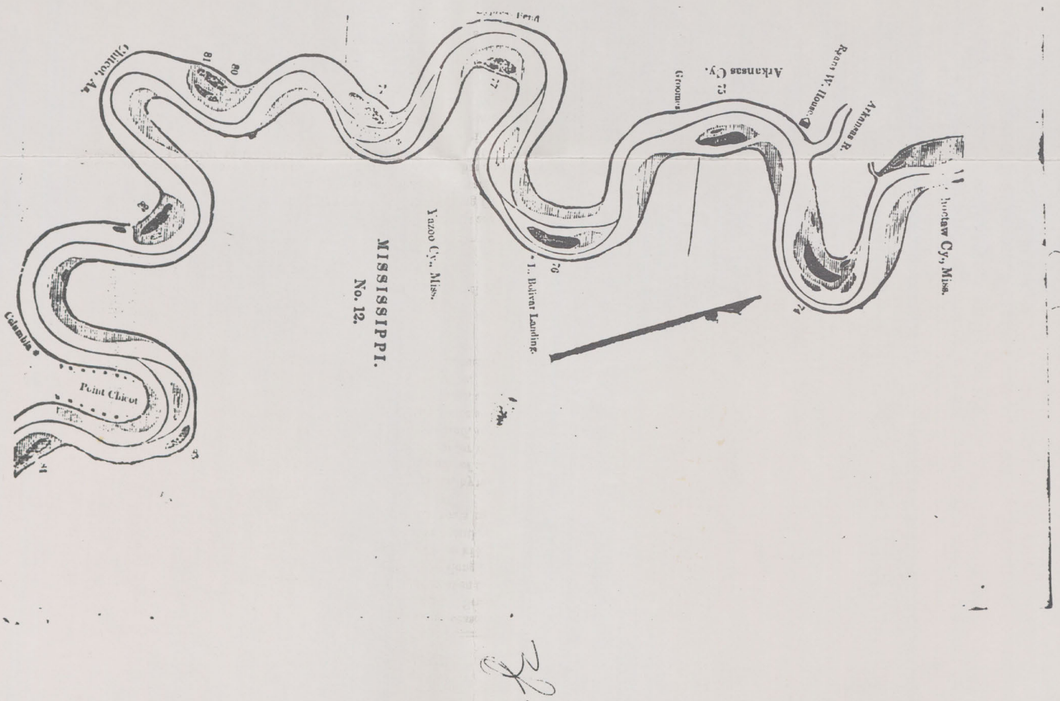
Lies under the point on the left at the foot of Bachelor's bend. Channel to the right, in the bend. When opposite the foot of Physic island, incline to the left to avoid the bar on the right, and when up with the point on the left opposite Old river Bayou, incline to the right again, and when up with the right hand point, go over to the left into Eggs, or Shirt Tail bend, to avoid Stephenson's bar on your right.

Directions for Map No. 13.—Mississippi River.

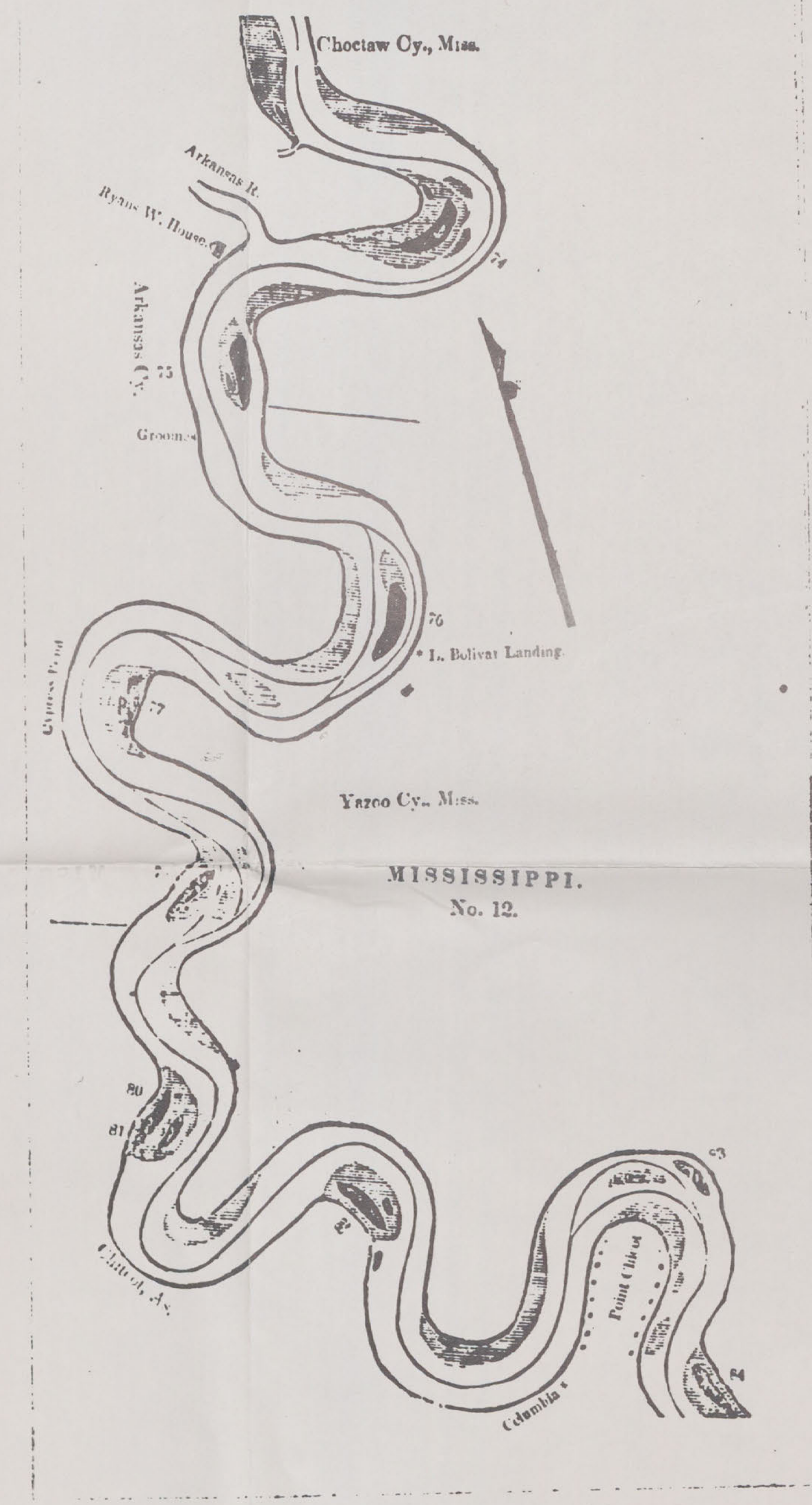
When you are at the foot of Shirt Tail bend, or at Eggs point, on the left, go over into the bend on the right. Under the next point on the right are

Nos. 86 and 87.—— 20 770½

Channel to the left, in Kentucky bend, in all stages of water. A little below the foot of 87, on the left hand point, is Worthington's Landing. From this point you cross over to the right into Mathers' bend. When up with the point on the right, at the foot of Mathers' bend, you make a long crossing between two bars in to the left shore, a little below Princeton.



Cumings 1847 - p. [103]



IN THE SUPREME COURT OF THE UNITED STATES

STATE OF MISS... PLAINTIFF

v.

STATE OF ... DEFENDANT

PLAINTIFFS EXHIBIT NO. P. 10

E. A. KNIGHT
COURT REPORTER

40626260

atmosphere absorb the water to such a degree, that in many seasons it may be forded many hundred miles below the mountains. Some of its tributaries are so impregnated with salt, as to render even the waters of the main stream unpotable. The alluvial earth along its banks contains so much salt, that cattle are said sometimes to be killed by eating it. To the distance of about 400 miles from its mouth, it has many lakes and bayous. In the spring floods, steam boats can ascend it nearly to the mountains.

Little Rock, or Ackropolis, is situated about 300 miles, by the course of the river, and about 120 by land, above the mouth of the Arkansas. It is a military post, and the seat of government for the territory. It stands on the south bank, on a very high stone bluff, and has been ironically named *Little Rock*, from the prodigious size and masses of rock about it. The situation is healthy and pleasant, and being the metropolis, a considerable village has grown up here. It has a court house, jail, and a printing office, from which is issued a weekly newspaper.

No. 75, or Ozark Island,

Is about two miles below the mouth of Arkansas river. Channel to the right.

No. 76, ---------- 10 — 684

Lies rather nearest the left shore. In low water the deepest and safest channel is to the left of it. At the foot of 76 is the landing for Lake Bolivar, on the left. If you take the right, keep well towards the island, after you have passed its head, to avoid the shore bar on the right of it. About two miles below the foot of No. 76, is a large middle bar. Channel to the left—you may pass to the right at a tolerable stage of water. There is seven feet of water to the right when the bar is just bare. After passing this bar, you enter the Cypress bend.

No. 77, ---------- 10 — 694

Lies close in shore under the left hand point in the head of Cypress bend, and nearly two miles below Catfish point. This point is on the left, opposite the last mentioned middle bar.

No. 78, ---------- 10 — 704

Lies pretty close to the right shore, under the right hand point at the foot of Cypress bend. Opposite 78, on the left, there is a large bar with willows on it. Be about in the middle of the river opposite the head of 78, then wear in near the bar on the left, leave the bar one-half mile above its foot, and then into the shore on the left—the bend opposite No. 72, is Chocktaw bend—next bend on the right is Yellow bend.

Nos. 80 and 81, ---------- 8¼ — 712¾

Lie just below a right hand point, and are connected by a large bar. Channel to the left, in the bend; and when past the islands, keep well to the right, to avoid a large bar round the left hand point, below.

No. 82, ---------- 10 — 722¾

Lies close under a right hand point. Channel to the left. You may take the right at a tolerable stage of water, by keeping close to the right hand point above. After passing No. 82, incline towards the right shore. Here you enter the Spanish Moss bend.

COLUMBIA, right side. ---------- 15 — 737¾

This is the seat of justice for Chicot county, and the town is in or a little below the middle of Spanish Moss bend.

Point Chicot Settlement, on the right. ---- 4 — 741¾

When you are up with this point, where the current leaves the shore, ware out from the point and to the right of the middle bars, close to the break of the steamer Ofallan, to the right of it, and near the bar on the left until you are below the plantation on the right, then ware gently towards the bar on the right, until middling close to it, then make a long crossing into batchelor's bend, near a mile below the post office, (which is the first house below the island.)

Bachelor's Bend,

Is the bend on the left, commencing at the foot of Chicot island. This bend is full of splendid cotton plantations, once owned principally by Bachelors, from whence it derived its name.

No. 84, or Physic Island, ---------- 9 — 750¾

Lies under the point on the left at the foot of Bachelor's bend. Channel to the right, in the bend. When opposite the foot of Physic island, incline to the left to avoid the bar on the right, and when up with the point on the left opposite Old river Bayou, incline to the right again, and when up with the right hand point, go over to the left into Eggs, or Shirt Tail bend, to avoid Stephenson's bar on your right.

Directions for Map No. 13.—Mississippi River.

When you are at the foot of Shirt Tail bend, or at Eggs point, on the left, go over into the bend on the right. Under the next point on the right are

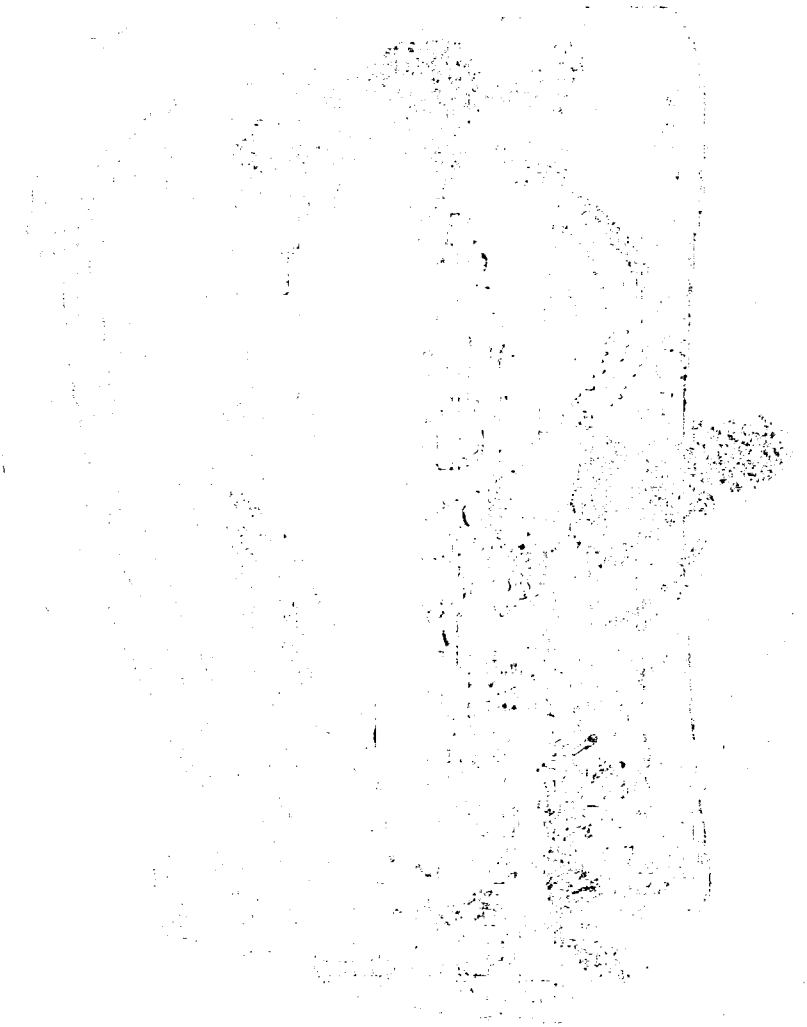
Nos. 86 and 87. ---------- 20 — 770¾

Channel to the left, in Kentucky bend, in all stages of water. A little below the foot of 87, on the left hand point, is Worthington's Landing. From this point you cross over to the right into Mathers' bend. When up with the point on the right, at the foot of Mathers' bend, you make a long crossing between two bars in to the left shore, a little below Princeton.

O

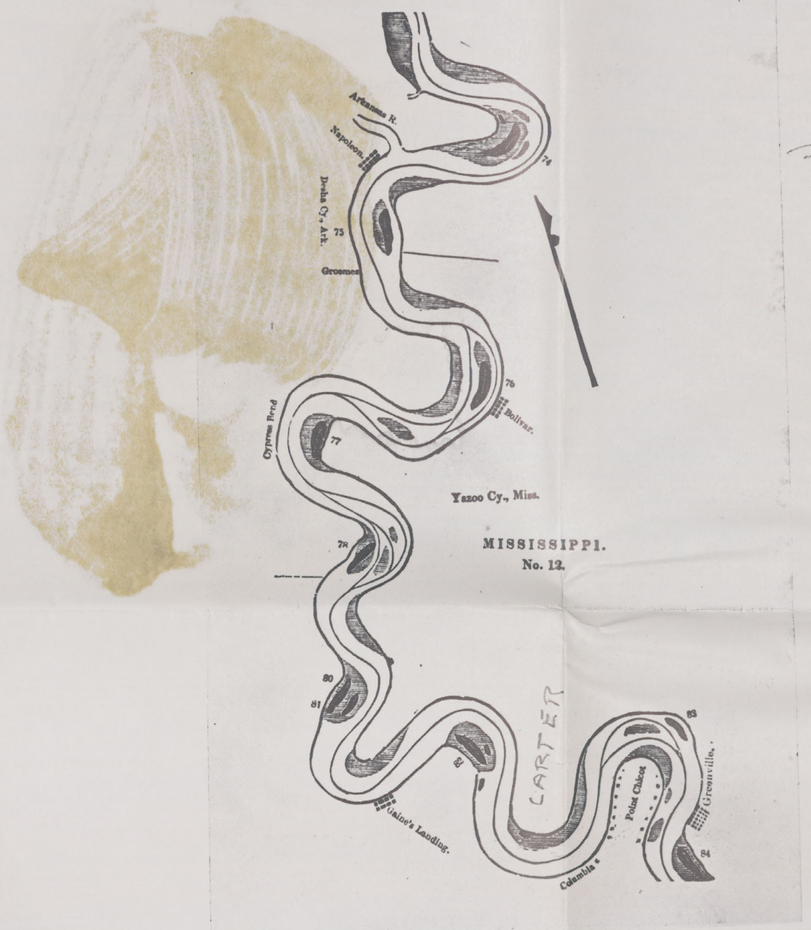
APPENDIX H

[Mississippi's Exhibit No. 10 — The Western Pilot by Samuel Cumings, 1847]



APPENDIX I

[Mississippi's Exhibit No. 11 — James' River Guide, 1856]



IN THE SUPREME COURT OF THE UNITED STATES
STATE OF MISSISSIPPI, PLAINTIFF
V. NO. 43 ORIGINAL
STATE OF ARKANSAS DEFENDANT
PLAINTIFFS EXHIBIT NO. P- 11
E. A. KNIGHT
COURT REPORTER

where between Helena and the mouth of White river. This expedition, ever memorable in the history of our country, sailed from Havana on the 12th of May, 1539. After a voyage of two weeks, the fleet landed in a small bay on the coast of Florida. Fired by a thirst for gold, and ambitious to be the first discoverers of the country, they eagerly plunged into the wilds of Florida and began their search for gold. The natives opposed them at every step. In order to make himself as secure as possible, De Soto always contrived to get possession of the chief of the country through which he was passing, whom he held a prisoner, as security for the good conduct of his people. After wandering about for more than 2 years, through a populous and hostile country, he at length reached the Mississippi. He crossed the river and wandered about Arkansas, in the neighborhood of White river. Provisions failing, and suffering from the coldness of the winter, he again directed his course toward the Mississippi, which he reached about 20 miles below the mouth of the Arkansas river. The fatigues and disappointments of the expedition began to weigh so heavily on his mind, that they brought on a fever, which soon terminated his existence. He died at the age of 42, a stranger in a strange land.

White River enters the Mississippi from **Arkansas**, 4 miles below Victoria. (See page 79.)

Arkansas River empties into the Mississippi 16 miles below the mouth of White river. (See page 80.)

Napoleon, just below the mouth of Arkansas river, in Desha co., Ark., is the depot and landing place for goods destined for, and produce brought down, that river. The U. S. Government has established a marine hospital here. Population about 1100.

Bolivia, capital of Bolivar co., Miss., 13 miles below the mouth of Arkansas river, is a small place.

Gaines' Landing, Chicot co., Ark., 35 miles below.

Columbia, 18 miles below, is the county seat of Chicot co., Ark. It is a very pleasant place, containing a number of stores, a court-house, and a population of about 400. Here commences the great cotton growing region, and the banks of the river are almost one succession of plantations. Just below this commences the growth of the Spanish moss.

Point Chicot, 4 miles below, in Ark., was formerly the county seat of Chicot co.

Greenville, 4 miles below, county seat of Washington co., Miss., is a small village. Population about 300.

Worthington Landing, 22 miles below in Washington co., Miss.

Grand Lake Landing, 6 miles below, in Chicot co., Ark. Grand Lake is a short distance back of the landing.

Princeton, county seat of Washington co., Miss., 4 miles below, is a landing point for the plantations in the neighborhood of Lake Washington, 5 miles in the interior. It is a small village. Population about 300.

Bunche's Bend and Cut-off is 10 miles below Princeton. This cut-off runs through a swamp, and is but a few miles across; while the main channel flows round a circular bend of nearly 18 miles.

Providence, 19 miles below, capital of Carroll parish, La., is a very handsome village, and has considerable trade in shipping cotton and supplying the planters in the interior. Population about 350. Just back of the town is the lake, from which it derives its name, on the banks of which there are a number of fine cotton plantations. On the opposite side of the river, is a very large, fine plantation, with a number of houses and negro quarters, giving it the appearance of a town.

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