

NO. 15, ORIGINAL

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In the  
Supreme Court of the United States

October Term, 1929

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THE UNITED STATES OF AMERICA, *Plaintiff,*

v.

THE STATE OF UTAH, *Defendant.*

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Brief of Defendant, The State of Utah

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Before HON. CHARLES WARREN, Special Master.

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ARROW PRESS, SALT LAKE

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Brief of Defendant, The State of Utah

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The substance of the pleadings is correctly stated on pages 2-7 of Complainant's brief. Although Defendant's prayer for general relief would doubtless be construed to include a prayer that it be adjudged and decreed to be the owner of those portions of the river beds here in controversy, it was stipulated between the parties to the action (R. 5, Vol. 1) that Defendant's prayer is intended, and for all purposes of this case shall be construed to include and be considered and treated as including a prayer that Defendant be adjudged and decreed to be the owner of all of those portions of the beds of the Colorado, Green and San Juan Rivers mentioned in subdivision numbered II of Complainant's Bill of Complaint.

The portions of the river beds in controversy are correctly stated on pages 1 and 2 of Complainant's brief.

We agree with the conclusion expressed by Complainant that the question of navigability of said rivers in interstate commerce is not in issue here and that evidence as to physical conditions and navigability on those portions of the rivers lying within Utah but without the areas in controversy is material only in so far as it may properly affect the question of navigability of the rivers within the areas in dispute. This is in accord with the rulings of the Special Master.

The significance, if any, of Complainant's status as a riparian owner, the materiality and effect of Utah statutes, and other matters argued in Complainant's brief, will be discussed by us after we have examined the evidence and the

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(Unless otherwise indicated the italics appearing in this brief are ours.)

law with reference to the question that has been most prominently stressed throughout the case, to wit, the question of navigability.

### THE TEST OF NAVIGABILITY.

In *The Daniel Ball*, 10 Wall. 557, at 563. Mr. Justice Field said:

"Those rivers must be regarded as public navigable rivers in law which are navigable in fact. And they are navigable in fact when they are used, or are susceptible of being used, in their ordinary condition, as highways for commerce, over which trade and travel are or may be conducted in the customary modes of trade and travel on water."

Complainant expresses complete accord with the language just quoted, and in view of the fact that the substance of Mr. Justice Field's statement has been reiterated in every later decision of the Supreme Court of the United States where the question of navigability was before that Court, it would be idle for either of the parties in this case to voice its dissent.

Complainant seeks to avoid this clear and unambiguous statement of the law in *The Daniel Ball* and in succeeding cases by construing cases like *United States v. Rio Grande Dam & Irrigation Co.*, 174 U. S. 690, and *Oklahoma v. Texas*, 258 U. S. 574, as in effect holding that in order to be navigable actual use of a river in commerce must be frequent; that if the navigation of a river is only occasional, it is not navigable. An analysis of those cases will disclose that they stand for no such proposition. As construed by Complainant the words "or susceptible of being used," which are always found in the Supreme Court's definition of navigability, are surplusage and utterly meaningless. An analysis of any decision rendered by that Court, wherein a river has been declared non-navigable because of the nature of its use in commerce, will reveal that such conclusion was based upon the fact that the river's *susceptibility* to such use was "exceptional" or only "occasional."

It would appear to be Complainant's contention that these rivers have not been navigated to the extent or in the manner or by the type of water craft necessary in order to meet the criterion of navigability established in the decided cases.

In *The Montello*, 20 Wall. 430, after approving the above quoted language of *The Daniel Ball* decision, the Court says, at pages 441-2:

"It would be a narrow rule to hold that in this country, unless a river was capable of being navigated by steam or sail vessels, it could not be treated as a public highway. The capability of use by the public for purposes of transportation and commerce affords the true criterion of the navigability of a river, rather than the *extent* and *manner* of that use. If it be capable in its natural state of being used for purposes of commerce, no matter in what mode the commerce may be conducted, it is navigable in fact, and becomes in law a public river or highway. *Vessels of any kind that can float upon the water*, whether propelled by animal power, by the wind, or by the agency of steam, arc, or may become, the mode by which a vast commerce can be conducted, and it would be a mischievous rule that would exclude either in determining the navigability of a river."

Again, at page 443, the court says:

"Indeed, there are but few of our freshwater rivers which did not originally present serious obstructions to an uninterrupted navigation. In some cases, like the Fox River, they may be so great while they last as to prevent the use of the best instrumentalities for carrying on commerce, but the vital and essential point is whether the natural navigation of the river is such that it affords a channel for useful commerce. If this be so the river is navigable in fact, although its navigation may be encompassed with difficulties by reason of natural barriers, *such as rapids and sand-bars.*"

Complainant would supplement the test of navigability as uniformly announced by the United States Supreme Court by various other additions and amendments that will be later noted in this brief. Among the amendments offered is the contention that it must definitely appear that the alleged navigable water will in the future be a valuable and substantial channel of commerce. If such contention has any merit the Supreme Court went far astray in deciding *United States v. Holt State Bank*, 270 U. S. 49, where it appeared

that Mud Lake, the bed of which was in controversy, had been completely drained long before suit was commenced.

We shall later have occasion to refer to cases cited under this title and to other cases involving the question of navigability, and in another place will discuss those decisions upon which Complainant most relies. As we read those cases, they in no degree tend to support its contentions in the case at bar.

In the Appendix to Complainant's brief appears what is designated as "Substance of Testimony on Navigation from Records in other Cases." We have not had opportunity to examine a transcript of the record in either of those cases and had not anticipated any necessity of so doing, because for obvious reasons such testimony has no pertinency in this case, and, under well-settled law, can not be considered in construing the decisions rendered in those cases. It is elementary that the basis of the Court's decision in any case must be found "within the four corners" of that decision. Probably more witnesses were sworn and testified on the subject of navigation in each of those cases than those whose testimony is digested in the Appendix. We are aware of no manner of determining which of the witnesses or what part of any testimony was believed or considered unworthy of credence by the Court. It definitely appears in *Oklahoma v. Texas*, 258 U. S. 574, that the Court utterly rejected certain evidence received in support of the claim of navigability, and the facts upon which its decision is based are there clearly stated. Whether the assumed facts were the actual facts is now wholly immaterial.

Great stress is placed by Complainant on the testimony of certain witnesses relative to silt and sediment in the waters of these streams. Defendant has made no tests of the water to determine its silt content; and, in the light of the testimony of the Government witnesses with reference to silt content, the making of tests and computations would appear quite fruitless. As stated on page 87 of Complainant's brief, Mr. Hoyt estimates "that the total amount of silt carried by the San Juan in suspension and as bed load during the course of a year is between 16,000,000 and 100,000,000 cubic yards." As appears on the same page of the brief the witness Howard estimates that for the twelve month period ending September 30, 1929, 60,200,000 tons of suspended matter passed the Goodridge bridge; whereas Love estimates that during the period of less than three months,

that is to say, between July 10 and October 1, of the same year, 150,000,000 tons passed that gauging station in suspension. We respectfully submit that even Complainant must be in a somewhat uncertain state of mind with reference to the amount of silt and sediment carried in suspension in these rivers. We concede that they carry a considerable amount of solid matter in suspension, but fail to see wherein it has affected or now affects navigation except for its contribution to bars in the streams which may impede the progress of one not familiar with their location.

It is true that the vast territory in eastern and southeastern Utah lying tributary to these rivers is sparsely settled and undeveloped and that hundreds of thousands of acres are as barren as was Salt Lake Valley when the Mormons arrived there in 1847. It is one of America's last frontiers. We believe that the evidence establishes that its potentialities in wealth and resources are very great, and (if such considerations were at all material) earnestly contend that these three rivers, which are obviously susceptible of being used as highways for commerce, should not be declared non-navigable because of the dire prophecy of counsel for Complainant as to what the future of that section may be in agriculture, stock raising, coal, metals, oil and other products.

Notwithstanding the undeveloped state of the country and its sparse population, each of these rivers has a history of navigation which conclusively demonstrates its navigability. The navigable capacity of each of these streams is not "occasional" or "exceptional" but *is present during every season of the year, including the low water stage.*

In its brief, Complainant has referred to certain portions of the testimony of certain witnesses who stressed difficulties incident to navigating the rivers. Without attempting a digest of the entire testimony of the witnesses we will now invite attention to certain pertinent portions of the testimony of each witness who was examined as to the navigability of these streams.

#### TESTIMONY AS TO NAVIGABILITY.

Because of the similarity of the rivers and of the boating experience of those who have navigated them, and because the experience of most of the witnesses was not confined to one river or one section of a river and in giving their

testimony they speak of one river or a section of a river in one answer and in the next answer, or even in the same answer, refer to a different river or locality. It has seemed to us that it would confuse rather than aid the Court to attempt to segregate the different parts of the testimony of a given witness or to attempt, by employing geographical subtitles or otherwise, to separately digest his testimony as to one river or as to a particular section of one river.

Until otherwise indicated the witnesses named below were witnesses produced by and testifying on behalf of Complainant.

*Clyde L. Eddy* testified: With a crew of nine college men, a camera man and one, Parley Galloway, I left Green River, Utah, on June 27, 1927, with two 22-foot boats having a 5-foot beam; also a 16-foot boat. (R. 39-44, Vol. 1.) Galloway had formerly made a trip on the river but no other member of the party had ever before been on the river. (R. 76, Vol. 1.) At a point five to eight miles downstream from the town of Green River, at a sharp bend in the river, we encountered some difficulty. (R. 44, Vol. 1.) However, we got safely through with all three boats. (R. 76, Vol. 1.) We ran into sand bars at a number of places between the town of Green River and the mouth of the Green River. (R. 45, Vol. 1.) Except for the rapid water at the place mentioned where there was a sharp bend in the river, no other rapid water was encountered until the party reached No. 1 Rapid at the head of Cataract Canyon. (R. 75, Vol. 1.) After going through Cataract Canyon, we had easy going on down to the Utah-Arizona line. There are comparatively few streams that in the course of fifty miles do not have riffles and more or less rapid water, but through that stretch the party had "easy going" (R. 77, Vol. 1.) and got through without any mishaps. Neither I nor any man experienced in boating would have any hesitation about going over any water in that stretch. In going through Cataract Canyon we lined the boats and portaged the cargo on four occasions. On the first occasion the load was portaged for a distance of one-half to three-quarters of a mile; on the second occasion, for practically a mile; on the third occasion, three-quarters of a mile; and on the fourth occasion, not to exceed a quarter of a mile. (R. 78-81, Vol. 1.) The trip was made at a high stage of water. In my judgment, with the water at the stage it was when I took this trip,

I could go up the Colorado River in a motor boat from Lees Ferry to Cataract Canyon. (R. 97, Vol. 1.) Starting from the head of the first rapids in Cataract Canyon, I believe a motor boat could have made the journey up the river to the confluence of the Green and Colorado Rivers and thence up the Green River to the town of Green River; this could have been done without any insurmountable difficulties. Although there would have been plenty of trouble with sand bars and rocks, those dangers could be successfully avoided if the persons in charge of the boats knew their business, and I am sure that it could be done. (R. 98, Vol. 1.) The process of lining boats around rapids is equivalent to the old portage with lighter boats. (R. 99, Vol. 1.) The trip from the town of Green River to Lees Ferry consumed about sixteen days. (R. 74, Vol. 1.)

*Arthur A. Baker* of the U. S. G. S. testified: I made a trip in a small boat equipped with an Evinrude motor from Moab to the oil well twenty-eight miles below, and on another occasion made the same trip in a slightly larger boat belonging to the Moab Garage Company. On the first of these trips I knew nothing about the channel and frequently ran on sand bars. On the second trip the boat was operated by Virgil Baldwin who was able to pick the channel but had to watch carefully. (R. 110-12, Vol. 1.) During my first two years at Moab the Moab Garage Company was operating boats throughout the entire period, making trips every few days; while they were running one boat they made possibly two trips a week, and for a time they ran two boats. I would say that they made more than one hundred river trips, carrying oil equipment and supplies during that time. (R. 113-15, Vol. 1.) I did not go to the oil wells in an automobile because it would have been a very arduous task to reach the places to which I wanted to go in that manner and I desired to observe things along the river. (R. 124-5, Vol. 1.)

*William Glen Hoyt* of the U. S. G. S. testified: I went from Washington, D. C. to Green River, Utah, for the purpose of making the examinations to which I refer in my testimony, arriving at Green River on September 27, 1928 (R. 271-2, Vol. 2), accompanied by Mr. Moyer, one of the attorneys of record in this case. (R. 278, Vol. 2.) I knew that the sole purpose of our trip was to bring back facts

from observations on the ground that would bear on the question of navigation up and down stream. (R. 298-9, Vol. 2.) At the mouth of the San Rafael we loaded about one-third of our supplies in a canoe and the remainder in a row boat. (R. 183, Vol. 2.) Below the mouth of the San Rafael there is a uniform slope of between one and two feet to the mile; "there are no riffles, no rapids, and no breaks in the general surface of the water." "With our small boats there was no great trouble on the bars. Every time we got on a bar we would push off." (R. 184, Vol. 2.) From the mouth of the Green we went up the Colorado River, a large motor boat of the Moab Garage Company taking some of our party, and Mr. Blake and I using our row boat, in which we had come down the Green, which row boat had an outboard motor. The large motor boat towed our canoe. (R. 211, Vol. 2.) That boat had a draft of two and half feet. (R. 195, Vol. 2.) Going up the Colorado we made approximately 2.4 miles an hour, including stops necessary to take pictures, fill the tank of our outboard motor and waiting for the other boat. The big boat was struck at a few points for a time and our small boat was stuck on a bar occasionally. (R. 213-14, Vol. 2.) In my report (Complainant's Exhibit No. 75), I specified one or two places that the boat got stuck, but from a technical viewpoint it might have been as well for me to have omitted those references, except as they show the character of the bed of the river. (R. 300, Vol. 2.) With the same boats, loaded and propelled in the same manner, I would say that one would encounter the same type of sailing going up or down the Green between the mouth of the San Rafael and the mouth of the Green and between the town of Moab and the mouth of the Green; it would be as easy to go up or down one of the streams along those sections as to go up or down the other. (R. 300, Vol. 2.) We had very much more trouble with bars on the Colorado River than on the Green River. (R. 285, Vol. 2.) We reached the confluence of the two rivers on October 14, 1928, and the Green River was at its lowest stage for the month during the period from October 1 to October 12. (R. 293, Vol. 2.) I made a survey of the bars and riffles mentioned in my report. I have read the 1909 report of the Army Engineers (Defendant's Exhibit No. 18), and have examined each of the bars and riffles therein mentioned. We had no difficulty in locating those bars and riffles, which are listed in their proper order, with approximate mileage. (R. 303-5, Vol. 2.) I had no

difficulty in locating the bars and riffles mentioned in the Army Report at the places therein indicated, notwithstanding the fact that there have been many floods and much high water since 1909. (R. 306, Vol. 2.) The soundings recorded in my report merely represent the depths I happened to get as our boat travelled down stream. (R. 319, Vol. 2.) When I say in my report that the channel depths as we found them were from three to five feet and tapering to zero, I mean tapering to the point where a bar was exposed. (R. 322, Vol. 2.) Over a period covered by long-term records there has never been a time when the Green River was dry, and regardless of where the channel lies from year to year, the amount of water would average more or less the same at each corresponding month in the year. The large flat bottom scow of the Moab Garage Company has been down the river during the periods of the year when weather conditions are the same as when I was there and they could go down the Colorado and back and could probably go up and down the Green River between the mouth of the San Rafael and its mouth with that boat. (R. 348, Vol. 2.) I was operating the canoe, and while I got stuck, the canoe would always have got through if I had known enough to find the channel. (R. 349, Vol. 2.)

I arrived at the Four Corners (the common corner between the states of Colorado, New Mexico, Arizona and Utah) at noon on October 26; located the Four Corners; ran a line along the state line between Utah and Colorado north to the rim of the San Juan river; that afternoon and the next day I made Plate 1 of Exhibit 87, my time being consumed in making that map. I then drove to Shiprock, New Mexico, my entire stay on the San Juan River being from 12 o'clock noon on one day until 3:30 p. m. next day, and all of my time being spent in making the map and taking photographs and cross sections at that point. I was never at any point on the San Juan River either before or after that visit, and I recall my statement that in order to make an intelligent examination of a river it is necessary to examine its tributaries and its entire basin. (R. 330-2, Vol. 2.)

Mr. Hoyt's trip on the Green River down to the head of Cataract Canyon and thence up to Moab is his only experience on either of the rivers here involved, with the exception of the day he spent at the Four Corners.



*Kamen Jones* testified: I went to what is now Bluff on the San Juan River in 1879. (R. 364, Vol. 3.) I have not traveled the river but have crossed it at different points. When we arrived at Bluff the river from there on down was confined in a comparatively permanent channel, with cane, willows and cottonwood trees along the banks. (R. 366, Vol. 3.) The banks of the stream were well defined at that time and the willows, trees and cane brakes along the banks had the appearance of age and stability. (R. 395; 401, Vol. 3.) In ordinary years there is just the regular high and low water, such as we have on all streams in the West. We do not average one big flood a year and there are many years when we have no big floods. The first big flood we experienced was in 1884 or 1886, and the next flood was in 1895 or 1898. (R. 398-9, Vol. 3.) Until the first flood came the channel of the river was confined between well-defined banks lined with old trees. After that flood the river returned practically to its original channel, but when the second flood came in 1898 the channel at Bluff ceased to be stable and fixed. (R. 402-3, Vol. 3.) From Chinle Creek to the mouth of the San Juan River, the course or channel of the river doesn't change; there is little shifting of channel and it is stable. (R. 400, Vol. 3.) In picking out a place to ford a river one usually selects a shallow place where there is a good ford. Where I have gone down to see it or cross it, I would say that the average depth of the water was from two to four feet. I did not attempt to ford the river at high water, which occurs during the months of May and June. During that season no one except the Navajos attempt to cross the river either on foot or horseback. (R. 407-8, Vol. 3.) There is not a year since I have lived at Bluff when I have not crossed the river. Near Bluff there is a mile or two where the river spreads out and I have crossed this wide strip on horseback. When I first went to Bluff there was no such wide-spreading space. (R. 411, Vol. 3.) The minimum depth I have ever observed at any regular ford of the San Juan River I would say was about two feet. (R. 414, Vol. 3.)

I have seen a hundred different boats on the San Juan River owned by different individuals; a good many of them owned by myself and partners. (R. 384, Vol. 3.) I used my boats to cross the river. I have seen one or two small boats go up and down the San Juan River. The first of these came down from Farmington, New Mexico. They made it up

there and went down the river, taking some supplies to a placer mine below Bluff. There were three people in this party and they carried with them food and lumber to make sluice boxes. (R. 385, Vol. 3.) I saw that boat about thirty years ago, and the second boat I recall was about five years ago, when two or three men went down to the placer mines in a boat. They came from Colorado down the river, taking with them lumber, tools and provisions. I was never much interested in mining and just happened to be at Bluff when the two boat parties I have mentioned went through; they came to our store for supplies while I was in the store. (R. 386-7, Vol. 3.) I have never lived right close to the San Juan River and my home has been in Blanding for about ten years. Before that I lived in Bluff for a little over forty years. (R. 381-2, Vol. 3.)

*John Adams* testified: I am in the sheep business and since 1882, have been in the San Juan country; have lived at Blanding for about fifteen years. (R. 421, Vol. 3.) I have been along the north banks of the San Juan between Bluff and the mouth of the river. Right at Bluff, the river is very quicksandy, with gravel across in places; but down below Bluff the river cuts through a limestone formation. The stretch of river where you find the quicksandy condition and unstable channel is for a distance of fifteen or twenty miles below Bluff; there the river enters the limestone formation. (R. 423-4, Vol. 3.) I have seen the river dry twice. (R. 427, Vol. 3.) One of these occasions was when I could see the rocks clear across the river at Clay Hill Crossing, which is always a shallow point (R. 429-30, Vol. 3); this was in wintertime, when only about four or five rods of the river was not frozen over and the water of that unfrozen portion only came to the ankles or a little above the ankles of my horse. (R. 431-2, Vol. 3.) There were perhaps two or three rods of frozen ice on each side of the open water and I couldn't see any part of the stream that was under the ice. (R. 433, Vol. 3.) When we first came to Bluff the channel of the river, which is now a half mile across and shifts as I have stated, was a narrow channel. (R. 426, Vol. 3.)

*Jens Nielsen* testified: I have lived near Blanding since 1880, and am a farmer and stock raiser and have freighted. (R. 440-1, Vol. 3.) There was never any line of boats operating on the San Juan River, the only boats being those used

by prospectors (R. 443, Vol. 3); they would come down from Farmington to Bluff in their boats, load them and proceed on down the river, taking with them their supplies. (R. 442, Vol. 3.) I have only seen the San Juan dry on one occasion. (R. 445, Vol. 3.) I have crossed the river at Bluff when it was only a foot deep. (R. 446, Vol. 3.) I have also crossed at Chinle Creek in the summer months when the water was only about two or three feet deep at that point, but I have seen it at that point when it was only about a foot deep. (R. 446-7, Vol. 3.) From Chinle Creek on down, the channel is confined and it is a very different situation than above Chinle Creek. (R. 450, Vol. 3.) The lowest that I ever saw the San Juan River when I crossed it was on one occasion when it was about a foot deep at Bluff, and when I saw it a foot deep it was extremely low water. (R. 451, Vol. 3.) The times at Bluff and at Chinle Creek when, as I recall, it was only about a foot deep at those crossings were during the lowest water seasons during my entire observation of the river from the year 1880, to date, and I have never observed any similar depths at any other points on the river. Even at low water the depth at Chinle Creek during every day of the year would be two or three feet. (R. 452, Vol. 3.)

A. L. Raplee testified: I have been placer mining and engaged in drilling for oil on the San Juan since 1893, and have been on the river in boats quite a lot. (R. 461-2, Vol. 3.) The placer miners, including myself, required the usual food supplies, picks, drills, lumber, also some machinery. (R. 472, Vol. 3.) For about three years there were something like one hundred and fifty miners working down the river. Supplies would be brought by wagon to Bluff and thence down the river on boats. I had probably eight or ten employees. (R. 473, Vol. 3.) All told a considerable tonnage was needed to keep us all going and there was a great deal of traffic. Another outfit that was down the river about 75 miles had a wheel similar to that used by me in my mining operations. All the other outfits working on the river had boats similar to mine. These boats were built at Bluff and during those three years there were probably fifteen or twenty boats plying on that river. (R. 474, Vol. 3.) In supplying my own operations there, I made something like twenty-four boat trips a year, carrying on each trip about 1000 pounds, so that the freight I carried for my own

purposes was about seventy odd thousand pounds during three years. (R. 475, Vol. 3.) A great number of miners who were working there came down the San Juan River in boats from New Mexico, bringing their supplies along with them in their boats. I would say that there were more than twenty or thirty men who came down in boats from above Bluff. (R. 476, Vol. 3.) The placer claims were being operated along the river to a point 75 miles below my camp, which camp was 10 miles below Chinle Creek. These other outfits needed similar supplies to those required by me. (R. 477, Vol. 3.) I suppose there were two or three hundred placer claims staked out at that time. There is tremendous tonnage of dirt in the San Juan River carrying gold values, but up to this time there has been difficulty solving the problem of a proper process for saving the gold, which is very fine. If, and when a better process is perfected for separating the gold, there will be tremendous values taken out. (R. 479, Vol. 3.) There have been a number of oil locations down the river, some at Slickhorn, and oil structures extend all along the river bed in that section and practically down to the mouth of the San Juan. (R. 480, Vol. 3.) The San Juan River was dry on one occasion. (R. 483, Vol. 3) and remained dry for about three weeks. (R. 487, Vol. 3.) In low water I generally made a 25-mile trip from Bluff to my camp with my boat load of supplies in fifteen hours; the trips I made during high water would generally consume about ten hours. (R. 488-9, Vol. 3.)

William J. Walker testified: I live on the San Juan River at Kirtland, New Mexico, and recall that about the year 1902, I was compelled to make a temporary dam across the river in order to divert any water. I have seen no boats on the San Juan River except small skiffs. (R. 492, Vol. 3.) These skiffs were used for carrying pelts and any products that the Indians had across the river and taking their supplies back. (R. 493-4, Vol. 3.)

Albert P. Blake testified: I live at Farmington, New Mexico and went there with my father in 1888. (R. 500, Vol. 3.) There was one year when the San Juan River was dry; I don't remember what year it was but all old-time residents remember that there was one such occasion. (R. 521, Vol. 3.)

*Orson J. Carson* testified: I live in Farmington, New Mexico, and have been in that section for forty-three years. (R. 533, Vol. 3.) I recall the flood of 1911. (R. 534, Vol. 3.) I recall one occasion when the San Juan River was practically dry. The only big flood on the San Juan River that I recall is that of 1911. We have heavy rains when there will be a rise in the river, but so far as I know, there has only been that one big flood. (R. 536-7, Vol. 3.)

*Parley Rogerson Butt* testified: I live at Dove Creek, Colorado. I went to Bluff in the same expedition with Mr. Kumen Jones. (R. 542, Vol. 3.) I have not been down the San Juan River between Bluff and its mouth but have forded it at Mexican Hat and at Clay Hill. (R. 544, Vol. 3.) We only forded the river when it was low; it would pretty near swim our horses sometimes, and sometimes the water only came up to about their knees. (R. 545, Vol. 3.)

*James McEwen* testified: I live at Dolores, Colorado. (R. 571, Vol. 3.) I saw the San Juan River once when it was almost dry below Shiprock, New Mexico; the farmers above had taken all of the water out. I cannot fix the date of this dry year, but it was somewhere between 1898 and 1906. (R. 575, Vol. 3.)

*Guy S. Newkirk* testified: In 1923, I went to the San Juan River to survey some prospecting permits. We forded the river below Bluff at about the mouth of Chinle Creek, and also near Moonlight Creek. (R. 582, Vol. 4.) The water at these fords was a foot and a half or two feet deep. (R. 584, Vol. 4.)

*Frank H. Hyde* testified: I am 60 years old and live at Salt Lake City, but before that spent all my life after reaching the age of 10 years in the San Juan River country in Utah. (R. 592, Vol. 4.) In operating our trading post we had a ferry boat operated on a cable at the mouth of Comb Wash. The Indians would ride on to this boat with their ponies and loads and thus be taken across the river. (R. 597, Vol. 4.) When the placer miners were working on the river they built some boats and went down the river to the bars in their boats, and I have twice taken a boat down the river from Montezuma to Bluff and from Bluff to Rincon at the mouth of Chinle Creek. (R. 606, Vol. 4.) I have

no knowledge of any other method of taking supplies to points down the river except overland. (R. 608, Vol. 4.) On two occasions I have seen the San Juan River dry. (R. 615, Vol. 4.) Along in August, the water gets down so low that is only 18 inches or 2 feet deep and you have to hunt a place to go in swimming. (R. 617, Vol. 4.) There are a good many rapids and sand bars in the San Juan River, although I have never gone through it anywhere in a boat and base my judgment upon what I saw from the rim of the canyon. (R. 621-3, Vol. 4.) When I first came to the San Juan River (about 1880) its banks were well defined and fringed with trees and willows and there was a very defined and readily discernible channel. You wouldn't recognize that condition from seeing the manner in which the river is spread out at Bluff today. (R. 643, Vol. 4.) Since I first saw the river the timber has been cut down on the watersheds and numerous trails have been made which has contributed to a quick run-off and floods. Since that cutting occurred there is no underbrush and no blanket of leaves or trees, but only a smooth mountain side left, so that where there used to be a forest with underbrush, pine, thistles and burrs that would hold the water back there is nothing to impede the run-off. (R. 649-50, Vol. 4.) This cutting has extended clear over to Dolores and between Dolores and Mancos and the sawmills became active in this work when the D. & R. G. railroad was constructed in there a few years following my arrival on the San Juan. I saw those forests before they were cut and I have seen the places once occupied by them. (R. 650, Vol. 4.) The cutting has continued during the last thirty years, but I think that a large part of it was done more than thirty years ago. (R. 651, Vol. 4.)

*John J. Lumnsden* testified: I live in Grand Junction. In 1905, I built a boat that was called the City of Moab; it was about 50 feet long, 16 or 18 feet wide, had several cabins, and its draft according to my best recollection, was from 12 to 14 inches; it had a marine gasoline engine and was designed to haul freight and passengers from Green River, Utah, down the Green River to its mouth and thence up the Colorado to Moab and return. There were about ten in the crew and we left Green River, Utah, with our supplies on board. (R. 664-6, Vol. 4.) The first day we got down pretty close to the mouth of the San Rafael and ran on to a sand bar, and after we got off that sand bar continued

to a point 4 or 5 miles below the mouth of the San Rafael and camped. (R. 667, Vol. 4.) We had trouble getting through what they called the Gimlet, where we touched the banks or rocks, but after getting through there we came into more quiet water and got along very well between there and the mouth of the Green River, except that we encountered sand or gravel bars in several places. (R. 668, Vol. 4.) We were hung up several times, maybe for two or three hours, maybe an hour. (R. 669, Vol. 4.) Our boat was not capable of making it up the Slide on the Colorado River, so we turned around and came back up the Green River. The water was very high at this time, it being during the spring run-off. (R. 670-1, Vol. 4.) We tied the boat up at the Wolverton or Halverson ranch, some 10 or 12 miles below Green River, Utah. (R. 673, Vol. 4.) The cabins on the boat were about 7 feet high. (R. 681, Vol. 4.) The reason we couldn't go up the Slide was that we didn't have enough power. (R. 684, Vol. 4.) I concluded that I couldn't make money operating the boat. I think we investigated as to whether the traffic that we could get would meet our operating expenses and yield a fair return on the investment, and when I received an attractive proposition for using the boat on Great Salt Lake, I decided that was a more profitable field. (R. 760-2, Vol. 4.)

*Arthur H. Spencer* testified: I live in Denver. From 1878 to 1884, my father ran a store at Farmington, New Mexico, at Four Corners and at Spencer's Mesa. In 1908, I went to Mexican Hat. (R. 687-8, Vol. 4.) The high waters which come in the spring on the San Juan River are regular, seasonal fluctuations, while the fall high waters are the result of rains. I have never operated boats on the San Juan River nor have I known of boats being operated except in crossing the river. (R. 701, Vol. 4.) I have never seen the San Juan River so dry that it was not running, but I have seen it quite dry a good many times, for instance, up east of Bluff in the sand flats, and in 1917, it got pretty dry below Chinle Wash. It was not 20 feet across at Goodridge for a time that year. (R. 703, Vol. 4.) I have taken a thousand pictures of the San Juan River, and those introduced here in evidence were picked out from the rest. Two of those produced here show the San Juan River at low water. I have other pictures which show the river at low water, but I will not pick them out or bring them here into court. (R. 715-16, Vol. 4.)

*Charles Warner Anderson* testified: I helped build the City of Moab, which was equipped with two 25-horsepower engines. It was a double decker with six cabins on each side. (R. 721-2, Vol. 4.) Before my trip in the City of Moab, I went with two other men from Green River, Utah, to Moab in a 16-foot boat with two sets of oars. We hit some sand bars between the mouth of the San Rafael and the mouth of the Green, but had no particular trouble going up the Colorado River to Moab except hard rowing. We went up the Slide without noticing it. This trip consumed ten days. (R. 724, Vol. 4.) We were about four or five days going from Green River, Utah, to the junction of the rivers. (R. 728, Vol. 4.) Our trip back up the Green River with the City of Moab was practically the same as going down, only it was not so hard because we could back off the sand bars. We encountered no sand bars in Stillwater Canyon, and there was plenty of water there, but did get on bars in Labyrinth Canyon and had some trouble at the mouth of the San Rafael. (R. 732-3, Vol. 4.) Next fall, I again saw the City of Moab after it had been remodeled. We went down as far as Valentine Bottom, located about a hundred miles below the town of Green River, in the remodeled boat. They had put in a new engine and a stern wheel and had made the boat 10 feet longer. We used coal as fuel. The stern wheel helped us in getting off sand bars, but our trip was much like the former trip. (R. 735-8, Vol. 4.) I can't say whether the channel of the river changed but the sand shifted about. We did not have very much trouble coming back upstream from Valentine Bottom until we reached the gravel bars. (R. 739, Vol. 4.) When I made the trip up to Moab in the small boat and made soundings, I arrived at the conclusion that there would be no serious difficulty in operating the City of Moab on the two rivers. That trip was made at low water, and at that same stage of water we would have had no difficulty in going up through the Slide with the City of Moab. (R. 743-5, Vol. 4.) When we made the trip in the remodeled boat, our objective was Valentine Bottom, and when we reached that objective we turned around and came back with only the incidental difficulties I have mentioned. (R. 746, Vol. 4.) I cannot tell whether the channel of the river was in the same place on my second trip as it was on my first trip; that is a difficult thing for any one to do. (R. 751-3, Vol. 4.) The remodeled boat was called The

Cliff Dweller and was of the same draft as the City of Moab. (R. 754-7, Vol. 4.)

*Ellsworth L. Kolb* testified: In September, 1911, my brother and I left Green River, Wyoming, with two flat bottom 16-foot row boats. (R. 764-5, Vol. 4.) Between Green River, Wyoming, and Green River, Utah, we noticed different ranches in different sections where boats were tied up to the shore. (R. 786, Vol. 4.) We made the 24 miles odd to Wolverton's ranch in one day. (R. 786, Vol. 4.) Between the San Rafael and Labyrinth Canyon, we frequently ran on to sand bars. Each of us when rowing would be facing upstream, but we would look over our shoulders and pick out what we thought were the deeper channels. (R. 788-9, Vol. 4.) If we had had some one in the stern who could have kept a lookout, it would have helped. We did not have much trouble in Stillwater Canyon. (R. 790, Vol. 4.) We ran every rapid in Cataract Canyon without lining either of our boats and without any mishap. (R. 792, Vol. 4.) I recall no difficulty in Narrow Canyon, but from there on down we frequently climbed out to make pictures. (R. 796, Vol. 4.) We saw three men at Hite and there were three cabins within a few miles of each other. We also saw Bert Loper in a boat. (R. 799, Vol. 4.) He had a placer dredge there and some stock. At Warm Creek we noticed twenty men engaged in building a flat bottom steamboat. (R. 800, Vol. 4.) We left Green River, Wyoming, on September 8, 1911, and arrived at Green River, Utah, October 16. We left Green River, Utah, October 19, and arrived at the mouth of the river October 26. We left there on October 26, and arrived at Lees Ferry on November 6, 1911. (R. 809-10, Vol. 5.)

On September 11, 1921, I again began a river trip, leaving Green River, Utah, on that day with the U. S. G. S. and Edison Electric expedition for the purpose of making a survey of the river for dam sites. (R. 812, Vol. 5.) There were ten men in that party. We had two 18-foot boats with a 4½ foot beam and a third boat equipped with an outboard motor. (R. 816-20, Vol. 5.) We had some trouble scraping rocks in the riffles directly below Green River. (R. 822, Vol. 5.) After we left the mouth of the San Rafael, my notes show that we hit one sand bar. (R. 823, Vol. 5.) Sometimes we knew there was a channel, but because of the speed of our motor propelled boat we didn't have a chance

to reach it and would run on to a sand bar; but more often it was because we did not know just where the channel and deep water was. We had less trouble in Stillwater than in Labyrinth Canyon. Below Double Bowknot we overtook my brother and tied his boat on one side and one of the other boats on the other side of the motor boat and propelled them all with the one outboard motor. We arrived at the mouth of the Green River on September 15. From the junction of the rivers down to the first cataract in Cataract Canyon, I recall having no trouble with sand bars. (R. 824-6, Vol. 5.) The rapids in Cataract Canyon change very little and I found conditions about the same as in 1911. (R. 830, Vol. 5.) We did not line the boats through Cataract Canyon except at the rapid in Dark Canyon. (R. 832, Vol. 5.) One boat was stuck on a rock and was overturned while pulling it to shore. Cataract Canyon is exceptional in that it is possible to take a boat out at every rapid and get it around the rapid if you wish to do so. (R. 836-7, Vol. 5.) From Narrow Canyon to the mouth of the San Juan we encountered about the same incidents as on my former trip. (R. 841, Vol. 5.) Tom Wimmer met us in a motor boat a short distance above Hall's Crossing; he was engaged in delivering supplies to the government engineers. (R. 845, Vol. 5.) Wimmer is a river man and always had boats scattered at different places. (R. 847, Vol. 5.) From the mouth of the San Juan to Lees Ferry we had two boats carrying 1500 pounds of supplies. We encountered sand bars where the boats would get stuck for a short time, but we would push them off. (R. 850, Vol. 5.)

*Henry E. Blake* testified: My only experience on the San Juan River was in 1921. I helped launch boats for the government survey party at a point about 4 miles below Bluff. The boats were 16 feet long, with a 4-foot beam and a 1-foot draft. On the first day we went down the river to Butler Wash and I took a boat down stream to a point just at the Narrows, where one or two other members of the party got in the boat and we rode through the Narrows. I did not run on to any sand bars and had no difficulty in operating the boat in that stretch. (R. 878-885, Vol. 5.) After that I would use the boat once in a while rowing across the river, but my next actual boating experience was through the canyon above Clay Hill Crossing. Our boats were heavily loaded and there were sand waves but

they were not large waves. Between there and the mouth of the San Juan River I recall an instance when I took a boat through a small rapid. Both boats struck rock at this point and the one I was operating split because of faulty construction of the boat. (R. 885-7, Vol. 5.) We portaged the boat around one rapid at a point 11 miles above the mouth of the San Juan. This was the only portage we made and we did not have to line the boats through any other rapid. Once in a while I observed that a boat was stuck on a sand bar. (R. 888, Vol. 5.) After we reached the Colorado River Bert Loper and I made a boat trip up the Colorado River to Hole-in-the-Rock, and all the party came back with us in the boat to our camp at the mouth of the San Juan. (R. 891, Vol. 5.) In boating from the mouth of the San Juan down to Oak Creek we had no great difficulties and I do not recall any special instance where we were stuck on sand bars so that we had to get out and push the boat. Then we continued on to Lees Ferry. (R. 892, Vol. 5.) In that stretch we were at one place stuck on a mud bar as a result of my poor judgment. The survey party left Bluff on July 18 or 19, 1921, and the date of our arrival at Lees Ferry was the 19th of December, 1921. (R. 893, Vol. 5.) While working on the survey, supplies were delivered overland to the party. (R. 894, Vol. 5.)

In 1928 I accompanied Mr. Hoyt on his trip from Green River, Utah, to Moab. (R. 911, Vol. 5.) The large motor boat that met us at the junction made it up through the Slide very easily. (R. 924, Vol. 5.) Our boat encountered a submerged bar there, so that I had to drift down and when I started up again had no difficulty in getting through. (R. 925, Vol. 5.) When I made my first trip from Green River to Moab in the gasoline launch there were several others in the party and we had our beds and supplies on board. (R. 931-4, Vol. 5.) My father has owned and operated two power boats that I know of on the river. (R. 935, Vol. 5.) The 1909 trip was taken at comparatively low water. (R. 936, Vol. 5.)

On my trip with Mr. Hoyt I purposely put my boat in a position where Mr. Hoyt could see and study a bar and on a great many occasions started the boat on to a bar for this purpose. (R. 938, Vol. 5.) On my trip with Mr. Hoyt down from Green River, Utah, to the San Rafael, the water was lower than it had been since the spring flow-off. (R. 944, Vol. 5.) Mr. Marrs brought supplies in a government

boat from Lees Ferry to a point near Aztec Creek located about 9 miles below the mouth of the San Juan. It was a 24-foot motor boat with several men in it. (R. 947-8, Vol. 5.)

We had less trouble on the journey I took with my father and his party in 1909 than on my trip with Mr. Hoyt in 1928. (R. 952, Vol. 5.)

*R. C. Clark* testified: I live at Moab; am an owner of Moab Garage Company which is engaged in the transportation business. We file our schedule of rates with the Public Utilities Commission of Utah. My company operates a scow on the Colorado River; it is 15 feet wide, 75 feet long and 3 feet deep from gunnel to the bottom. The first engine we used in this scow was an automobile engine. Empty its draft is 4 inches and with a 15-ton load the draft is 20 inches. I have personally been down the river on that scow and had no difficulty in operating it on any of the trips when I was along. It did not get stuck on any sand bars on the five or six trips I have taken. (R. 959-63, Vol. 5.) Between March 2, 1925, and June, 1929, that boat has made from 245 to 250 trips, eight of which have been made this year and there are prospects of further freight. We expect that another well will be drilled down there. I am familiar with the bed of the Colorado River from Castle Creek to the junction and have been on the river in all kinds of boats, motor boats, row boats and sail boats. Our scow has never been farther down than Lockhart, about 40 miles below Moab. In my river experience with row boats and motor boats, I have encountered sand bars which are generally found in the same place. They can usually be avoided and I have not been stuck on them for any length of time. (R. 964-6, Vol. 5.)

I recall the Undine, which was 60 feet long, with a round bottom and propelled by steam. It drew about 18 inches of water. I don't know how many trips it made before they started to go up the river from Moab to Cisco. At Nigger Bill riffle the boat got sidewise in a riffle and turned over. (R. 966-7, Vol. 5.) Since I started to operate boats on the river I have taken whatever business was offered. I have had four boats in operation at the same time, three power boats and one boat with an outboard motor. I supply the various oil companies with my service. For transportation of freight alone the various companies operating below Moab have paid me approximately \$40,000. In addi-

tion to our freight operations we have had quite a little passenger traffic and have taken parties up and down the Colorado to its confluence with the Green. (R. 971, Vol. 5.) We have run advertisements for sightseers and have invited traffic on our boats from sightseers. Since 1925 we have made from two to three hundred trips with our boats carrying passengers only. (R. 973, Vol. 5.) I have been there on the job as manager all the time and have kept in touch with the trips and the freight carried. During all of the period in which we have been engaged in freight and passenger transportation on the river there has been no serious incident occur in the way of interference with navigation. Our gasoline launches that we have operated in commercial service are: one boat 22 feet long, 6 feet wide, with a screw propeller; one boat 18 feet long and 8 feet wide; and another boat 18 feet long and 4 feet wide. We used our boats other than the scow for taking small loads on rush trips. (R. 974, Vol. 5.) The Midwest Oil Company operated boats on the river, plying up and down between its wells and Moab. The Texas Oil Company had a motor boat. The government has had boats with outboard motors, operating up and down the river from Moab. (R. 975-6, Vol. 5.) Defendant's Exhibit No. 4 is a picture of another of our boats. Defendant's Exhibit 3 is similar to a boat of the Utah Petroleum Company. (R. 976, Vol. 5.) Defendant's Exhibit 1 appears to be our pier at Dock No. 1. (R. 975, Vol. 5.) We operated our boats, leaving on a schedule at a certain time every day while the oil operations were in progress. A lot of people from all over the country took the trip to see the wells and others were interested in oil structures down there. This was mostly in December, 1925, and January and February, 1926, but we have had a little passenger transportation all of the time until our last shutdown. If oil should be discovered farther down the river, say down toward its junction with the Green River, the oil men would get their supplies down there by boat. (R. 979-981, Vol. 5.) We have taken 15 or 16 tons at a time on the big boat. (R. 988, Vol. 5.)

*Harold W. C. Prommel* testified: I am a geologist and mining engineer and in 1920 went to Moab to study the geology of that section. (R. 989-991, Vol. 5.) I made the location for Shafer No. 1 Well. (R. 997, Vol. 5.) I recommended to my employers that in drilling that well they use river transportation because it was cheaper during the exploration period and also quicker. (R. 1003-4, Vol. 5.) In

the event that it turned out to be a commercial field, I believe that it would be more economical to construct a road. (R. 1007, Vol. 5.) I made a trip from Moab to Shafer No. 1 Well (R. 1035, Vol. 6), and we got stuck on a sand bar going down. On the upstream trip I believe we struck a sand bar once. (R. 1036, Vol. 6.)

*John Galloway* testified: I have boated on the Green River from almost its starting point to Lees Ferry and on the Grand River from Westwater to the mouth of the Green. (R. 1041, Vol. 6.) In April or May, 1926, my brother and I went from Westwater to Moab in a 16-foot row boat with a 5-foot beam, drawing only 4 inches of water loaded. From Westwater Canyon down the water was sluggish in places and in other places would break over little riffles. (R. 1040-5, Vol. 6.) I think I could take a row boat up from Moab to Westwater Canyon but could not row all the way up. (R. 1045-6, Vol. 6.) In February or March, 1925, my brother and I, with the same boat I have mentioned, went from the mouth of the Green River up to Moab, consuming five days in reaching Shafer Well No. 1, where we put our boat on to the big motor boat and rode up to Moab. (R. 1047-9, Vol. 6.) It is not difficult to row a boat up through the Slide on the Colorado and we did so, but we probably towed the boat two-thirds of the distance upstream. (R. 1050, Vol. 6.) We would row where it was not convenient to reach and pull the boat with our tow line. When we were riding on the big barge it had a little trouble at a sand bar just below Moab. (R. 1051, Vol. 6.) In December, 1927, my brother and I made a boat trip from the Junction up to Lockhart. There was ice running in the river, so we left our boats there, walked up to Oil Camp No. 1, where we took passage on the Moab Garage boat to Moab. I recall no difficulty encountered by that boat on that trip, although it seems to me we kind of stuck on bars two or three times. The floating ice didn't seem to bother it. (R. 1053-4, Vol. 6.) In February following we went back to Lockhart and trapped for beaver the rest of the winter between Lockhart and Moab. (R. 1055, Vol. 6.) On my different trips on the Green River I have noticed some difference in the channel of the river, but those changes do not occur frequently in that stretch of the country. (R. 1058-9, Vol. 6.) The Green River does not freeze over every winter in that section, and I do not believe the Colorado River freezes over above the mouth of the Green in that region. (R. 1060-1, Vol. 6.) I



have prospected through Glen Canyon in two different years, and on one trip hauled our lumber to North Wash, about 4 miles below the mouth of the Dirty Devil, and there built our boats. (R. 1062, Vol. 6.) In the stretch of the Colorado between Cataract Canyon and Lees Ferry there is some difficulty in different places; it is about the same as the upper Colorado, except that you have more water. Occasionally, but not frequently, there are twisting currents in the nature of whirlpools. (R. 1068, Vol. 6.) My father, Nathaniel Galloway, used to do a lot of trapping on the San Juan, Colorado and Green Rivers, which he went up and down, following his vocation; I suppose he went up in places. I know he went all the way down on those rivers. (R. 1074, Vol. 6.) I do not remember father's ever having any motor boat; the old trappers seemed to depend on the old style of navigation. (R. 1076, Vol. 6.) I don't particularly mind going up the Colorado River, although it is hard work, as it is rowing upstream on any river. (R. 1081, Vol. 6.) I had no more difficulty in going from the mouth of the Dirty Devil down to Lees Ferry than I had in going from the mouth of the San Rafael to the mouth of the Green River. (R. 1107, Vol. 6.) I know there is a big Indian reservation on the Snake River, the Blackfoot Reservation, and I don't remember ever seeing an Indian with a boat on the Snake River. (R. 1116, Vol. 6.)

*Parley Galloway* testified: I have made four or five trips from Green River, Utah, to the mouth of the Green River and I have always found the location of the sand bars the same in that section of the river. I had trouble with sand bars nearly all along that section. (R. 1126, Vol. 6.) On the first part of the Eddy trip we had considerable trouble; none of the party had ever had any experience in navigation. (R. 1127, Vol. 6.) In going through Glen Canyon with the Eddy party we did not have a great deal of trouble, although we found sand bars and nearly every day some of the boats would get stuck on a sand bar; and when we took Howland through Glen Canyon we had some difficulty with sand bars. (R. 1130, Vol. 6.) In my opinion you could not take a boat from Moab up to Westwater but you could go from Moab up 10 or 15 miles. (R. 1133, Vol. 6.) There are some riffles there that I do not believe a man could row over but he could row over those and go on up. (R. 1134, Vol. 6.) I was probably 15 years old when I took a trip through Cataract Canyon with my father. I

don't recall whether or not we lined our boat. It was a prospecting and trapping trip to Lees Ferry. When you are traveling with a row boat, especially upstream, on any river that I am familiar with, it is much easier in certain stretches to get out and tow the boat than to row. (R. 1140-1143, Vol. 6.) Because none of the other members of the Eddy party had had any prior experience with boats or with the river, we encountered quite a bit more trouble than otherwise would have been encountered on the early portion of the journey. (R. 1145, Vol. 6.)

*Virgil Baldwin* testified: I have operated three small boats and one large boat on the Colorado River. One boat was 27 feet long, 5 feet wide, and drew 10 inches of water with ordinary load; it had a 6 cylinder automobile engine. Another boat was 20 feet long, 4 feet wide, with a draft of 6 or 8 inches of water and was powered with a Ford motor. Another boat, called the Black boat, was 18 feet long, 3½ feet wide, and drew 10 inches of water. The big boat was 75 feet long, 14 feet wide, and equipped with an automobile engine. It had an 8-foot paddle wheel that was 12 feet across and contained twelve paddles. At the rear that boat probably drew 18 inches of water and when loaded its draft would be two or three inches greater. My first experience on the Colorado River with these boats began in February, 1925, although I had formerly taken a trip or two for pleasure in an Evinrude boat. (R. 1155-61, Vol. 6.) In 1925 I made 80 or 90 trips with the big boat; in 1926, about that many more; during 1929 I probably made 25 or 30 trips, and other trips were made in 1927 and 1928. There were probably 150 or 200 trips all told. (R. 1163-4, Vol. 6.) We started in March, 1925, and ran steadily for five months, with occasional trips from that time on during that year. Next year we made trips during most of the months of the year every few days. In 1927 and 1928 there weren't so many trips. In 1926 we made trips during each month of the year. (R. 1164, Vol. 6.) Our load would average between 12 and 15 tons during a part of this period. (R. 1165, Vol. 6.) We did not always find the deep water and its location would change in the course of three or four days, especially if we were not running. Every change in the stream flow caused a rearrangement of the sand. (R. 1166, Vol. 6.) We had more trouble in operating the boat at low water. (R. 1167, Vol. 6.) Ordinarily if we ran on to a bar going upstream we could back off



it, but often it was more difficult going upstream because we could not handle the boat. (R. 1168-9, Vol. 6.) During high water we occasionally encountered sand bars. If we had no trouble going downstream we would make the trip to Shafer No. 1 Well in about two hours and a half, a distance of 19 or 20 miles; the return trip would take about 6½ or 7 hours, sometimes longer. Seventy-five per cent of the time we would have trouble with sand bars. (R. 1169-70, Vol. 6.) The longest time we were ever stuck was a day and a half at a point 1½ miles below No. 1 Well, where the river divided into four parts, no one of which was deep enough to float the boat; that was in August, 1926. (R. 1170, Vol. 6.) We were stuck many other times for as long as an hour to four hours. The longest time we ever took going up to Moab from No. 1 Well was ten hours. (R. 1171, Vol. 6.) The troubles that I have detailed occurred during July, August, December and January, when the water was at its lowest stages. (R. 1177, Vol. 6.) We also had trouble during other months, including trouble with floating ice during January, February and March. (R. 1178, Vol. 6.) If we hadn't been on the river for a day or two or a week, we would have members of the crew up in front taking soundings, which would help quite a bit; but if we were running regularly there "wouldn't be much for the other men to do, because running regularly I would know very near where to go; but I would kind of get off my course lots of times and get stuck." (R. 1181-2, Vol. 6.) During the winter of 1924-5 the river froze over between December and the following March, but it has not frozen over since then and such an occurrence is unusual. In January, 1926, there was an ice jam that prevented us getting through. (R. 1192, Vol. 6.) The tonnage of freight carried on the big boat would average 10 or 11 tons a trip going down and about the same tonnage on the upstream trips. (R. 1200, Vol. 6.) In operating the big boat I would say that 25 per cent of the time we had no difficulties going either up or downstream; 50 per cent of the time we had no difficulties that would tie us up for more than a few minutes; and 25 per cent of the time we would have difficulties that would delay us five or six hours, except three occasions when the delays were longer than that. (R. 1208-10, Vol. 6.) All of the boats concerning which I have testified were run for commercial purposes and for the profit to be made in the operation. (R. 1215, Vol. 6.)

*Lieutenant-Colonel Elliot J. Dent* testified: I am in the Corps of Engineers, U. S. Army, have had experience on many rivers of the United States, and between September 25 and October 4, 1929, examined the Colorado River. (R. 1217-18, Vol. 7.) I went down the Colorado from Moab to Cataract Canyon; thence up the Green River 5 miles; thence back to the confluence and up to Moab. The bed of the Colorado is quite permanently located between rock banks, with small opportunity to move sidewise more than a few hundred feet or as much as its full width. Within these limits the bed is very changeable. With few exceptions the bars had small trees on them, generally not older than 20 years. (R. 1222-7, Vol. 7.) We left Moab on August 25, 1929, in the 27-foot power boat of Moab Garage Company, and I observed numerous groundings of the boat. (R. 1227-33, Vol. 7.) As compared with the lower Mississippi River the sand in the water of the Colorado was extremely heavy. (R. 1244, Vol. 7.) I know of no other river in the United States comparable in character to the Colorado. (R. 1247, Vol. 7.) After examining this stretch of the Colorado I went overland to North Wash, leaving that point in a 16-foot boat with a 4-foot beam and a very pronounced keel, powered with an outboard 8-horsepower motor, on September 1, 1929. (R. 1252-1256, Vol. 7.) Between Mile 78 and Mile 74 I observed sand waves, the worst of which were 10 or 12 feet long, that is, between crests, and about 3 feet in height, tapering down to nothing but the chop. We had no difficulty in getting through. (R. 1261-3, Vol. 7.) At Red Canyon (Mile 150) we saw a prospector with a skiff about 12 feet long but no other boats. (R. 1266, Vol. 7.) With the boats actually in use between Moab and the junction that section was much more navigable than Grand Canyon. (R. 1267, Vol. 7.) I was instructed by the War Department to assist in this case and understood the nature of the controversy here involved. (R. 1271-2, Vol. 7.) We left North Wash (167½ miles above Lees Ferry) at 1:30 p. m., on September 1 (R. 1277, Vol. 7) and arrived at Lees Ferry at 1:10 p. m. (R. 1282, Vol. 7) on September 4 (R. 1267, Vol. 7), making a side trip to Rainbow Bridge on September 3. (R. 1280, Vol. 7.) I was never before on that river and have never seen it since. (R. 1288, Vol. 7.) There was much more water in that section of the river below North Wash than on the section between Moab

and the confluence. (R. 1290, Vol. 7.) Most of the western rivers carry sand in varying quantities and are subject to precipitation from melting snow and also from heavy rains in the late summer. The Missouri River below Kansas City, during freshets, builds bars, cuts banks and changes considerably, and if it was never dredged the maximum depth in low water over some of those bars would be 3 feet. (R. 1296-8, Vol. 7.)

*Carrol Edward Dobbin* testified: I am with the U. S. G. S. In 1926 I was on the Colorado from Moab to the junction and up Green River one mile. (R. 1308-9, Vol. 7.) During that summer I was supervising four field parties, two of which were working south of the railroad line, and I had occasion to visit the country in the pie-shaped area south and lying between the Green and Colorado Rivers. (R. 1310, Vol. 7.) I took a trip down the Colorado to the junction with J. B. Reeside, Jr., between August 4 and 10, 1926, in a 16-foot Evinrude motor boat, in which we had two rolls of bedding, supplies for a week, at least 25 gallons of gasoline and our cameras and surveying instruments. We had sand bar trouble and got stuck at some places coming back upstream where we had no difficulty going downstream. We were examining the country, collecting fossils, noting its geology, taking photographs, and would stop two, three or four hours at a place. (R. 1318-23, Vol. 7.) This was my only boat trip on the Colorado River except one former trip from Moab down to the Shafer Well. If I had been familiar with the channel of the river I would in all probability have avoided a great deal of our trouble. (R. 1327-1334, Vol. 7.) I have no recollection of being stuck or encountering difficulty at any place coming upstream on this trip where we had met with no difficulty doing downstream. (R. 1335, Vol. 7.)

*Harry Aurand* testified: I am a geologist employed by Midwest Refining Company of Denver. (R. 1338-9, Vol. 7.) I have gone by boat from Moab to the head of Cataract Canyon and also on the Green River from its mouth to Mile-post 34. I have been below Moab in a boat on five different occasions, twice on the big scow of the Moab Garage Company, once in another of their boats, and twice in a still different boat. My first trip was in a row boat and I had difficulty with sand bars. (R. 1348-50, Vol. 7.) On my trip in the smaller Moab Garage power boat we commenced

to encounter trouble after leaving Mile-post 39, that boat having been towed by the big scow up to that point. Going down on the scow and the smaller boat we encountered trouble with sand bars at eleven different places. (R. 1351-2, Vol. 7.) It was not necessary for any one to go overboard and push the boats off from sand bars on either my Colorado or Green River boat trips. (R. 1354, Vol. 7.) The only oil permits in which my company was interested below the Shafer wells was at Indian Creek. (R. 1363, Vol. 7.) On the river trip I have described I made notations of difficulties in navigation after I passed Indian Creek clear down to 5 miles below the confluence and thence up to Mile 34 on the Green River, although my company had not even a prospective contract for drilling wells or any other interest in wells in the vicinity of Green River. (R. 1363-5, Vol. 7.) I have heard that my company was a defendant in a certain suit instituted by the State of Utah and Texas Oil Company against the Midwest Refining Company, Shafer and others. (R. 1368, Vol. 7.) One reason why I made notations as to navigability on the Green River was to determine whether we could bring supplies down from Green River to the junction and thence up to Indian Creek on the Colorado River by boat. (R. 1377, Vol. 7.)

*Franklin A. Nims* testified: I am 75 years old and on May, 25, 1889, left Green River, Utah, with the Robert B. Stanton expedition. There were sixteen in the party, which was to survey a railroad line down the Colorado River. We had 15-foot boats with a 3-foot beam and a depth of 2 feet and keel bottom. (R. 1382-3, Vol. 7.) Between Green River, Utah, and the mouth of the San Rafael we encountered rapids and gravel bars and about 2 miles below the town my boat struck a rock which knocked two holes in it; occasionally our oars would strike gravel, showing that it was shallow. Between the San Rafael and Labyrinth Canyon, we encountered some rapids with no damage to the boats except to spring some seams. Once in a while we would run on to a sand bar, jump out and pull the boat off and go on. "All of the boats didn't do that; the boats in the lead would do that, and the others would attempt to steer clear of it by trying to find another current, or a current, in another place." We started with six boats, which were so heavily loaded that the water came within three or four inches of the gunnel. Thereafter we pulled ashore and made a raft, which the sixth boat towed with part of our cargo

on it. We encountered some sand and small rapids in the upper end of Stillwater Canyon, but after we came out of that canyon encountered no difficulty until we reached the head of Cataract Canyon. (R. 1397-8, Vol. 7.) We lost two boats in Cataract Canyon and broke up a third boat in order to get nails to make repairs on the other three boats. Mr. Stanton took five men with him to continue his survey and the remainder of the party, with two boats, went on down to the placer mines at the mouth of the Dirty Devil for provisions. (R. 1399-1400, Vol. 7.) There were from twelve to twenty miners scattered along there and not more than a dozen buildings at Hite, which we called Dandy Crossing. (R. 1401, Vol. 7.) Below Cataract Canyon we encountered the Tickaboo Rapid, where one boat was damaged and repaired, and we had more trouble at Trachyte Rapid, where we stopped and repaired leaks. From Trachyte down to Lees Ferry we would strike rocks and could not find a defined channel. We also encountered sand waves and such a strong wind that it was hard to row against it. There was no rapid water below the San Juan but every few miles one of the boats would run on to a sand bar. (R. 1402-4, Vol. 7.) We drank the water of the Green and Colorado Rivers on this trip, although occasionally we would come across a spring. We didn't strain the river water, but at night the cook would dip up a bucketful and let it settle. (R. 1408, Vol. 7.)

On November 25, 1889, I left Denver for another river trip. We shipped three 22-foot boats, with a 3½-foot beam and a depth of 22 inches, having a draft of from 15 to 18 inches loaded, to the mouth of Crescent Creek, located a few miles below the Dirty Devil on the Colorado River. (R. 1409-10, Vol. 7), leaving that point in our boats on December 10. We visited Mr. Hite at his placer mine, also stopped at Smith Brothers' ranch, and there were placer miners working in the canyon. We had some trouble with gravel bars; more than on our first trip because the water was lower. (R. 1414, Vol. 7.) About two-thirds of the way down the river we would stop occasionally when we would see a sand bar and pan the dirt for gold. I wrote the articles appearing in Complainant's Exhibit No. 177 entitled "Miscellaneous, by Franklin A. Nims." I wrote the article contained in said exhibit which bears the description "Through the Colorado River," when the incidents of my trip were fresher in my mind than at the present time and when I had the benefit of my notes and diary. I refer to my journey

from Green River, Utah, to the mouth of the Green when I say at page 258 in said exhibit,

"We had a pleasant sail down the Green of one hundred and twenty miles, to its junction with the Grand, forming the Colorado." (R. 1433-4, Vol. 8.)

And the statement that I make on the same page of said exhibit, to wit,

"In the beginning of Cataract Canon, we encountered our first real rapid \* \* \*" (R. 1436, Vol. 8.)

is also a true statment.

My article "Through Mysterious Canons of the Colorado," after reciting that we had arrived at the mouth of the Green River, correctly states the fact at page numbered 254 of said exhibit:

"After overhauling and re-packing our cargo and establishing our points, we turned loose on our perilous journey \* \* \* Six miles below, at the head of Cataract Canon, we struck our first real rapid." (R. 1438, Vol. 8.)

The perilous journey I referred to was through Cataract Canyon. (R. 1439, Vol. 3.) In another of my articles appearing on page numbered 74 of said exhibit, where I said: "Here ended the 'picnic' part of our trip; then followed in quick succession mishaps, loss of provisions, etc.," I referred to our trip from Green River, Utah, down to the head of Cataract Canyon as the "picnic." (R. 1440, Vol. 8.) On page numbered 75 of said exhibit I correctly record: "From this point (mouth of the Dirty Devil) to Lees Ferry, Arizona, one hundred and fifty miles, the trip was uneventful." (R. 1450, Vol. 8.) Also at page numbered 259 of said exhibit I make the following comment concerning the trip from Tickaboo down:

"We now pushed out, and owing to the long stretches of smooth water, with very few rapids, we arrived at Lees Ferry, one hundred and fifty miles below, on the afternoon of July 2nd, etc." (R. 1444, Vol. 8.)

igh B. Lint testified: I was with the U. S. G. S. in A boat was brought to us overland at North Wash e used it as far as Bullfrog Creek. We then went Green River, Utah, where we obtained three boats Galloway type and used them down the Green River ough Cataract Canyon, continuing our work until ked up our old lines at Bullfrog. (R. 1467-8, Vol. 8.) ss on the lower Colorado River survey was very slow e we had to work on the side canyon up to a 3900 evation. We had just one boat and encountered sand and shoals. It was necessary to go back and forth the river in the boat and it took time to pick a l. The main thing was that we were compelled to look out for sand waves so as not to be caught in with our load. (R. 1470-2, Vol. 8.) When we brought ats down the Green and made our survey through ct Canyon we had an Evinrude motor in one boat. 16 feet long, 4-foot beam, and drew about 10 inches loaded with about 1000 pounds. The other boats were t boats with rounded sides. We left Green River in mber and encountered a lot of shoals and several times ne had to get overboard to push the boats along. 79, Vol. 8.) This situation continued the same through ater and Labyrinth Canyons. (R. 1480, Vol. 8.) From ater Canyon to the head of Cataract Canyon, we enered no difficulty except that just above the confluence t a sand bar and broke the propeller shaft of our . From there on we didn't use a motor. (R. 1481. .) I don't think we could have brought the same boats the load they had, up the river with that motor. (R. Vol. 8.) (Ellsworth L. Kolb testified concerning this trip, especially the journey through Cataract Canyon.) progress through Cataract Canyon was comparatively because we had to carry the line of traverse through at me time we went through with the boats. (R. 1484, 8.) I believe there are talus slopes on one side or ther all the way through Cataract Canyon. (R. 1486, 8.) As soon as we got through Cataract Canyon, the took all of the boats except one. I was again on the River in 1922, with the Trimble party but that ition did not go below Green River, Utah. (R. 1490, 3.)

Frederick S. Dellenbaugh testified: I am 76 years old am an artist and writer. In 1871 I joined the second

Powell expedition which began at Green River, Wyoming, and went thence down the Green and Colorado Rivers to the mouth of Kanab Canyon, Arizona. (R. 1514-15, Vol. 9.) We had three 22-foot boats with three compartments in each, having a draft of 18 inches loaded. There were ten in our party; four men in Major Powell's boat and three in each of the others. (R. 1517-18, Vol. 9.) Upon arriving at Green River, Utah, then known as Gunnison Crossing, we took on new supplies. Between Green River, Utah, and the mouth of the San Rafael there are no rapids; just swift water with riffles which didn't amount to much as compared with rapids we had gone through farther up the river. (R. 1522-5, Vol. 9.) We left Green River, Utah (Gunnison Crossing), in July and, as I recall had no very serious trouble with groundings between there and the mouth of the San Rafael. We did have trouble with groundings in Labyrinth Canyon, but not in Stillwater Canyon. Only Major Powell had been on first Powell expedition. (R. 1527-8, Vol. 9.) Just below the San Rafael there were heavy rain storms and cascades falling into the river, but I recall no difficulty or change or rearrangement of sand bars as a result of these rains. Through Cataract Canyon and 10 miles of Narrow Canyon you have a very severe river, in one 20-mile stretch there being a fall of about 220 feet. (R. 1529, Vol. 9.) We often lined the boats and at times had to portage our cargo from a hundred yards to perhaps a quarter of a mile; we lost no boats in Cataract Canyon. (R. 1530, Vol. 9.) There was one rapid in Glen Canyon just below the mouth of the San Juan, but above that the water had been rather low and we encountered ledges running across the river which made it necessary for us to get out and wade and lift our boats over those ledges. (R. 1531, Vol. 9.) When we went through Glen Canyon a second time the water was high and we had no trouble with the ledges. We had trouble with a number of small rapids and shallows. I remember no sand bars in Glen Canyon. Because the river was low we had to go with great caution over the rapids. (R. 1532, Vol. 9.) When we passed the mouth of the San Juan in the middle of October, 1871, that river, like the Colorado, was low; on my second trip there, about July 1, 1872, the water was exceedingly high. We had no trouble at the Crossing of the Fathers because the Indians had marked the shoal and we could see right where it was. From there to Lees Ferry we encountered no difficulty. (R. 1537-8, Vol. 9.)

I never found any evidence of Indians having owned or operated boats on these rivers. (R. 1558, Vol. 9.) I have found no evidence that the Spaniards ever used any of these three rivers for navigation purposes. (R. 1563, Vol. 9.) There was extensive fur trapping in and about the Green River commencing about 1835 or 1840 and the furs were moved out of that country by pack train to St. Louis (R. 1570, Vol. 9.) With furs as with other commodities, the seller goes to the place where he finds a market. (R. 1571, Vol. 9.)

When I passed the mouth of the San Juan in October, 1871, the stage of water was quite low. When I wrote "A Canyon Voyage" (Exhibit No. 14), I had leisure and ample opportunity to consider the facts there recited. We saw no part of the San Juan River except its mouth. My statement that when I passed the San Juan in October, 1871, it was shallow and "some eight rods wide" was an accurate statement, although I did not get out the measure the stream with a tape. When I went past the San Juan on my next trip the water was high and that river and the Colorado were large streams. (R. 1572-4, Vol. 9.)

The statement made in my book (Exhibit No. 14) that our descent from Gunnison Crossing to the head of Cataract Canyon was without a rapid worth recording was correct from our point of view. Except for sand bars that stretch of water was quiet and easy sailing. We had no serious difficulty but occasionally would strike a sand bar and have to get out and wade along. At times we had difficulty in locating the channel and if we got on a sand bar would push off into deeper water, which sometimes was a long ways off, but we had no serious delay or mishap. (R. 1575-6, Vol. 9.) We had no sand bar trouble in Stillwater Canyon but in Labyrinth Canyon would strike a sand bar every hour or so. On one or two occasions, as I recall, we were compelled to walk as much as a quarter of a mile to reach deeper water. The sand bars didn't hurt our boats and we did not consider them of any particular importance except that they retarded progress. I do not wish to intimate that we spent most of our time on sand bars in Labyrinth Canyon or anything of that kind. (R. 1577-9, Vol. 9.) In Glen Canyon the water was at low stage. It is true, as stated in my book, that a trifle more water would have done away with the sand bars, or at least would have enabled us to ignore them completely. I think it would have required consider-

ably more water to have done away with them in Labyrinth Canyon so that we wouldn't have been bothered by them. (R. 1580, Vol. 9.) I remember no sand bars in the Colorado River after we reached a point 20 miles below the Dirty Devil. The only thing we observed on the stretch of river between Cataract Canyon and the Utah-Arizona state line which created anything approaching the obstacles encountered by us in Labyrinth Canyon was the one rapid I have referred to located just below the mouth of the San Juan, the sandstone ledges I have spoken of and some sand bars. In going over those ledges I do not recall spending any time trying to pick out a particular channel for our boat. (R. 1581, Vol. 9.) In my book entitled "Romance of the Colorado" (Exhibit 13, at page 287), I say that all through Glen Canyon we found evidences of Puebloan occupation and that the "river was tame." It would have been better had I said that the river was "comparatively tame." Below the San Juan we had no trouble except at the rapid. "the only real rapid in the Glen Canyon." We made no portage there, ran right through it, and did not consider that there was any danger incident to doing so and paid no attention to it. Below that rapid I recall no obstructions or navigation difficulties from sand bars, shoals or any other cause. (R. 1582-6, Vol. 9.) The only place below Green River, Utah, where our boats were filled with water was in Cataract Canyon and the only other place where you might ship water would be at the rapid in Glen Canyon that I have mentioned, but I don't think we shipped any water there. (R. 1589, Vol. 9.) I don't recall seeing any sand waves but we would not mind sand waves. I suppose we had 1000 or 1200 pounds of supplies in our boats after we left Green River, Utah. (R. 1590, Vol. 9.) We left one of our boats at the Dirty Devil and loaded all of our supplies in the remaining two boats, so that from there down to Lees Ferry our boats were more heavily loaded than they were at Green River, Utah. (R. 1591, Vol. 9.) In Glen Canyon there are bottom lands, all the way through which have been cultivated by the Indians, some of them perhaps a quarter of a mile long and several hundred yards wide. (R. 1593, Vol. 9.)

*John Wetherill* testified: I live at Kayenta, Arizona. I have been a guide in the San Juan country; have seen boats on that river, usually skiffs for crossing. I saw two small skiffs carrying prospectors, one of which made the journey

overland to Bluff. When I saw these parties I was on the bank of the river at Mexican Hat in about the year 1898. (R. 1598, Vol. 9.) I have forded cattle across at Mexican Hat. Once I prospected at the mouth of Johns Canyon, taking my supplies in by pack and I never saw other prospectors down there use the boats or bring in other supplies by boat. In 1902 or 1903 the San Juan went dry. (R. 1599-1600, Vol. 9.) Many times I have seen the San Juan when it was shallow at the place where they cross it below Bluff and also at Mancos and above the Animas River. I wouldn't say how deep it was on those occasions but I could have crossed over at those places without getting my knees wet. (R. 1602, Vol. 9.) Many different people have operated the ferry boat at Hite, but I have never spent any time there except to cross the river. (R. 1608, Vol. 9.) I have crossed the San Juan when it would be 4 feet deep on one side and three or four days later the channel would be on the other side and you couldn't cross because of quicksand. (R. 1609, Vol. 9.) At Johns Camp sand is deposited so that the bed there has been raised 10 feet in the last few years. This has been caused by the summer storms. (R. 1610, Vol. 9.) There are rapids on the San Juan River at the mouth of Piute Canyon and those are the only ones that are of any extent in there. I have seen Turner's 24-foot motor boat on the Colorado. He also used a sail on that boat and he had placer mines there in 1915. (R. 1611, Vol. 9.) He was there for several years and I have seen him going down the river in his boat but haven't seen him use the sail. (R. 1612, Vol. 9.) I have not known of Navajos using boats except to carry their wool across the river in boats owned by the traders. (R. 1613-4, Vol. 9.) The only people who ever resided in the country along the San Juan below Bluff except oil men and placer miners are those at the Mexican Hat trading post. (R. 1620, Vol. 9.) When Turner took me across the Colorado River all of the stock swam the river. (R. 1645-6, Vol. 9.) Between Hite and Lees Ferry there were the following recognized Colorado River crossings: Hite; Red Canyon; Halls Crossing; Hole-in-the-Rock; Crossing of the Fathers. There is a trail or road by which one can get to those crossings and all of them have been established for some years. (R. 1648-50, Vol. 9.)

*Winslow Wetherill* testified: I have never been on the San Juan River below Bluff but have been along its banks.

One winter for about six weeks I trapped for beaver above and below the mouth of Moonlight on the San Juan and waded along the river to set out my traps. During that winter you could wade the stream most anywhere. On one occasion, about 1900 or 1901, the San Juan was dry up at Farmington, New Mexico, where I lived. (R. 1653-4, Vol. 9.)

*Louisa Wade Wetherill* testified: I live at Kayenta, Arizona. I have never seen boats on the San Juan except those we crossed in. (R. 1663, Vol. 9.) The year the river was dry children crossed at a point about 6 miles above Farmington. The dry year was 1902. I have never seen it dry on any other occasion but have seen it real low, so that above Farmington, New Mexico, and below Shiprock, New Mexico, it would be only maybe 3 feet wide and 6 inches deep at different places where we would cross. (R. 1664-7, Vol. 9.) The time when I saw the San Juan when it was only 3 feet wide was at Bloomfield, New Mexico, and it was not the same year as that during which the river went entirely dry; I think it was the next year. (R. 1669, Vol. 9.) Those two dry years were 1902 and 1903, and the place where I saw the river was above Farmington; below Farmington the Animas, which is the largest tributary of the San Juan, also the La Platta and Mancos Rivers flow into the San Juan. (R. 1672, Vol. 9.)

*Clinton Neal Cotton* testified: I live at Gallup, New Mexico; am not very familiar with the San Juan River and have no personal knowledge of any boats being used on that river. (R. 1674-7, Vol. 9.)

*Ernest B. Hyde* testified: I went into the San Juan country in 1880, when I was 14 years old. (R. 1678, Vol. 9.) Later my father opened a trading post 2 miles above the mouth of Montezuma Wash and still later at the mouth of Comb Wash. I helped in the store and we ran some sheep and cattle in that country, which I looked after a good deal of the time. (R. 1681, Vol. 9.) I moved away in 1911 but have been back several times since. I know of no supplies received by boat on the San Juan. (R. 1682-3, Vol. 9.) I have seen sand waves at different places on the river. (R. 1686, Vol. 9.) I have observed the San Juan River during low water at the mouth of Moonlight Canyon and Zahn's Camp. I would say that in low water the normal

width of the river at those points where I saw it would be from 125 to 150 feet and its normal depth there in dry season would be from a few inches to knee deep. I have mostly crossed the river on horseback but I have gone across the river stepping from one stone to another without getting in the water. (R. 1688-9, Vol. 9.) The place where I crossed from one stone to the other was at the mouth of Comb Wash, where there are larger rocks so placed that in extreme low water you can step from one to the other. I don't think it was ever necessary to run ferry boats there for more than 90 days except when the rains came. (R. 1690-1, Vol. 9.) We had a 30-foot ferry boat at Comb Wash and the only other boats I have seen are ordinary 12 to 16-foot skiffs, with flat bottom, and a width of 5 to 6 feet. (R. 1692, Vol. 9.) Except when the first gold boom was on, I don't think there have been more than twenty-five men at one time placer mining on the San Juan. (R. 1694, Vol. 9.) The country west of Bluff is very poor agricultural country, with some little patches that can be dry farmed up near the Elk Mesas. (R. 1697, Vol. 9.) I never knew of Indians boating on the river. (R. 1698, Vol. 9.) I have seen the San Juan frozen over with ice 10 or 12 inches thick: some years it will run mush ice, which is the usual condition. (R. 1700, Vol. 9.) On the occasion when I saw the San Juan River dry, it remained dry for a short time only, "possibly a couple of days." (R. 1701, Vol. 9.) My brother, Frank, who has been a witness in this case, as well as I myself, has an interest in an oil company (R. 1702, Vol. 9); that company has a United States oil permit covering lands which lie near the San Juan River but not in the river bed, although possibly one corner of the permit extends into the bed of the canyon. (R. 1704, Vol. 9.)

*Owen R. Clark* testified: I have lived at Lees Ferry since August, 1922, and am Recorder for the U. S. G. S. On November 10, 1927, I left Green River, Utah, with a party in charge of Mr. LaRue. (R. 1707, Vol. 9.) The purpose of the trip was to take moving pictures. We had six boats 18 feet long, 5-foot beam, and two 16-foot boats. (R. 1708, Vol. 9.) Between Green River, Utah, and the mouth of the San Rafael we had no severe trouble except that two of the boats grounded, and I think they were 15 or 20 minutes getting loose. Between the mouth of the San Rafael and the mouth of the Green the only trouble

we had was on sand bars and getting out of the channel. (R. 1710-11, Vol. 9.) My boat was stuck once and I can't be positive how many times the other boats were stuck between the mouth of the San Rafael and the mouth of the Green. (R. 1712, Vol. 9.) In going through Cataract Canyon two boats were slightly damaged. We portaged our cargo around the Dark Canyon Rapid and lined our boats part way through, shooting the remainder of the rapid. We lost no boats. We ran all of the rapids except one. (R. 1714-15, Vol. 9.) From the foot of Cataract Canyon to Lees Ferry our difficulties consisted of running on gravel bars. One or two of the boats were hung up so that a man had to get out to push them off. We also had some difficulty with what they call whirlpools. We encountered no rapids in Glen Canyon. (R. 1717-18, Vol. 9.) Moving pictures were taken all the way down on our trip, which consumed 21 days. (R. 1719-20, Vol. 9.) On five or six occasions I have made an upstream trip from Lees Ferry. The first trip was in July, 1926, in a 26-foot motor boat with a 5-foot beam and drawing 18 inches of water. We went up approximately 40 or 50 miles, the flow of the river at that time being about 40,000 second feet. We had difficulties with sand bars and in making headway against the current. Two and a half days were consumed going up. (R. 1721-4, Vol. 9.) In taking advantage of the eddies going upstream you may get into a pocket with no outlet and be compelled to return downstream and choose another course. (R. 1725, Vol. 9.) I found that when the river was high we didn't have enough power to go upstream, and when it was low there was too much trouble with sand bars. (R. 1731-2, Vol. 10.) At Lees Ferry bars often form in an hour's time and then cut out. Many times the bars will hold the ferry boat 50 feet from the bank and we would be delayed from a half to three-quarters of an hour getting across. (R. 1732-3, Vol. 10.) I ran this ferry boat for the County between May, 1923, and February, 1925. We ordinarily made four or five trips a day, and in the fall I have made as high as sixty or seventy trips a day with the ferry boat. (R. 1734-5, Vol. 10.) On my upstream trip from Lees Ferry in July, 1926, I found trouble with swift water at two places and also sand bar trouble. (R. 1734-5, Vol. 10.) On my upstream trip from Lees Ferry in July, 1926, I found trouble with swift water at two places and also sand bar trouble. (R. 1738, Vol. 10.) When we turned around to come back we had about two gal-



lons of gasoline left, which we used up on our downstream trip. (R. 1741-2, Vol. 10.) Most of our sand bar trouble in operating the ferry occurred in low water periods. (R. 1747, Vol. 10.) When I made my upstream trip with the Ford motor boat we traveled 16 miles the first day, 24 or 25 miles the second day, and after we had traveled 8 or 10 miles the third day we stopped our journey. (R. 1755-6, Vol. 10.) The trip with the LaRue party from Green River, Utah, was a commercial undertaking for the purpose of obtaining moving pictures for commercial purposes. (R. 1758, Vol. 10.)

*Julius F. Stone* testified: In 1898 I went to Glen Canyon, having invested some money in Mr. Stanton's placer mining venture there. I remained six weeks or two months, during which time about twenty men were employed by Mr. Stanton. There were other prospectors farther down the river. We had boats that we used for crossing the river and taking supplies, occasionally taking trips down the river with supplies to other camps which were established from place to place. Mr. Stanton had practically the whole of Glen Canyon surveyed and located for placer claims. Some of his employes brought a boat up from Lees Ferry by means of rowing and towing. The stage of water was fairly uniform while I was there and we had no great flood but bars would shift to greater or less extent with every change in the volume of current. (R. 1760-8, Vol. 10.) In going from Trachyte Creek down to Lees Ferry we grounded several times. There were not what you would call rapids in that stretch, although at Aztec Creek there is some unquiet water. (R. 1769, Vol. 10.) The Stanton boat that came up from Lees Ferry was 18 or 20 feet long, rather heavily constructed, and propelled by oars. (R. 1772, Vol. 10.)

On my next visit to the river we began our journey at Green River, Wyoming, and went down stream to Needles, California, using four 16-foot keel, with a 4-foot beam and a depth of about 8 inches and a draft of 5 or 6 inches. There were two men in one boat and one man in each of the other boats. (R. 1773-4, Vol. 10.) We left Green River, Utah, on October 11, taking on new supplies in our boats at that point. The boats were practically open. Between Green River, Utah, and the mouth of the San Rafael there were just a few riffles. I recall no groundings on sand bars and we had no serious difficulty. (R. 1781-2, Vol. 10.)

In that stretch we were probably hung up two or three times but that was all in the day's work. In Labyrinth Canyon we had quite a little trouble with sand bars, at times getting out of the boat and at other times rocking it loose. From the end of Labyrinth Canyon to Cataract Canyon we possibly grounded once or twice. (R. 1783, Vol. 10.) Through Cataract Canyon we lost no boats, portaging our cargoes at some of the rapids and at places lining the boats; at other places running the rapids without either portaging or lining. (R. 1786-7, Vol. 10.) We ran all of the water in Narrow Canyon and encountered no difficulties between the end of that canyon and Lees Ferry except grounding on sand bars. (R. 1788, Vol. 10.) I don't think I could have taken my boat from Lees Ferry back up to Hite alone, although possibly I could have done so. I possibly could have taken my boat from the mouth of the Green River up to Green River, Utah, but could not have rowed all the way; it would depend a good deal on the stage of water. (R. 1792-3, Vol. 10.) On my 1909 trip with Mr. Galloway he was the only member of the party who was familiar with the river. (R. 1797-8, Vol. 10.)

*Constantine Rodin* testified: I left Green River, Utah, on November 10, 1927, with a party in charge of Mr. LaRue, the witness, Owen R. Clark being in the party. Between Green River, Utah, and Cataract Canyon some of the boats grounded quite a few times the first few days and later at times. I can't tell how many times we encountered bars in Labyrinth Canyon, but if you are not watching the swift current will take you on to the bars, where naturally the boat will get stuck and you will have to get out and push it off to deeper water. We had quiet a little difficulty in Cataract Canyon. (R. 1800-4, Vol. 10.)

In the section below Cataract Canyon we sometimes had to get out and push a boat off a bar, but that did not occur every day. At times some of the boats stuck and some did not. We did not take on any supplies between Green River, Utah, and Lees Ferry. (R. 1808, Vol. 10.) Our great trouble between Cataract Canyon and Lees Ferry was to keep warm enough. (R. 1809, Vol. 10.)

*Valentine Woodbury* testified: I was on the trip in Mr. LaRue's party with the witnesses Clark and Rodin. My boat was loaded so that it had a draft of 9 or 10 inches.



(R. 1812-14, Vol. 10.) At places on the Green our boats had trouble with sand bars and we would touch bottom with our oars. I recall getting stuck at Double Bowknot and at a point 14 miles below Green River, Utah; I think there were other times beside these two, but they are the only two instances that I recall. We encountered no difficulty between the mouth of the Green and Cataract Canyon. Mr. Rodin's description of our trip through Cataract Canyon is about the same as mine would be. (R. 1816-19, Vol. 10.)

The boiling condition that we encountered below Cataract Canyon is just the ordinary swirling of water that occurs in any stream where there are rocks in the current. Perhaps on our trip there were fifteen or twenty occasions when most of the boats were stuck, but it was not always necessary to get out of the boat to push off. I think we were all stuck just below Double Bowknot on the Green except Mr. Dodge. I am not sure whether we were all stuck at the place above Bullfrog Rapid but am sure all of our boats dragged there. We did not all get out. On the one occasion in Glen Canyon and once at the Bowknot the majority of our boats were stuck. (R. 1823-8, vol. 10.)

Outside of Cataract Canyon there was no unusual difficulty in taking our boats through any section of the rivers we traversed except at the bad swirls in the narrow parts of the canyon. (R. 1830, Vol. 10.)

*Raymond M. Priest* testified: In 1914 I was engaged in investigating reservoir and dam sites on the San Juan River for the Bureau of Reclamation, N. B. Conaway being chief of the party and Messrs Dahl and Merrill being in the party. I went over the country from Farmington, New Mexico, to a point 25 miles below Bluff in the vicinity of Mexican Hat on the San Juan River. (R. 1833-5, Vol. 10.) I was there on the river in September, 1914, which was in the low water period, and had occasion to cross the San Juan back and forth in making our survey between the dam site located at the point I have indicated below Bluff and a point at the upper end of the reservoir, some 30 or 40 miles above. (R. 1837, Vol. 10.) At that time the water in the channel at Bluff was from 24 to 36 inches deep. "It (24 or 36 inches) seemed uniform throughout the whole stretch of river we worked on." (R. 1837-8, Vol. 10.) I saw no boats during the four or five weeks I was there on the San Juan River. (R. 1843, Vol. 10.)

*T. G. Gerdlinc* testified: I have had 36 years' experience in the U. S. G. S. and am Division Engineer of the Topographic Branch and supervised the survey work on the Colorado River. The 1921 surveys for dam sites in Glen Canyon were made in cooperation with Southern California Edison Electric Company. (R. 1846-8, Vol. 10.) In July, 1921, I went from Lees Ferry to Warm Creek in a flat bottom scow propelled by a marine engine, which had been designed to carry supplies up to the rapids below the mouth of the San Juan River; the boat was 27 feet long with a 7-foot beam, and its draft would depend upon its load. We put it in the river below the Paria Rapids, 3 miles below Lees Ferry, but it wouldn't go up those rapids without help. (R. 1849-52, Vol. 10.) We assisted it over the rapids and it was easy going to Lees Ferry. Upstream from Lees Ferry we encountered rapids and a sand bar that night about 11 miles above Lees Ferry. Next morning we found it easier to follow a course up the south bank of the river and went on to Warm Creek. (R. 1854, Vol. 10.) Next day we went back to Lees Ferry because it was too much of a struggle to go further up the stream, which was flowing from 25,000 to 28,000 second feet at that time. Later I made another short trip up from Lees Ferry and encountered no difficulty. (R. 1855, Vol. 10.) I believe the boat in which we took my trip up to Warm Creek had a draft of 18 inches loaded. There was no rapid or riffle at Warm Creek, where we turned around and came back, it being pretty good water there and not difficult as compared with water we had been over. (R. 1882-5, Vol. 10.)

*William Hiram Edwards* testified: I was with the Stanton expedition of which Mr. Nims was a member and which launched its boats at Crescent Creek on December 6 or 7, 1889. (R. 1893-7, Vol. 10.) Between Crescent Creek and Tickaboo Bar we were stuck on bars quite a good deal. Between Tickaboo Bar and Lees Ferry we had no difficulty in operating our boats except as a result of the extreme shallow water. I think we made one portage of about a half a mile because of shallow water, but can't locate the place. (R. 1898-9, Vol. 10.) Between Crescent Creek and Lees Ferry we saw, in addition to a party from Omaha, eight or ten other people engaged in placer mining. On Tickaboo Bar they had a 40-horsepower pump. (R. 1901, Vol. 10.)

The next time I saw Glen Canyon was in 1891, when I was with a party of eight in charge of J. D. Best, Harry McDonald being head boatman and Elmer Kane and L. H. Jewell being also boatmen. (R. 1902-3, Vol. 10.) We left Green River, Utah, in July, 1891, with two boats like those used on the Stanton expedition. They were 22 feet long with a 4½ foot beam and a depth of 32 inches. We encountered no difficulties between Green River, Utah, and the mouth of the San Rafael except that we grounded at Devil's Auger and shipped water. (R. 1904-5, Vol. 10.) In going through Labyrinth and Stillwater Canyons our boats didn't ground as frequently as on my later trip but there were plenty of sand bars. From the mouth of the Green to Cataract Canyon we encountered no difficulty. (R. 1906-7, Vol. 10.) We lost a boat in running Rapid No. 13 in Cataract Canyon. (R. 1908, Vol. 10.) At Hite we picked up a flat bottom boat and repaired it and continued on with that and our other boat to Lees Ferry. (R. 1912, Vol. 10.) I don't recall encountering any sand bars between Narrow Canyon and Hite. On the way down we staked off several claims and had more or less trouble with bars. (R. 1913-14, Vol. 10.) I can't say whether I noticed any difference in the channel of the river through Glen Canyon between my first and second trips. (R. 1915, Vol. 10.) In 1893 I and some others leased a steam launch that had been abandoned at Wheeler's ranch and we intended to investigate the possibility of navigating the river with tourists. This boat had been abandoned in 1891 and was known as the Major Powell; it was about 35 feet long, had a beam of 8 feet and a draft of about 18 inches. We repaired the Major Powell and started down stream, three of us on board. It had been changed from an oil burner so that it would burn wood. We would travel until we ran out of wood and then stop and gather more for fuel. We had plenty of difficulty with sand bars and stopped about a quarter of a mile above the first cataract in Cataract Canyon. Coming back upstream, we had less difficulty because we could back off from sand bars, but we required more wood. The water had risen between our downstream and upstream trips. We took the Major Powell back up to Wheeler's ranch. (R. 1916-22, Vol. 10.) We took a later trip at a higher stage of water and the bars had shifted so that information as to channel gained on our first trip was not of much use. On our return journey on the second trip we had consider-

able trouble at the mouth of the Green in getting the Major Powell out of the Colorado and into the Green. We again tied the boat up at Wheeler's ranch. (R. 1922-4, Vol. 10.) In 1894 I was with a mining company at a camp 7 or 8 miles below Green River, Utah, when three or four fellows brought the Major Powell up to our camp and there abandoned it. I judge that Wheeler's ranch was about 15 miles below that camp. They took the engine and boilers off the boat and used them in operating a wrecking plant at Green River. (R. 1924-5, Vol. 10.)

In 1892 I went to Red Canyon on the Colorado and thence 15 or 20 miles down the river to some placer mines in an old boat that I found at Red Canyon. (R. 1927, Vol. 10.) I went to the San Juan and stayed overnight in 1892, but didn't try to wash any gold and saw no boats on the river. (R. 1929, Vol. 10.) It was winter time and as I remember there was very little water in the stream; I suppose it was not more than two or three feet wide and possibly a foot deep. (R. 1932, Vol. 10.)

In 1895 I was again on the Green River 8 miles below Green River, Utah, where I put in an amalgamator; there were some bars and a dry land dredge there. Messrs. Galloway, Flavell and Richards passed along down the river with their boats bound for the canyon. We employed about twenty men at the dredge. Finally we sold the dredge. We had two 100-horsepower boilers, a steam engine and an electric generator and used coal for fuel. (R. 1934-5, Vol. 10.)

When I made the trip I have mentioned to the San Juan in the winter of 1892 or January, 1893, I do not know whether there was snow on the ground or whether there was any ice on the river. If there was then ice and snow then I wouldn't know anything about the amount of water under it and I don't pretend to say anything about that; I do remember that there was open water there, which I judged to be about a foot deep; I don't know how far the water extended out or under the ice. (R. 1939-40, Vol. 10.) On the return journey I went to Dandy Crossing but can't remember whether our horses had to swim part of the distance or not when we took them across. (R. 1940-1, Vol. 10.) The row boat in which I made the trip down the river at that time had oars and coming back upstream with the boat we probably rowed and towed as is usually done on any river. (R. 1941-2, Vol. 10.) On the Stanton expedition I acted

as first boatman and then as cook. Mr. Nims who was on that expedition seemed to be a keen observer of facts. (R. 1944-5, Vol. 10.) I never observed any sand waves during any of my trips on the Green or Colorado Rivers. In our mining operations I never heard of any government permits and know nothing about any government permits for our placer mine. (R. 1958, Vol. 11.) Exhibit 233 is a picture of Aztec Fort located below Bowknot Bend on the Green River. We there found where the Cliff Dwellers had irrigated probably 200 acres on the river bottom and found a ditch some 60 feet above the river; we could trace out their ditches and laterals. There was no sign of any trail indicating how they got in or out of there. (R. 1962-3, Vol. 11.)

The Major Powell was 35 feet long with two 6-horsepower engines, and in my opinion that is not sufficient horsepower to utilize on the Green River. If we had had more horsepower we could have come up the river better. The current of the river was our principal trouble and more horsepower would have overcome that. (R. 1978, Vol. 11.)

*Elmer Kane* testified: In the summer of 1888 I made a raft trip from Grand Junction to Moab. (R. 1984, Vol. 11.) We could not get a boat at Moab with which to continue our journey on down the river as we had intended so went from there to Salt Lake. Placer miners whom we saw on the river above Moab had a flat bottom skiff which they had used when they came down from Grand Junction. We also saw small boats used by people who lived on the river to cross back and forth. (R. 1985-7, Vol. 11.)

In 1889 I left Crescent Creek in December with the Stanton party. We used two pairs of 9 or 10 foot oars in each boat; the boats were overloaded. No rough water bothered us but with the cargo and passengers the boats would sink down level with the water and were hard to handle. (R. 1992, Vol. 11.) We got stuck on sand bars. "There were certain channels that would let a boat through, if you followed them and could follow them." We would decide on a place to run through and probably would get through all right, but at times would have to drag the boats or push them; then for a few miles we would have smooth water of sufficient depth. We would find these conditions every few miles through Glen Canyon and also in the stretches above Cataract Canyon. (R. 1993-4, Vol. 11.) Between Hite and Lees Ferry we encountered quite a number

of rapids or rough water, including Tickaboo and Trachyte Rapids. All of these rapids are at the mouth of side washes. The river would change at each different stage of water. (R. 1995-6, Vol. 11.) We had 1600 or 1700 pounds of supplies in the boat, it may have been a ton, when we left Crescent Wash. In addition to this weight we had the passengers. (R. 2000, Vol. 11.)

On July 3 or 4, 1891, we left Green River, Wyoming, with the Best expedition. The testimony of the witness Edwards concerning the boats used on that expedition reflects my recollection. (R. 2001, Vol. 11.) We arrived at Lees Ferry on August 26. The only trouble we had on our journey down to the mouth of the Green River was shallow water; at places there were several channels; we generally didn't pick a channel until we got stuck on the bar and then would look for deeper water. I don't think any member of our party had ever before been on that section of the Green River. The riffles between Green River, Utah, and the San Rafael gave us no difficulty. We touched bottom on one of them but did not stop. At another place one of our boats touched bottom. Between the mouth of the San Rafael and the mouth of the Green both boats ran on to sand bars a number of times each day. There was no trouble encountered between the mouth of the Green and Cataract Canyon. (R. 2003-5, Vol. 11.) The boat in which McDonald, Best, Jewell and I were riding struck a rock at Rapid No. 13 in Cataract Canyon and was lost. (R. 2006-7, Vol. 11.) All the other boats ran all of the rapids in Cataract Canyon. (R. 2013, Vol. 11.)

From Cataract Canyon to Lees Ferry we had fairly good water, but I remember two rapids at Dark Canyon and another one somewhere below. (R. 2013, Vol. 11.) The sand bars in Glen Canyon were not so bad as they had been in the previous December but we had to make one portage of our cargo and shove the boats through light for about a mile. That was where we encountered the reefs. (R. 2016, Vol. 11.) The boats used by us in 1889 had a draft of about 14 inches loaded and on the 1891 Best expedition our boats were of substantially the same type. (R. 2026, Vol. 11.) The raft we used on our trip from Cisco to Moab was about 14 by 5 feet and built of dry pine logs; we found it lying on the bank. (R. 2033-4, Vol. 11.) Mr. Nims was on the Stanton trip when we went over the reefs and made the portage mentioned by me. He was on both Stanton trips. I

don't remember whether we made a portage each time we went over those reefs. (R. 2034-5, Vol. 11.)

*Otto J. Zahn* testified: I first went to the San Juan river in May, 1904, where I was placer mining at Zahn's Camp, indicated on page 15, of Exhibit 10. (R. 2037-9, Vol. 11.) At that time the river was shallow—"Rather shallow, I consider, about not over waist deep." Its channel was about 200 feet wide and it was about waist deep in the main current, which would be located 100 or maybe 125 feet off shore. (R. 2041, Vol. 11.) In 1905 I was again on the river and took a sluicing hopper weighing about 250 pounds on a 14 by 6 foot raft constructed by me from a point 15 or 18 miles above my camp. I had to wait for the water to subside because it was too deep to take any chances going down the canyon with the raft. I got stuck many times during the day in shallow water; it was difficult for one person to try to watch where the main current was and keep the raft afloat. I started downstream at about 10 o'clock and arrived at my camp at sundown; I think this was in July. I rode the raft myself, except when it got stuck, when I would get off and steer it clear of the rocks and climb on again. (R. 2045-8, Vol. 11.) On one occasion I diverted the entire river to our pumps during a period lasting about 10 days. As I recall this was in 1904. (R. 2049-50, Vol. 11.) I was there for about five months in 1905. At that time there were no other people operating placers there. Since then I have been back to the river at all seasons quite a number of times. On these occasions I have seen other placer mines in operation on the river near our place. As far as I know they didn't use boats to bring in supplies and our supplies came overland. (R. 2051-3, Vol. 11.) Our camp was wrecked by the big flood of 1911 when our rock house and tool house were flooded and only the top of the roof, which was 10 feet high, protruded. I should judge the top of the tool house was 16 feet above the low water level of the river. (R. 2054-7, Vol. 11.) I have seen sand waves many times, and in 1904 the water was so thick with sand that it would choke the fish in the river. The main current would shift from one side to the other; sometimes it would stay pretty well in the center, but many times would sway to the other side. I have seen the water get so low during the low water season that there was not much trouble in wading across the river. (R. 2058-9, Vol. 11.) I mean that the water was not over waist deep at those times. (R. 2060, Vol. 11.) The occasion

I have mentioned when the river became so dry was on my first trip. I was about 30 years old then and if that was my age at that time the river became dry in 1902 instead of 1904. (R. 2062-4, Vol. 11.) I am quite sure that my first trip in the San Juan country was in May, 1904. (R. 2092, Vol. 11.)

*Hector M. Zahn* testified: I went to the San Juan in 1902 and my brother Otto J. Zahn was not there that year. (R. 2074-5, Vol. 11.) When I arrived in June the river was pretty high but gradually went down until the latter part of July when it dried up completely and remained dry for about five weeks. (R. 2077, Vol. 11.) I was again at the river in November, 1902, and remained until February, 1903. It was very low in February—about 40 or 50 feet wide and 2 feet deep and froze up in January. I again returned to the river in 1915. (R. 2078, Vol. 11.) While I was down there I saw sand waves during high water that were 4 feet high. At other times I saw them a foot or two high. None of our supplies came by boat and I saw no boats used. (R. 2079, Vol. 11.) During the period when the river went dry I made a trip with a 4-horse team about 20 miles down the bed. (R. 2082, Vol. 11.) When I went there in 1902 the houses used by us were already there and showed no signs of having been previously flooded. They were in good condition and then had the appearance of being old structures. I suppose they had been built there by some of the former owners. (R. 2086-8, Vol. 11.) I wish to change my answer that those buildings appeared to be old when I first saw them; they appeared new; I don't know how old they were but they were in good condition. (R. 2089, Vol. 11.)

*Kenneth Sawyer* testified: For a number of years I was with the U. S. Reclamation Service and in 1914 with the government party in charge of John F. Richardson and engaged in making a survey for reservoir and dam sites on the Green and Colorado Rivers. (R. 2093-5, Vol. 11.) Machinery consisting of boiler, engine, casings, tools, drill rods, etc., was loaded on to boats at Wimmer's ranch on the Green River and taken thence down the river to the dam site at the junction of the Green and Colorado. There were two scows approximately 6 by 24 feet each, which were decked over and fastened side by side, making practically one boat. (R. 2094-6, Vol. 11.) We had three row boats, two small motor boats, and Mr. Wimmer's boat the Marguerite. The trip down-

stream took three or four days. We grounded on sand bars many times, the channel being a little difficult to pick out. (R. 2097-9, Vol. 11.) Exhibit 264 is a picture of our light barge and shows our survey barge, the Betsy Ann, stuck on a bar. (R. 2100, Vol. 11.) During our drilling operations at the junction I was compelled to go out at times. (R. 2102, Vol. 11.) One morning there was a sudden 8-foot rise in the Colorado River and immense quantities of driftwood came down, which collected on the ropes anchoring the barge on which our drilling outfit was placed. We were compelled to cut the front anchor lines in order to save the barge and machinery. Thereafter we took the outfit out. (R. 2104-9, Vol. 11.) We made the Betsy Ann into a steamboat, installing a paddle wheel on it, loaded 600 pounds of coal that Wimmer had brought down in the Marguerite, and took the Betsy Ann upstream on its own power. Going upstream the Marguerite pushed one of our small scows and the two motor boats pushed the other scow, we having loaded all we could of our outfit on the scows. We had some difficulty getting around sharp bends of the river and grounded on sand bars but arrived at Wimmer's ranch without any serious accident, there unloading the equipment, which was taken by wagon to Green River, Utah, and shipped on the railroad. (R. 2110-14, Vol. 11.)

When we made our survey Captain Yokey had charge of the boats. During that period we had motor boats 14 or 16 feet long, 4 or 5 feet wide, and with a draft of 7 or 8 inches. With those boats we encountered trouble with sand bars but became accustomed to them like eating and sleeping. (R. 2117, Vol. 11.)

While our drilling operations were in progress I made three or four boat trips out, two up the Colorado River and on one occasion I went with Mr. LaRue on Wimmer's boat up the Green River. We could discover no fixed channel in the Green except in two or three places where the water was very fast and deeper. Although there were no marked changes in the river while we were there except that one flood down the Colorado, there was a shifting and changing of bars. The five days consumed by us in going upstream with our drill outfit doesn't represent actual running time. Our upstream journey after we finished our survey also consumed four or five days. (R. 2118-21, Vol. 11.)

Mr. Wimmer had been awarded the contract for freight-ing our equipment and supplies to the junction. On the

downstream trip with our equipment the width of the two scows that were fastened together was 17 or 18 feet and the length 24 feet. Wimmer's boat, the Marguerite, was tied behind the scows and shoved them. The drilling machinery weighed about  $2\frac{1}{2}$  tons and our entire load on the two scows was possibly four tons. (R. 2123-4, Vol. 11.) One of our motor boats pushed the Betsy Ann downstream. We had provisions, supplies, etc., loaded on that boat to the amount of  $2\frac{1}{2}$  or 3 tons. The row boats were moored alongside of the Marguerite and the two scows. (R. 2124-6, Vol. 11.) We used coal for fuel in our drilling operations and on the down trip we took coal with us and Mr. Wimmer would bring us more coal on his subsequent trips while drilling operations were in progress. I imagine he made four or five round trips furnishing us with coal and supplies; about one trip every two weeks was his schedule. (R. 2129, Vol. 11.) He would bring about 1000 pounds of coal at a trip on the Marguerite. (R. 2130, Vol. 11.) When we took the outfit upstream the Betsy Ann carried 600 or 800 pounds of coal besides our machinery, weighing about 2500 pounds, and three passengers. It also towed our row boats. The actual running time of the 95-mile trip upstream when we took out our drill outfit was  $36\frac{1}{2}$  hours. There were ten or twelve men, including Mr. Wimmer, with us. (R. 2137-9, Vol. 11.) Our cook was a woman who went down the river and came back up with us. (R. 2141, Vol. 11.) When we went down on our survey with Captain Yokey we took sufficient supplies with us to last the entire month that we were gone. (R. 2142-4, Vol. 11.) Before making the motor boat trips from the junction up to Moab, when I had occasion to go out during the progress of drilling operations, neither I nor Mr. Shaw who operated the motor boat had ever before had any familiarity with that stretch of river. On the first trip I walked six miles up to Moab, but on my subsequent trips I traveled the entire distance in the boat. (R. 2144-5, Vol. 11.)

*Harry McDonald* testified: I am 77 years old. (R. 2150, Vol. 12.) About 1888 my partner and I went to North Wash on the Colorado River and with five other men I remained there mining and prospecting for gold. I built a flat skiff for use on the river in crossing and with which to reach the bars. (R. 2165-8, Vol. 12.) Hite then had an outfit two or three miles below us. (R. 2170, Vol. 12.) Later I joined the Stanton party at Green River, Utah, then known as Blake. There were sixteen men in the party and I had

charge of the boats. From Green River, Utah, down to the junction we ran along feeling out the channel, which is arbitrary through there; every once in a while we grounded; sometimes four or five times a day, and at other times not so often. Down to the mouth of the San Rafael it was pretty bad in places. (R. 2171-3, Vol. 12.) Going through Cataract Canyon we lined our boats, which were too heavily loaded, and there lost three boats. (R. 2176, Vol. 12.) We got more supplies just below North Wash and between there and the San Juan had trouble several times in running on to bars and rocks. There is one place where there is a shelf or ledge of rock and you have to find an opening through it. We felt our way across until we came to an opening in the ledge and then put our boats through. (R. 2178-9, Vol. 12.)

(This shelf or ledge of rock referred to by this and many other witnesses was, in response to a question propounded by the Special Master, fixed by Mr. Ryan at a point about Mile 112 above Lees Ferry.)

There are quite a few rapids in Glen Canyon but most of them are not bad to run. (R. 2181, Vol. 12.) From the San Juan down to Lees Ferry, we had no trouble. At three places we got on bars. (R. 2183, Vol. 12.) I later made a second trip, going on the second Stanton expedition. We came to the place where the ledge crosses the river before we noticed it but found a channel through which we got our boats. We had more trouble with bars on this trip. (R. 2191-3, Vol. 12.)

In 1891, I accompanied the Best expedition, using the same kind of boats we had on the Stanton trip. We didn't find the channel in the same place on the Green River as on my former trip and had the same trouble with bars and hunting channels. This trouble occurred sometimes two or three times a day. We lost one boat in Cataract Canyon and had lots of trouble with sand bars in Glen Canyon, but the channel there was not as bad or as changeable as on the Green River. (R. 2194-6, Vol. 12.) We again had to hunt around for a channel through the ledge, which is between 75 and 100 yards wide. (R. 2197-8, Vol. 12.) After leaving the Best expedition at Lees Ferry, I returned to Glen Canyon five months later to work for myself. The Stanton dredge was constructed in 1899 or 1900, the lumber coming overland to the river. It was an 82 bucket dredge and could dig in 28 feet of water. (R. 2201, Vol. 12.) The hull, buckets, pumps, 5 engines, 82 tables for saving gold, the amalgamator,

settling tank and plates all came to the river overland. We also had an ice plant on shore for the purpose of keeping supplies from spoiling. We put in a telephone line between the two bars we were working and built a scow that we could take down and load with material and pull back up. (R. 2202-4, Vol. 12.) We had no difficulty with sand bars in taking this scow upstream. The heavier pieces of machinery were brought to the river with eight and ten span of horses. Fourteen or fifteen carpenters were employed in building the hull of the dredge, which was operated by about eight men. The dredging operations continued for eight or nine months, when the concern went into the hands of a receiver. (R. 2204-7, Vol. 12.) There was an old fellow named Meskin in there prospecting and mining; he would be months and months away from Lees Ferry and would go up as far as Hite. (R. 2214-15, Vol. 12.) In our dredging operations we took out gold that was shipped to New York. (R. 2221, Vol. 12.) Before I went on the Best expedition I took a trip with Old Rocky, trapping and hunting on the river between Green River bridge and a point below Wheeler's ranch. (R. 2223, Vol. 12.) We encountered about the same amount of trouble navigating the Green on the trips concerning which I have testified that we met with in navigating the Colorado River between Cataract Canyon and Lees Ferry and I would say from my observation that the impediments and obstacles to travel up and down in boats are about the same on those two stretches of river. (R. 2226, Vol. 12.)

*Robert N. Allen* testified: In 1921, I was with the U. S. G. S. on the San Juan River with the Trimble party. We put our boats in the river about 3 miles below Bluff on July 18, 1921. (R. 2233-5, Vol. 12.) I would say that the minimum depth I observed was about 6 inches, maybe slightly over that in the center of the stream. At low water, in the more open stretch, the river is perhaps 20 or 30 feet wide at most, and say 6 inches deep. We had to cross it several times a day and these crossings were made by boat. There are a number of places besides Clay Hill Crossing where you could have walked across during low stage if you wanted to. I didn't walk because of the quicksand. (R. 2238-40, Vol. 12.) We were continually combatting sand waves; the river will be perfectly quiet and suddenly a wave will appear. This occurs at every stage of water. R. 2141, Vol. 12.)

Our boats drew 6 to 8 inches of water and the current is very swift. Frequently the boats were stuck on sand bars at the low stage of water. We encountered perhaps thirty rapids between Bluff and the mouth of the San Juan. (R. 2242-3, Vol. 12.) We did not have nearly as many difficulties in operating our boats on the Colorado but there were several rapids similar to those on the San Juan. (R. 2244, Vol. 12.) On our trip to Lees Ferry we grounded four or five times but weren't compelled to get out and push our boats. (R. 2245-6, Vol. 12.) Of the pictures produced here by me (Complainant's Exhibits 265 to 402) those numbered from 1 to 121 were taken on the San Juan River, the remaining 19 being taken on the Colorado. I didn't happen to take any picture of the San Juan on any of the occasions when it was only 20 or 30 feet wide and 6 inches deep and I have no pictures of the San Juan at real low water. (R. 2247-9, Vol. 12.) The lowest water on the San Juan to which I have referred was in the 17-mile stretch below Spencer's camp, between there and Piute Creek. I have pictures that were taken through that 17-mile stretch but they were not taken when I saw the low water there. (R. 2250-1, Vol. 12.) I didn't take any pictures of the stream at low water because at that time I wasn't particularly interested in low water. (R. 2253, Vol. 12.) The sand bars varied from year to year in location and would sometimes vary 5 or 6 feet in a day. (R. 2254, Vol. 12.)

*David E. Rust* testified: In 1897, my brother and I got a boat at Hite which he took down the river to Last Chance Creek, where I had taken some horses. We spent three months placer mining there and saw Mr. Stanton take his boats down the river and also saw another party of prospectors going down stream in a small boat. I then saw Nathan Galloway coming up the river, rowing and towing his boat. Last Chance Creek is not far above the Crossing of the Fathers and I went from there upstream about 60 miles in my boat to Halls Crossing, where there were two or three other small boats. (R. 2258-61, Vol. 12.)

In 1898, I worked on the Good Hope Bar for three months. About twenty men were then employed there. Supplies were brought overland to Hite and thence to Good Hope Bar in boats, which were 20 feet long and designed to carry about a ton. They would be rowed and towed upstream. During that stay on the river I saw Mr. Stanton

with a crew of about ten men doing assessment work. They used boats in going up and down the river. There were several small boats then at Hite. Our boats had a draft of about 1 foot loaded. The river was at medium stage then and we did not encounter much difficulty between Good Hope and Hite, where I did my boating. (R. 2262-5, Vol. 12.) I find that the stage of water makes a great deal of difference; I have seen a channel change within a week. I always preferred a low water stage but I have been on the river in every month of the year except June. (R. 2266-7, Vol. 12.)

During the past twelve years I have made on an average of one trip a year through Glen Canyon, conducting travelers who wished an unusual trip. These trips have been made from North Wash to Lees Ferry. I have used a small canvas folding boat of the 14 and 16 foot type, with a 5-foot beam and a draft of 6 inches loaded. They are pointed at each end, are operated by oars and carry two passengers and luggage. One of the passengers acts as boatman. (R. 2268-70, Vol. 12.) I have encountered sand waves on this stretch of river and endeavor to keep the boats out of them. There is usually quiet water on one or the other side of the river and we are able to keep out of the sand waves. I prefer to go through sand waves with my boat lengthwise in the trough of the wave, but have done it both ways and have always gone through safely. (R. 2272, Vol. 12.) There are some small rapids between Crescent Creek and Lees Ferry, including Trachyte, Tickaboo, Bullfrog and Rainbow Rapids. We never encounter any real difficulty on account of sand bars with these small boats, but occasionally will touch a bar. I have not found it necessary to get out of the boat in order to get off a sand bar. (R. 2273-4, Vol. 12.) I do not engage in general advertising of my tourists' trips. I have taken them in April, September, July, August and October. On one trip I lost a boat when two members of our party became careless just before we reached Lees Ferry and ran into sand waves and capsized. (R. 2275-6, Vol. 12.)

I try to accommodate the date of my trips to the convenience of the tourist. On the occasion I have mentioned when a boat capsized the men who were operating it did not follow my boat as they were supposed to do. In all my experience on the river, I have never had an upset and in all that experience no other member of my party has had an upset except on that one occasion. Governor Dern of Utah was a member of that party. I have taken ladies



through Glen Canyon on these trips. My daughter was with me on two separate trips where the wives of men going with me were in the party. My daughter does not swim. Members of the parties I take through Glen Canyon on these trips do not wear life preservers. (R. 2281-3, Vol. 12.) We usually figure on about five days actual running time for the trip from Crescent Creek to Lees Ferry, with three or four days off for side trips. I know of the place on the Colorado River where there is a reef or strata of rock running across the stream; it is 10 or 15 miles below Halls Crossing. There is a little narrow channel to the right of the island which we go down without difficulty; that channel is possibly 40 or 50 feet wide and there is no place where it is less than a foot deep. There are parts of the channel where the water would be 2 or 3 feet deep at any stage of water I have ever seen. (R. 2284-6, Vol. 12.)

*Dean Daily* testified: I live in Hollywood, am 25 years old, have had experience in boating on the Columbia, Snake, Colorado and Green Rivers and was with the Pathe Bray expedition in 1927, on the Colorado River. Between Green River, Utah, and the mouth of the San Rafael we continually grounded on sand bars, especially on mud flats around the San Rafael. Between the San Rafael and the mouth of the Green there weren't so many sand bars but the water was shallow and we hit a good many riffles where the boats grounded several times. In going through Cataract Canyon we had a good deal of difficulty; "the water was very shallow; we were continually grounding, all the time." When you ask me about Cataract Canyon, do you mean the place where "the first series of small riffles begins?" I know where the junction of the Green and Colorado is located and "the first part below the junction is very shallow water; we hit on sand bars; and below that the sand seems to give way to small pebbles, that is, the stream is low, and you grate along on sort of riffles in the stream; it is not sand, but the surface is very close to the water, and we grated along there." I never wore a life preserver but all the rest of the party wore them. (R. 2297-2305, Vol. 12.)

*Bert Loper* testified: In the fall of 1893, I went to a point 25 or 30 miles above Bluff and tested the bars for gold. About March 1, 1894, I went to the foot of Honaker Trail, where supplies were delivered overland and we carried

them thence down into the canyon. There were six in our party and we sluiced and rocked the dirt for gold until about May 1, 1895. In August, 1894, when the river was very low, I made a trip down the river with two companions. In 1894 and 1895, we went down past the Indian Farms to the mouth of Copper Canyon and back in a 16-foot row boat, with our bedding and grub. There were three men at the mouth of Slickhorn Canyon who had boats and we got our boat from them and made this trip in August. I remember that the river was so shallow we couldn't ride the boat at Indian Farms and had to drag it along. The stream was probably 300 feet wide there but there was no channel that would float a boat and there were places where we actually had to drag it. We went to a point 60 miles below Honaker trail. We encountered rapids at one place and had to take our boat out of the river and work it around the rapid. We encountered no more rapids below there, although there were several rapids above and a little rapid below at the mouth of Moonlight. When we ran on to a bar we would hunt a deeper channel if we could. (R. 2306-14, Vol. 12.) The largest sand waves I ever saw in my life were above Mendenhall cabin about February, 1895. There had been an ice gorge that had stopped the flow of the river just above there and when it broke the water carried my placer outfit away. On our 60-mile boat trip down the river we didn't encounter any sand waves to amount to anything; the water was too low. We towed our boat upstream. Indian Farms, otherwise called Piute Farms, is located about 77 miles below Chinle Creek and 50 miles up from the mouth of the San Juan. That is a different place from Piute Creek, which is only 21 miles from the mouth of the river. When I left the San Juan in 1895, I went to Bluff on horseback. During my stay there in 1894 and 1895, we loaded two 16-foot row boats with provisions for five men at Bluff and with these boats and supplies went down the river to Johns Canyon. We took this trip when the river was "awful low, awful low, and it must have been in July or August." From Bluff to Chinle Creek it was just a case of walk, but below Chinle Creek we had good stretches and could ride a little ways, but with two men in one boat with a lot of provisions and three men in the other boat we didn't have enough water to do very much boating. We ran the Soda Basin Rapid but lined our boats at Gypsum Creek, using caution not to lose anything. The Soda Basin Rapid is a bad rapid at certain stages of



water. While on the San Juan "I have waded across, I have swum across, and I have boated across, and there has been times when I wouldn't cross, not with an open boat." I have seen the river rise 8 feet when there was not a cloud in the sky. (R. 2315-20, Vol. 12.)

After leaving the San Juan I went to Moab until October, 1895, and there were then boats on the Colorado River, the largest except the ferry boat being a 16-foot row boat. One day they ferried 3000 sheep across and the boat was used for ferrying teams and stock. I saw no boats bring in or take out merchandise from Moab. (R. 2320-2, Vol. 12.)

In 1921, I was with the Trimble party on the San Juan. We had three open boats and I was boatman of the party from June 29, until December, 1921. In 1921, the river channel was 3300 feet wide at Piute Farms but not entirely covered with water; there were three or four streams to the river, which was very low. At one time Mr. Trimble estimated that the water was 6 feet deep across the entire 3300 feet, and that is the time I referred to when I said I wouldn't cross the river. In 1895, when I went through Piute Farms the river channel was only 300 or 400 feet wide. When we went through Piute Farms in 1921, there was hardly any water. There were other floods beside the one I mentioned. The rapid I saw at Grand Gulch in 1895, was only a little rapid in 1921, and the large boulders had disappeared. I recall no other changes in the river that are worthy of note. (R. 2322-6, Vol. 12.)

Aside from the change in the San Juan River at Piute Farms and at Grand Gulch, I wouldn't say that I remember any other changes of note between the years 1895 and 1921. (R. 2327, Vol. 12.)

The difficulties we encountered in bringing Mr. Trimble's boats down were: that we portaged our loads at one rapid above Slickhorn Canyon; after we passed Grand Gulch we began to have more trouble with sand because the river is quite wide below there, therefore shallower, and there were two or three instances when all at once our boat would catch on the sand and maybe tip up sidewise, once throwing Mr. Allen and Mr. Trimble out; we would get out and find the channel and maybe by walking could get through; we had the same difficulties until we came to Clay Hill Crossing; I have told you about having to drag the boats nearly through Piute Farms; ordinarily I had no help

but when we came to the Narrows Mr. Blake did some boating. (R. 2327-9, Vol. 12.)

On one occasion when our pack train failed to bring supplies, Mr. Miser and I took a boat up the river 17 miles to Spencer Canyon and brought supplies back down the river in the boat. The stage of water was very low and there were reefs where it was not 4 inches deep. It took us two days to make the upstream trip and one day to come back, pulling the boat a good part of the way down the same as we did going up. At some places we could ride but at lots of places we couldn't. At the place where the water was only 4 inches deep we just ended the boat around until we got it across the reef. (R. 2330-4, Vol. 12.) I can sum it up generally by saying that throughout this trip we had trouble with sand bars. I then saw no other boats outside ours on the San Juan River. (R. 2335-6, Vol. 12.)

After we reached the Colorado River, I took our cook and recorder down to Lees Ferry, went overland from there to Flagstaff, and brought back another cook and a rod man. The water was very low at that time and running on to a few sand bars constituted about all of our trouble. I went downstream in our boat but came back up in a 25-foot motor boat, with a draft of about 18 inches loaded. There were six or seven people on the boat and I also had my row boat. Our most serious difficulty coming upstream was in finding a channel at Last Chance Creek, but we finally got the boat over the sand bar at that point. Later I went down the Colorado River to Lees Ferry and that was my last trip until this month. (R. 2340-4, Vol. 13.)

On September 19, 1907, I left Green River, Utah, on a prospecting trip down the river with Charles Russell and Ed Monette. We had three steel boats, 16 feet long, 18 inches deep, and a 4-foot beam, without motors. Down to the mouth of the San Rafael, the only trouble we encountered was striking one riffle and I believe gravel. Through Labyrinth and Stillwater Canyons we had trouble at nearly every channel crossing where one or all of us would run aground. I couldn't tell by observation where the deepest water was and we daily encountered difficulties with channel crossings—sometimes several times a day. (R. 2347-50, Vol. 13.) We only portaged one rapid in Cataract Canyon. (R. 2351, Vol. 13.) From Narrow Canyon to Hite we encountered the old conditions; at North Wash there is only one channel through, which has never changed since I knew the river. I

was in the canyon from 1907 to 1915. Monette, Russell and I did some placer mining at the old Stanton dredge for about a month, taking out a little gold. They went on to Lees Ferry, where I later followed expecting to meet them, and when I found they had gone on I turned around and pulled my boat back up the river to Hite in November. I was five days on the downstream trip to Lees Ferry, grounding numerous times, especially at Shock Rapid. I recall crossing the ledge just below the mouth of Lake Canyon, but I never had very much trouble getting over that ledge. At Lees Ferry I got enough supplies to take me back up to Hite. (R. 2353-7, Vol. 13.) On my upstream trip I saw some people placer mining where Russell, Monette and I had mined. My supplies would come overland to the river at Hite and I would drag them up the river in my boat to Red Canyon, where I located. (R. 2359-60, Vol. 13.) I lived at my ranch for seven years and during that period traveled from Green River, Utah, to Lees Ferry; made numerous trips to the dredge, other trips to Olympia Bar and to the California Bar. I observed changes in the channel at all stages except high water, when it is always on the outside of the river. High water always leaves sand bars on the inside of the bends. The high water cleans the river, and after that the summer floods come along and fill the channel again. (R. 2364-5, Vol. 13.) Even at points where the river crosses there are some deeper places which we try to find, which I suppose you would call the deeper part of the channel. What I intend to testify to is that from year to year, you can't tell in advance where that deeper place is, and I am probably wrong in saying that there is no channel there. (R. 2366-7, Vol. 13.) At crossings there are places that are 2 feet deep, but you have to get out and wade around to find them, and in approaching a crossing you know that you are going to encounter those very things; in other words, you have to hunt for the channel where the river crosses when the water is at a lower stage or when there are rains in the mountains. (R. 2368, Vol. 13.) In 1911, I went with Mr. Seaboldt, who was investigating placer mining, from Hite to Lees Ferry; we encountered only the usual sand bars, ran on a rock at Trachyte and Shock Rapids, hitting a gravel reef at Shock Rapid, with no serious result. This trip was made in December, 1911, and we towed our boat back upstream, leaving Lees Ferry, January 31, and arriving at Hite February 17 or 18. (R.

2370-2, Vol. 13.) In July, 1914, I again left Green River, Utah, with Charles Russell, with two steel boats that we tried to deck over but couldn't make water tight. The boats had keels. We had no trouble down to the mouth of the San Rafael and very little trouble in Labyrinth and no trouble in Stillwater Canyon. In Cataract Canyon, at Rapid No. 4, the waves were 20 feet high and right below where we expected trouble there was not any rapid. Because of Russell's peculiar actions and his fear of the big waves, he had an upset and lost his boat. (R. 2374-84, Vol. 13.)

In September, 1914, I was employed with the Richardson party, then engaged in drilling at the junction of the Green and Colorado. I made one trip in the Marguerite from Wimmer's ranch to the junction, and on the way down we picked up the Betsy Ann barge, lashed it to the Marguerite, and took it with us. Once or twice we struck sand bars, but it was nothing serious. The approximate length of the two boats lashed together was 50 feet—perhaps a few feet more than that. I was on the upstream trip when they brought out the drilling outfit. The Marguerite's load may have been two or four tons. We were on bars quite frequently and made the 95-mile upstream trip in four days. The stage of water was quite low. We left the Betsy Ann at Wimmer's ranch and unloaded the freight from the Marguerite and then continued on up to the town of Green River in the Marguerite with about eight or ten men. We grounded at one place below the Auger and it seems to me that it took us a little while to get over the Auger. Just below Green River bridge we all helped push over the break where the island is located. It is much easier to avoid sand bar trouble coming upstream than down because you can back off the bars; the current assists you. (R. 2385-91, Vol. 13.)

In 1915, Seaboldt and others were drilling a gravel bar at Good Hope and at Tickaboo for gold and I worked for them until October, 1915. I ran my light boat between Hite and Good Hope, about 18 miles up and down the river for those parties, bringing freight and mail to them. (R. 2393-5, Vol. 13.) In 1916, Ellsworth Kolb and I boated from Greenwood Springs, Colorado, to the Cisco pump house on the Colorado River, my recollection being substantially the same as Mr. Kolb's testimony concerning that trip. (R. 2396-7, Vol. 13.) I was on the Green River with the Trimble party in 1922, as head boatman and had substantially the difficulties enumerated by other witnesses who have

testified about that trip. My next river trip was with Colonel Dent from the mouth of North Wash downstream. We had a semi-keel boat with a round bottom, 16 feet long, and equipped with an Evinrude motor. We left North Wash about 1 o'clock September 1, touched bottom a few times between there and Red Canyon, but "nothing serious"; we also touched bottom with our oars at Trachyte, but didn't use our power through that or any other bad water. Opposite Olympia Bar I had to get out and nose the boat around to get it where it should be. The stage of water was not extremely low, about 12,000 or 14,000 second feet. Between North Wash and Lees Ferry, I remember only one place below Halls Crossing where it was necessary to get overboard. At Shock Rapid I took the same channel I had previously taken, but it proved to be the wrong one and I had to zigzag to the other side and we got through. There was no more trouble until we got below the San Juan, where we saw some pretty big sand waves. Five miles below Navajo Creek we had nice sailing to Lees Ferry. When I made my first trip in 1908, there was no place in Glen Canyon that you could not walk on one side or the other of the river while there are many such places today. (R. 2398-2406, Vol. 13.) Between 1908 and 1914, all of the traffic in Glen Canyon that I remember was with 16 or 18-foot row boats. Bennett had a boat or two and did most of the running up and down the river at that time. Lon Turner had a 24-foot steel boat. I met Julius Stone and his party. (R. 2407, Vol. 13.) The only differences I recall in conditions on the Green River during my acquaintance with that stream are that in 1907, the main river ran along the right bank above Green River bridge with a very small channel on the east side and now there is an island there in low water and not much of a stream on the right bank in high water. (R. 2408, Vol. 13.)

On my first visit to the San Juan, we took two boatloads of supplies to a point near Johns Canyon, approximately 60 miles below Chinle Creek in July or August, when the river was at low water stage. Later I saw three men at Slickhorn Canyon placer mining but I don't believe they had a boat, although it may have been their boat in which three of us went down to Copper Canyon in 1894. (R. 2410-13, Vol. 13.) Both Wimmer and I were employed by the California Edison Company to handle boats on the Colorado river. (R. 2422, Vol. 13.) When I took out the cook and

photographer we started our boat journey from a point 8 miles below the mouth of the San Juan and went thence 70 or 72 miles down the river to Lees Ferry. When I left I figured on coming back upstream with my row boat and didn't expect to be carried by a motor boat. (R. 2424, Vol. 13.)

When I took the 1907 trip with Russell and Monette, Monette had never rowed a boat across the river and Russell might have been on some river before but he had never before seen a rapid. Neither of these men had ever before seen the Colorado River so far as I know. I myself was not then familiar with the Colorado River below the Stanton dredge but "I had done a whole lot of boating on the San Juan in 1894 and 1895." (R. 2426-7, Vol. 13.) I have gone up the Colorado river with my boat for nearly as many miles as I have gone down it, but I rowed upstream ten per cent of the time and towed ninety per cent. (R. 2431, Vol. 13.) Generally speaking there is no difficulty in avoiding sand waves by getting off either to one or the other side of the stream. (R. 2437, Vol. 13.) Aside from my trip with the government party the longest consecutive trip I have taken on the San Juan was my boat trip in August, 1894. I would say that the greatest number of miles that I have traveled along the San Juan without being interrupted at all by getting out of my boat or by portaging or otherwise would be 5 miles, but that is a mere guess. (R. 2448-9, Vol. 13.)

In 1921, when I was at Fowler's camp, 17 or 18 miles below the mouth of Rock Creek on the Colorado River in Glen Canyon. I borrowed Wimmer's outboard motor boat and went 15 miles up the river and back in that boat. I had never before operated an outboard motor boat. I had no trouble in going either up or down the river with Mr. Wimmer's boat. (R. 4862-4, Vol. 27).

*William L. Marrs* testified: In 1921 and 1922 I was employed by the California-Edison Company on the lower Colorado. Exhibit 408 is a picture of a power boat I operated on that river; it was 26 feet long, 5 feet wide, a tunnel stern boat with propeller, and was brought to Lees Ferry in August, 1921. On our first river trip we left Lees Ferry with a crew of three persons and seven or eight passengers and supplies; the propeller would kick all the water out of the tunnel and the boat would settle on the sand and when we would drift back a ways we would lose

more distance in a minute than we could make going forward in fifteen minutes; the boat had a draft of a foot loaded; we sometimes carried a line ashore four or five times a day and on that trip only made nine miles in two days. We hauled supplies to the Fowler camp and as required would move the camp two or three miles to another place. I don't know how many trips we made in 1921, but didn't cross the Utah-Arizona line more than six or eight times, on one occasion going up as far as Mile 68. (R. 2450-6, Vol. 13.) A flood would usually take out a majority of the troublesome bars and for a few days thereafter we would have the best traveling and then would have to pick our way through the bars. Our first trip was about August 1, when the water was at low stage and we could only make one or two miles per hour upstream. The channel of the river was never the same. We would make a trip one week and next week would find a dozen new bars. A bar will form in the quiet water and I do not mean to say that the channel is never the same anywhere. In operating my boat I didn't always pick the deepest water because of the swift current in the deep parts, and if it is not swift there is a bar. When I speak of channel I don't necessarily mean the deeper part of the river but I mean where I went through with my boat and I didn't travel the deepest water because I couldn't make progress. Going downstream I would steer along the deep portions of the channel but would encounter a bar every mile or two. (R. 2457-63, Vol. 13.)

Later I installed a new paddle wheel on the boat and had very much better luck and could make more progress upstream at all stages of water. With the new paddle wheel we would get stuck on bars but it was not as bad because the boat didn't settle on the bars as formerly. Almost every day the crew would have to get overboard and assist the boat off a bar and try to find another channel of sufficient depth. (R. 2463-5, Vol. 13.)

In 1922 I built a new stern wheel and new bow for the boat; that year our work was within about 10 miles of Lees Ferry and we had less trouble. From Bridge Canyon down to 10 miles above Lees Ferry the condition of the river is practically uniform. We called this boat the Navajo and Exhibit 409 is a picture of it after the paddle wheel was installed. (R. 2465-7, Vol. 13.)

I marked the places where there were obstructions to navigation with piles of rock unless there was some natural

object there to designate such a place. I did this because if I knew when I was approaching a bad place it would enable me to steer by it with greater ease. When I took Mr. Loper and the cook upstream I did not attempt to mark the river because I knew that was out of my territory and that would be my only trip, my territory being below Warm Creek. I had no chance to observe any changes in the bars or river bed above Warm Creek and the changing conditions that I have referred to are all below the Utah-Arizona line. I endeavored to fix the places where I had encountered difficulties because I expected to encounter that difficulty on succeeding trips. Very few of such markings were of value because the channel changed before I got back, but nevertheless I continued the practice with the expectation that I would meet the same difficulty there. (R. 2468-72, Vol. 13.) In 1922 we put a larger paddle wheel on the boat and used a slower speed engine, which was an improvement on the smaller paddle wheel, and we managed to get up the river without towing so much. Never having gone up to Warm Creek after the big paddle wheel was installed, I have no knowledge from actual observation as to what trouble I might have encountered on that trip. When I took Loper up the river we had the small paddle wheel on the boat; the journey was approximately six days and was an average trip. (R. 2479-81, Vol. 13.)

*Franklin Thomas testified:* I am a civil engineer and in 1922 was in Glen Canyon, entering the river at Halls Crossing, where Mr. Wimmer met us with four boats. They were 16-foot skiffs with square ends and two of them were equipped with Evinrude motors, the others having no motors. There were sixteen men in our party and we tied two boats together in tandem fashion with a motor in each of the two stern boats. We shipped water at the worst rapid but ran them all and did not wear life preservers. I don't recall grounding on the rapids but on one or two occasions we grounded on rock ledges a short distance above the rapids and were probably aground several times a day on sand bars, but it usually did not take more than five minutes to get off. We left Halls Crossing September 8 and arrived at Lees Ferry September 16, our purpose being to investigate the possibility of obtaining water and power for Pasadena. We carried supplies and bedding with us and in one boat with six passengers we had somewhere between 500 to 1000

pounds of supplies and equipment; thus loaded the boat had a draft of 9 or 10 inches. (R. 2487-94, Vol. 13.)

We made frequent stops to examine dam sites. I have no recollection of any occasion when both boats were stuck on the same sand bar or at the same time and half the time the two parties there were traveling within a few miles of each other. We saw no sand waves. I would say that on this trip one or the other of the boats would get stuck on an average of twice in a half day's traveling. Because two boats were traveling in tandem fashion there was the additional weight in handling them and in getting them clear. I only have one distinct recollection of any boatman stepping into the river to help get a boat off a bar but I would say this happened twenty times on the trip. (R. 2495-9, Vol. 13.)

*Benjamin D. Harshberger* testified: In the winter of 1892-3 I did some mining along the San Juan River and went to the river at Box Canyon, taking supplies along. I was there about two months and didn't see any boats on the river when I arrived but later I saw a few boats. (R. 2500-3, Vol. 13.) In 1902 there was a small excitement there and a considerable amount of drilling in 1904 and about 1906 to 1910. I put a well down near Mexican Hat, taking our tools and equipment there overland. (R. 2503-6, Vol. 13.) I never knew of any one bringing in machinery in boats and don't know of the Bluff merchants using boats for carrying merchandise, except a ferry boat used for crossing the river. There were a few prospectors who came down the river in small boats, but I never saw any of them going back up. Most of the boats I saw on the river belonged to prospectors who came down the San Juan River from Farmington, New Mexico. I have seen sand waves, which usually occur in high storm weather. I have crossed the San Juan at a point 4 miles below Bluff and went across during the month of December without getting my knees wet. (R. 2507-9, Vol. 13.)

In 1906, 1907 and 1908 I went to Hite on the Colorado and did some prospecting, ferrying our equipment across the river there and hauling it up into White Canyon about 30 miles from the river. We crossed at Hite in a boat and a few times were able to get our animals across so that they only had to swim perhaps 20 feet. (R. 2509-17, Vol. 13.)

Men were placer mining along quite a stretch of the San Juan River in 1892. In later years they have gone

down the river very largely in the winter time placer mining from Chinle Creek down to within 20 miles of the mouth of the San Juan. They have thus gone down there to placer mine in the winter between the years 1892 and 1919, but the bars are not as rich as they used to be and with present mining methods the miners can't make a living. Those who had boats would go down from Bluff to their claims along the river, taking their supplies with them in their boats. I remember two different outfits going down that way in 1904 and another outfit in 1906 when I was at Bluff and happened to see them pass. I was only on the river two months in 1892 and next went back there ten years later in 1902, and most of the mining down the river was done between the years 1892 and 1902, during which period I was there for only two months. (R. 2518-21, Vol. 13.)

*Richard Elmer Caldwell* testified: I am a civil engineer and was on the trip described by the witness Franklin Thomas, being then State Engineer of Utah. I now reside in Los Angeles. Our boats were 20 feet long with a 5-foot beam and drew a foot of water. I made a notation as to these boats. I took no soundings and don't recall any one else doing so on the trip. We occasionally were caught on sand bars but thought nothing of it. At points where we got on a sand bar we were always able to float after we pushed the boat into deeper water, and it may have been that our getting stuck was occasioned by our not getting into the deeper portion of the river at that point. (R. 2522-8, Vol. 13.)

*Frank Barnes* testified: In 1908, I went to Bluff, Utah, and was in the San Juan country until 1918. I have been down to Spencer's camp. I have seen row boats cross the San Juan River and have seen two boats going down the river but none coming upstream. I was operating those two boats. In July or the first of August I took a boat trip from a point about 4 miles below Bluff to the mouth of Comb Wash and on that trip had to pull the boat over sand bars "a time or two." (R. 2530-2, Vol. 13.)

In 1910 I went to Lees Ferry where I was employed by Charles H. Spencer's company. I saw an 18-foot launch he had there and operated it on an upstream trip about mid-summer. We made a lot of trips to try out the launch and

made one trip with it and a row boat from Lees Ferry up to Dandy Crossing with three other men. We had to line the boat a good many times. We stopped on the way to make placer mining locations. When we left we had 500 pounds of provisions. At one rapid the launch was carried on to a rock and turned over; on two occasions our row boat turned over. (R. 2533-6, Vol. 13.) On our return journey we had no difficulties, there having been a rise of water. Later a larger boat was brought to Lees Ferry; it was 26 feet long with a 5-foot beam, a 2½-foot draft, and was equipped with a 40-horsepower gas engine. We took this last mentioned boat and a scow up the river in August, 1910, to get some coal and were stuck on sand bars about ten times. On the return journey we ran on to sand bars about twice. Going upstream with this boat if you didn't hit the current just right, the boat would turn around. (R. 2538-41, Vol. 13. We didn't take a line to shore to assist in getting either the launch or the row boat off from sand bars; just hand-spiked the boat off the bar and let it swing clear. (R. 2544, Vol. 13.)

About a week before I took my boat trip on the San Juan I saw two miners going down that river in a boat; I judged they were miners from the character of the outfit they had with them. (R. 2545, Vol. 13.) I saw sand waves on the Colorado River but they were usually confined to the center of the stream and most of them were below the mouth of the San Juan River. We had some difficulty in navigating them. (R. 2549, Vol. 13.)

*Lewis Ransome Freeman* testified: I am an author, explorer and world traveler and have written books concerning several rivers, including the Colorado River. I have found no evidence that the upper Colorado was ever boated by Indians. (R. 2553-70, Vol. 14.)

In August and September, 1922, I went from Lees Ferry to Halls Crossing with a party of six. We had four 18-foot boats, one equipped with an Elto and three with Evinrude motors, the purpose of the trip being a government survey for dam sites. (R. 2571-5, Vol. 14.) During the first 6 or 7 miles up from Lees Ferry we had no serious sand bar trouble, except that occasioned by the faults of our own navigation; next day we made 10 miles upstream with very little difficulty from sand bars; on the third day there was a very spectacular cloudburst but I don't recall that it had any effect on the river. Mr. Wimmer, who was more

familiar with the river and a better hand with outboard motors, usually got ahead of the rest of us and would come back and help someone along. He had warned me that a plunger pump was entirely useless and showed me a practical way of avoiding the effect of sand and silt on our motors. (R. 2576-82, Vol. 14.) In the first 40 or 50 miles we encountered nothing that by any stretch of imagination could be called a rapid, the nearest approach to a rapid being at Aztec Canyon. The engines in my boat and in that of another member of the party there became out of commission, whereupon Wimmer lashed his boat behind one of the other boats tandem fashion and the other two boats were simply fastened together, each unit thus having a length of 36 feet, and in this fashion we continued on upstream with one motor in each rear boat, aiding the motors by rowing. I can't estimate the number of times we got stuck between Warm Creek and Halls Crossing; sometimes our trouble was with sand bars and at other times from rocks and current. (R. 2583-6, Vol. 14.) We averaged slightly better than 10 miles a day. After reaching Halls Crossing I took a boat and with three companions went upstream from there 10 miles through Bullfrog Rapid and to a creek above that point. On our return journey to Lees Ferry we had occasional groundings on sand bars—perhaps a few more than on the upstream trip, our boats being more heavily loaded coming back. There were only five in our return trip party and we went down with the four boats tandem fashion as on the upstream journey. Going down we spent something like a week on the river, making stops, side trips and surveys. (R. 2588-90, Vol. 14.) I did not make any specific observation as to the location of any change in the channel between the up and downstream trip; we occasionally remarked that the channel had changed here and there or we might have said that the water was shallower than it had been, but one takes that as a matter of course in any sand bar river; you get it anywhere. (R. 2593, Vol. 14.)

Our Evinrude motors were 3 or 4-horsepower and my Elto motor was 3-horsepower. Each of our units consisted of two boats lashed together and were powered by one of these motors. Our downstream trip was easier than upstream, the difference between the two trips being "just the difference the current makes, inseparable from all up and downstream navigation." With clean water you would

have no motor trouble; the outboard motor has no radiator. (R. 2594-5, Vol. 14.)

*Herman W. Freeze* testified: In 1911, I was employed by the American Placer Corporation of Chicago at Lees Ferry. The company had a boat called the Charles H. Spencer, which was around 80 or 100 feet long. Exhibit 416 is a picture of that boat. On its first trip it brought three or four tons of coal on the front of the deck; on the second trip it brought a little more; and on the third trip it brought fifteen or twenty tons of coal, used for firing the boilers at Lees Ferry, where we also used driftwood for fuel. (R. 2599-2604, Vol. 14.) The company also had two small gasoline launches, one of which was intended for use in bringing down the barge loaded with coal, but it couldn't make the upstream trip and I recall their using it for pleasure trips once or twice. The other launch was used for gathering wood on the river and for other purposes. I don't know whether the Charles H. Spencer was used after I left. (R. 2605-6, Vol. 14.) I wouldn't say whether or not they made some trips in the two launches while I was there. On the upstream trip I think they took food on the Charles H. Spencer for the miners; the boat had a crew of about five or six men. In operating the Charles H. Spencer they had no trouble when that boat was observed by me or when it was observable from Lees Ferry. (R. 2619, Vol. 14.)

*F. J. Weber* testified: I have been on about 45 miles of the Colorado River in the vicinity of Dandy Crossing; went there in 1891 and remained until about July, 1892, placer mining. I was taken from Hite to Good Hope bar in a boat; saw other men use boats but didn't use them myself. They would go up the river and bring supplies down on skiffs. There was a scow 22 feet long and 7 feet wide used at and about Hanson Creek. (R. 2624-9, Vol. 15.) Stanton's company had many wagons and horses with which they brought supplies and freight over to the river. (R. 2630, Vol. 15.) The scow I mentioned was built at Dandy Crossing, and taking it down the river to the dredge it grounded about seven miles below Good Hope bar; loaded, its draft was 14 or 15 inches. The dredge began operating in 1899 and shut down in the early summer of 1901. (R. 2634-6, Vol. 15.) The scow would carry as much as three thousand pounds of coal at a trip. The coal came from a point midway between the Henry mountains and the river, a distance of

about 17 miles from the mouth of Hanson Creek. (R. 2638-9, Vol. 15.) On the occasion I have mentioned, when the scow got stuck, I didn't know whether it was because we had missed the channel. We found deeper water off to the side. (R. 2640, Vol. 15.) In those days the crossing at the foot of White Canyon, where they had a good-sized boat that would ferry the whole outfit across and on which you could take a wagon and team across, was a well-recognized crossing. (R. 2643-4, Vol. 15.)

*G. D. D. Kirkpatrick* testified: I am in charge of the Public Survey Office, Department of the Interior, in Salt Lake City, Utah. (R. 2645, Vol. 15.) In November, 1926, I went to a point near the mouth of Nokai Canyon on the San Juan River where I crossed the river on horseback and observed the depth as closely as I could; it varied from a few inches to probably a foot, with some pools 18 inches deep. The bed was quite sandy and shifting. Our camp was only a few hundred yards from the river and I was there several days. The width of the water was about 600 feet; it was shallow, with a number of channels that would shift from side to side. Our supplies came over it. Our party had a small sectional metal boat which I got into but didn't operate it. (R. 2670-3, Vol. 15.)

In May, 1926, I made a trip in a 20-foot launch of the Moab Garage Company from Moab to Lockhart on the Colorado. The down trip consumed 2½ or 3 hours; we struck two sand bars but had no serious difficulty with them; allowing the boat to drift around, by polling we pushed off. The upstream trip was slower because we kept close to the shore to take advantage of the slower water; went up to No. 1 Well, where I stayed all night. I recall no difficulties on the upstream trip, although we may have struck several sand bars, but I don't remember. We took a different course on our upstream than on our downstream trip, and I think the course of the rapid water was changed, probably due to a change in the river bed in some way. (R. 2674-7, Vol. 15.) Again, in 1926, I went from Moab to No. 1 Well in the same boat; then on down to No. 2 Well in a 16-foot row boat, with an outboard motor; the only difficulty encountered in the big boat was striking bars, but it was not necessary for us to get out of the boat at any time. We had no trouble with the outboard motor boat and I don't recall encountering any bars, mud, whirlpools or rocks although the river was low at that time. (R.



2678-9, Vol. 15.) I believe that when we were making our meander survey below Moab we got stuck many times with the small boat at points from 3 to 9 miles below Moab. (R. 2679-80, Vol. 15.)

In November, 1926, I made another trip with the black boat, also in one of our boats and on the big scow of the Moab Garage Company. (R. 2682, Vol. 15.) Our survey parties obtained most of their supplies by trucks and wagons at points near our camp, although some of our supplies were hauled down the river on our boat and on the Moab Garage Company's boat. (R. 2683, Vol. 15.)

When I crossed the San Juan River at the mouth of Nokai and observed that its width was about 600 feet and its depth from a few inches to a foot, I was directing my attention to the matter of depth; the water "probably came two-thirds of the way up" my horse's legs. I was riding either a mule or a horse of medium size, weighing from 800 to 1000 pounds; I should judge its hind legs were 30 inches long and its fore legs maybe 24 inches. As I crossed the river I looked down to see where the water reached on the animal and observed that it came to a point more than two-thirds up its legs. It came up to the horse's belly. Our camp was back at a point from which one couldn't see the San Juan River. (R. 2700-3, Vol. 15.)

On the May, 1926, trip from Moab to Lockhart when, as I testified, there was an observable change in the channel of the river, we didn't go upstream in the same channel that we went down because going up we endeavored to go as close to the shore as we could to take advantage of the slow water, whereas on the down trip we generally kept in the deep part where the current was and on our upstream trip avoided, as far as we could, the path we had followed going down. (R. 2711, Vol. 15.) I don't know definitely about the changing of channels. "I think we changed our course because we thought the river had changed its course." (R. 2712-3, Vol. 15.)

In the meander survey, concerning which I have testified, the course of our boat would sometimes be in the middle of the stream, sometimes along the shore, sometimes we would cross back and forth, and we would often beach our boat and also hug the bank as closely as we could. We would thus, of course, very frequently touch sand. (R. 2715-6, Vol. 15.) On an occasion when the Moab Garage boat was stuck on a sand bar it became thus stuck when they took

the boat as far into shore as they could in order to permit me to keep an appointment I had made to meet Mr. Moore at that point and they probably got stuck because of their attempt to land me. (R. 2717-8, Vol. 15.)

*Charles F. Moore* testified: I am a U. S. surveyor for the General Land Office. From December, 1923, until the spring of 1924 I was at our survey camp at Oljeto Springs, about 12 or 13 miles southwest of Goodridge. We were surveying the area between the San Juan River and the Utah-Arizona line. (R. 2723-5, Vol. 15.) During that period I had occasion to go to the river's edge at the mouth of Slick Horn Canyon and Clay Hill crossing. I was also at the San Juan River in the winter of 1925-6 when we surveyed the country from Moonlight to Piute Canyon. (R. 2728-9, Vol. 15.) I crossed the river once or twice in a boat and also crossed frequently on horseback. I didn't observe the depth of the water at Copper Canyon, but at the mouth of Piute Canyon it came up so that you would have to hold your feet out of the stirrups of your horse to keep from getting wet. At other places it didn't come up that high. I judge it varied at other places from 6 to 18 inches. (R. 2730-2, Vol. 15.) Our supplies came overland to our camp and I can't tell how deep the water was on any occasion when we took supplies across the river in our boat. I have seen sand waves as high as 4 feet. (R. 2734-6, Vol. 15.)

In 1928 we made government surveys above Moab and I went upstream from Moab in August of that year in a 16-foot outboard motor boat to a point just below Big Bend—maybe farther up than that. We beached the boat at Big Bend, went to the mouth of Castle Creek and got a small row boat which we used in our downstream survey, crossing back and forth as we worked. (R. 2736-8, Vol. 15.)

In May, 1926, I went from Moab to Lockhart in the black boat of Moab Garage Company, and later made a boat trip to a point 10 miles below Lockhart. I recall no difficulty on the down or upstream trip except there were a few whirlpools and our progress was slow. (R. 2741-2, Vol. 15.) Supplies for our camps below Moab came part by boat and part overland. Part of the time I had no way of getting in touch with the garage so as to know when their boat was coming down, and they would only come when they had special trips to make. (R. 2743-4, Vol. 15.)

During my survey work on the San Juan the only one of the camps that we established that was close to the



river was the camp near the mouth of Nokai Canyon, from which point we would supply other camps. (R. 2747-50, Vol. 15.) In the lower section our survey barely crossed the river, but in the eastern section we surveyed back several miles. (R. 2753, Vol. 15.)

*Robert C. Yundt* testified: I am a Surveyor with the U. S. Land Office. (R. 2761, Vol. 15.) In 1926 I was on the survey from a point 10 miles above Moab bridge down to a point several miles below the mouth of Indian Creek on the Colorado. In this work we used an out-board motor boat. At low water sand bars interfered with the operation of our boats. There was one place below Lockhart where the channel would change and at times we would have to go down and around the bar and come into camp from the lower side; at other times the channel would be free so we could come directly into camp. At other places I have observed that we couldn't always follow the same channel and there would be changes in the channel observable during low water. (R. 2773-5, Vol. 15.) Supplies for our camps came part by boat, part overland. (R. 2776-7, Vol. 15.) In August, 1926, the large Moab Garage boat was stuck on a sand bar for the greater part of a day, and in August, 1927, we were hung up for a short time at one place in going from Lockhart to Moab. (R. 2778-9, Vol. 15.) I never saw any member of our party cross the Colorado River on horseback or afoot. (R. 2780, Vol. 15.)

In 1927 some of our survey work was quite a ways back from the Colorado River. (R. 2782, Vol. 15.) The sand bar difficulties that I encountered on the river were at low water, principally in 1926; in 1927 and 1928 I didn't have much trouble with sand bars. Throughout 1926 the Moab Garage Company was operating its boats, including the big barge. (R. 2785-6, Vol. 15.)

In doing our survey work along the river, we would cross the stream back and forth; would land quite frequently; at times we would hug the shore to get down a little lower, to some desirable point; we would only use the main channel of the river in going to and from work. It was usually more shallow on one side of the river than on the other and when we went over to the more shallow part we more frequently encountered bars. I would say that most of the bars that we encountered in that work was when we were crossing back and forth. We always

succeeded in going up and down the river, and when our boat got stuck we always succeeded in getting into deeper water. (R. 2786-8, Vol. 15.)

We surveyed about ten miles inland to the east from our camp at Lockhart. The average width of our survey along the river was five miles, and we had camps that were 5 or 6 miles off the river on both sides, with five to seven men in those parties. The camps of the parties working on land were in most places inaccessible from the river. Each party had a pack train. One truck load would supply the different parties. (R. 2788-90, Vol. 15.)

*Howard W. Miller* testified: I am employed in the execution of public land surveys for the U. S. General Land Office. (R. 2799, Vol. 15.) In October, 1911, I located a ford across the Green River at a point about a mile east of the mouth of the San Rafael and took our stock across there without swimming them; I would say that the depth of the river at that ford was about three feet on that occasion. (R. 2806-7, Vol. 15.)

*Carl S. Swanholm* testified: I am U. S. Cadastral Engineer, and from September 1st to the early part of December, 1926, was in charge of the meander survey work below Moab. (R. 2828-9, Vol. 15.) One of our camps was just on the outskirts of Moab. Most of our supplies for our lower camp were taken down the river on a barge but some of them were taken down on a small boat. At times when the barge didn't go below Well No. 1 we would have our supplies delivered there and take them thence to our camp by pack outfit, or we would go up with a small boat and bring them in. (R. 2829-30, Vol. 15.) About December 1st I made the trip upstream on the Moab Garage barge and it consumed an entire day because we frequently struck a sand bar. In 1926 our party had a boat which I operated most of the time. We used it to transport us up and down the river in making our surveys. It had an Evinrude motor and drew 10 to 12 inches with a light load. With that boat we were frequently delayed on bars and the shearing off of propeller blades occurred. I believe it required the replacement of one propeller blade during the 1926 season. I sometimes noted changes in channel occurring within 24 hours and at other places the channel would remain the same during the entire period we were there. (R. 2830-4, Vol. 15.) The surface of the water at that time was from

three to four hundred feet in width and I once waded the river at the mouth of Mill Creek before we had a boat available and the maximum depth was about thigh deep and the current 5 or 6 miles an hour. (R. 2835, Vol. 15.) In 1927 I went down the river on a Moab Garage Company boat to Lockhart and there used the same outboard motor boat I had used the previous year. The section of the river around Lockhart was no more difficult to navigate than the upper portion with which I am familiar. The river channel there is better water than in the upper portion and the channel can be found with less trouble. (R. 2836-8, Vol. 15.) When I went out, in 1927, I went up the river in the black boat of Moab Garage Company, trailing our outboard motor boat. In 1928 I went down to a point known as the loop, located about six miles above the junction of the rivers, on or about October 20th, taking with me two 16-foot boats with outboard motors. (R. 2840-1, Vol. 15.) The work that year was of the same general character as I have described before, and we used one or the other of our boats in the progress of the work. I encountered more submerged rocks in the lower section of the river, whereas in the upper section our delays were usually occasioned by bars. When we would strike a rock and shear off the propeller it would be necessary to install a new pin, which we would do and then proceed. Four of us went upstream with our two boats about December 15th when ice cakes were running in the river, and we would try to avoid them; sand bars offered no more trouble than in the past. (R. 2842-5, Vol. 15.) With our inboard motor boat we had a metal projection that fends off obstructions from the propeller. (R. 2848, Vol. 16.) One of the government camps was at Indian Creek, located several miles back from the river. In 1927 that camp may have been a sort of distribution point for other camps working on the east side of the river. There was a road to that camp. My Lockhart camp was about 20 miles from that camp and about 8 miles from another inland camp. At Lockhart I wouldn't always be advised when the Moab Garage boats would leave. After the first trip down to Lockhart, when I took our supplies on the barge, we obtained one or two additional small consignments by bringing them down in our small boats from Well No. 2 where the barge had delivered them. While at Lockhart we obtained some supplies from Indian Creek and some from

the other inland camp about 8 miles away. It would have been necessary for me to make special arrangements with the Moab Garage people had I desired to have them deliver supplies by boat to Lockhart. (R. 2850-3, Vol. 16.)

*L. L. Taylor* testified: I publish a newspaper at Moab and my father started the first ferry boat on the Colorado River at that point. As a boy, I have gone swimming in the river and have been in row boats during all seasons of the year. The channel of the river occasionally changes a little bit at Moab. I recall such changes at the mouth of Court House and Mill Creek, where sand bars and drift wood will obstruct the river at times, almost putting a small dam across it. (R. 2855-7, Vol. 16.) Sometimes the river is 10 or 15 feet deep for quite a distance across and at other times during the dry season it is not so deep. When I was a boy I have waded the river and have seen cattle driven across, but I don't think I ever saw cattle taken across when it was not necessary to swim them. I have been two or three miles downstream in row boats and have noticed no change in channel over that stretch. I have taken boat trips on picnics up and down the river and went down the river in December, 1925, and also in April of the previous year to Well No. 1. We encountered no sand bars on the April trip, but on the December trip we were heavily loaded and stuck on a sand bar about noon. We proceeded to eat our dinner and before we had finished the barge drifted off the bar. (R. 2858-61, Vol. 16.) While drilling operations at the oil wells were in progress, I was many times in sight of the Colorado River, where I could see the Moab Garage barge, and I never saw it stuck on sand bars. I don't know of any occasion when the merchants of Moab brought in any merchandise or supplies on the river and don't know of any fruit or agricultural products being shipped that way. (R. 2862-3, Vol. 16.) I know of lumber being rafted down the river and of oil being transported up the river on boats. I have knowledge of several barrels of oil being thus transported and later taken to Lasal for use in dipping cattle. As a boy around the river I have seen several rafts of lumber come down to Moab from Castle Valley, 25 miles above. (R. 2864-5, Vol. 16.) This lumber was rafted from a point on the Colorado River above Castle Creek down to Moab. It is difficult for me to describe the rafts which I saw some 25 years ago, but I would say that a raft would be

40 or 50 feet in length and possibly half as wide; they would contain several thousand feet of lumber, and it was the easiest way to get lumber down because the road was very bad. Usually two or three men would ride the rafts. I know of equipment of various kinds, including machinery, also freight of other character, that came up the river from points below Moab. I recall several instances of people coming down the river in boats prior to the time when the Moab Garage Company started to operate; I think these people continued on their journey, and have personal knowledge of their coming down the river to Moab and then proceeding down the river on their journey. (R. 2866-71, Vol. 16.)

I recall the Undine coming upstream to Moab on several occasions; I personally saw it arrive there on several occasions but wouldn't undertake to say how many passengers there were on board. Later it was wrecked at a point two or three miles above Nigger Bill Canyon where the river is narrow and the water swift. (R. 2872-3, Vol. 16.) As editor of my paper I have kept in close touch with the operation of Moab Garage boats during the past few years and think those boats made trips with reasonable regularity. I know they had lots of delays but they hauled a lot of freight and for a long while were making trips pretty regularly. I believe I saw one of Mr. Wimmer's boats at Green River and know that he came with a boat once or twice to Moab but I didn't see his boat; I have also heard of Mr. Wolverton in connection with operations on the river. (R. 2875-7, Vol. 16.)

*John B. Cleary* testified: I am a civil engineer and for 11 years have been in the employ of Midwest Refining Company. My company spent approximately two million dollars during a period of 2½ years in oil operations between Moab and Lockhart. It has no present interest in drilling operations there. I first went to the river on December 31, 1925, going to Well No. 1 on the Moab Garage barge. About half way down we stuck on a sand bar for almost two hours, taking a line to shore to pull the boat off. I remained there seventeen days staking ground covered by permits, etc., and investigating a road. (R. 2895-2902, Vol. 16.) Transportation is always a problem in a producing oil field and at times it is necessary to get freight in promptly. With the method of transportation then being followed, it was necessary to unload from

the cars at Thompson, unload again at Moab and reload onto the boat and then unload at destination. There is seldom a producing oil field with less than three wells, and the size of a Moab Garage boat then in use was not sufficient to supply a producing oil field; it might require twenty such boats. (R. 2903-11, Vol. 16.) When I speak of bringing in material for a producing oil field I have in mind a 5-year period. A complete drilling rig for a depth of 4500 feet weighs a million pounds, in round figures. (R. 2912, Vol. 16.) Exhibit 461 is a reconnaissance I made for a pipe line. (R. 2914, Vol. 16.) Exhibits 462 and 463 are maps of a road survey I made for the proposed road to Well No. 1. (R. 2922, Vol. 16.) I have taken three trips on the Moab Garage Company barge; it had sand bar trouble on my first trip only. I was frequently on the Colorado River with the small passenger boat with which we got stuck on sand bars at different times and at other times made the passage quite freely. At every trip we found a shifting of channel which would at times occur within a few hours; at times I believe we found the channel in the same place. (R. 2925-6, Vol. 16.) I was around Bluff during the summer of 1926, and I think also in 1921, but I didn't go west of Bluff. As I recall, the river then had a discharge of 4000 second-feet. I would hesitate to say how wide it was there at Bluff. (R. 2927-8, Vol. 16.)

Our purpose in making the road survey was to prepare an estimate of the cost of a road in the event that we had a producing oil field. (R. 2930, Vol. 16.) I am not sure whether my company was one of the defendants in the suit brought by the State of Utah and Texas Oil Company. (R. 2944, Vol. 16.) It is not necessarily the practice of my company to make a reconnaissance before they go to the expense of getting their equipment and supplies on the ground for drilling operations. (R. 2949, Vol. 16.) When my company expected to drill at Elk Ridge it built a road before any drilling operations were commenced. (R. 2952, Vol. 16.) I think the Moab Garage boat would cost about one and a half times (possibly twice) as much as the type of truck I had in mind for use on a road. The truck would carry six tons and that boat would carry fifteen tons. We didn't at any time contemplate the construction of a road until and unless a producing oil field was developed there, and until that time we decided it to be more feasible and practicable to use boats on the

river. (R. 2954-5, Vol. 16.) In making my estimate of comparative costs of land and river transportation I assumed the cost of the Moab Garage boat to be \$12,000.00; however, that is a guess. If Mr. Clark, who owned the barge, has testified that it cost \$7,000.00, my answer as to the comparative costs of truck and boat should be changed. In such event, my estimate of the cost of the two would be about the same. A truck of the type we used cost \$6,685.00. (R. 2956, Vol. 16.)

*Walter F. Edwards* testified: I am a civil engineer employed by the Midwest Refining Company, and on my first river trip accompanied Mr. Cleary from Moab to Well No. 1 on the barge of Moab Garage Company. I surveyed the boundaries of the permits and used a motor boat called the Riff Climber to take us to our work up and down the river. We had trouble with sand bars. On January 25th I took a trip on the big barge and we had some trouble at the mouth of Bull Canyon, where we had to cross to the other side of the river because of a cross channel. I made another trip on that barge on March 25th, but recall no trouble. (R. 2960-4, Vol. 16.) While I was in that section I was on the river practically every day; we didn't have trouble every trip, but almost every trip, especially in crossing the river and on trips to Moab on the larger boats. Our only trouble was running on sand bars. We didn't always find the channel in the same place, but it was easier to find in extreme low water because the bars were then up, more or less exposed. At extreme high water our greatest trouble was in following what we knew to be the best channel in crossing from one side to the other. "In traveling up and down the river as many times as we did, we of course got to know places where the water was the deeper, and at extreme high water there was enough back eddies along the banks to aid considerably in going upstream rather than trying out in the main channel." But occasionally, in going up along the bank, we would run into where we knew there were submerged rocks because we had seen them at low water and we would then cross the river and try another channel on the other side and might get into trouble with sand bars in the middle of the stream. (R. 2971-3, Vol. 16.) I don't know whether I would have had any trouble if I had followed the same course in high water that I followed in low water. When taking advantage of the eddies along

the side, we didn't as a general thing have difficulty in getting out of them back into deeper water. (R. 2974, Vol. 16.)

*John L. Dugan* testified: I am superintendent of Utah Southern Oil Company. In 1924 I went by motor boat from the mouth of Mill Creek to the present site of the Frank Shafer well. We made the round trip that day, spending an hour at the well site; the river was flowing slush ice, which caused us a good deal of trouble, but we had no serious difficulties with sand bars. (R. 2984-7, Vol. 16.) My company was interested in all of the wells that were drilled down the river except one. In December, 1924, and August, 1925, I made river trips in row boats equipped with an outboard motor and took one trip on the Moab Garage boat when we had great deal of trouble with sand bars. On the last mentioned trip we started late in the forenoon of one day and did not return until the evening of the following day, although we started upstream shortly after breakfast. In January, February and March, 1926, I was on the river several times, invariably going down on the barge, which was then hauling considerable material. On most of these trips we had trouble with sand bars; except on two or three occasions, we would leave the boat a mile or two above camp and walk into Moab because it was quicker. (R. 2988-90, Vol. 16.) Between June and October, 1926, I made a number of boat trips, going down on the barge a few times and at other times on a motor boat. When our operations commenced, we rented a Moab Garage boat and drove it ourselves, and between July and the early part of November I made at least three trips a month down to Lockhart, most of the time running my own boat. The channel of the river changed rapidly from trip to trip, and we had to keep a careful watch for it. The most rapid changes seemed to be in July and August, when we had thunder storms, and it was at that time that we encountered the greatest trouble with bars; the streams coming in from the side would carry more silt and would change the speed of the current and start a shifting of the bed of the river. (R. 2991-3, Vol. 16.) From former experience I knew the place where the channel would pinch out and be shallow all the way across and generally tried to go through at the same point where we had gone through before. Notwithstanding this knowledge, I would get out and walk clear across the river to find

a place to come through. We practically always found a place where we could get a boat through, but it was very limited and the water was shallow. It was practically 22 miles from the Frank Shafer camp to Moab by river and from the place where we would get off and walk it was eight miles to Moab. The Moab boat landing was a trifle over three miles from the town of Moab. My company still technically retains its interests in those wells and is one of the defendants in the suit commenced by the State of Utah and Texas Oil Company v. Midwest Refining Company, Shafer and others. (R. 2994-3001, Vol. 16.) On those reefs would run clear across the river at low water, we would get 8 or 10 inches to a foot in depth when they gave us trouble; a number of times that would be the maximum. There were two or three points between the Moab landing and Kane Creek which gave us quite regular trouble in 1927 and 1928; at times the channel would extend through but at other times it would be very shallow. At the times I speak of the Moab Garage Company was not operating regularly but when it did operate, its boats came through the places I mention. (R. 3002-3, Vol. 16.)

*Herman Rosenfelt* testified: I took part in the building of the boat known as the C. H. Spencer. Its hull was 80 feet long, it had a 12-foot stern wheel with six inches clearance, thus making its length over all 92½ feet. It had a 25-foot beam and drew 18 to 20 inches of water, empty. After it was constructed in San Francisco it was shipped overland to the mouth of Warm Creek on the Colorado River. It was a steamboat, the boiler being 8 feet in diameter and 10 feet long. After being assembled at Warm Creek it was there launched in the river and everything was tested out and found all right, the boat being run up and downstream for 100 yards or so in making these tests. Exhibit 469 is a picture of a part of the frame of the boat and Exhibits Nos. 467 and 468 are pictures taken right at the mouth of Warm Creek. It burned coal for fuel, the coal being obtained from a vein 12 or 14 miles up from the mouth of Warm Creek. Its cost was not less than \$30,000.00. (R. 3006-14, Vol. 16.)

*Jeremiah Johnson* testified: I was born in 1876, and Lees Ferry has been my home most of the time since then. My father ran the ferry for 22 years and I assisted him, and

also ran it many years. It was about 40 by 18 feet. We also had row boats that we used. (R. 3015-16, Vol. 16.) I made a trip with three 14-foot boats and one 18-foot boat, which had a motor in it that didn't work, from Lees Ferry to Bull Frog Creek, located about a mile above Hall's crossing. There were fifteen in our party and our 135-mile trip upstream consumed twenty-one days. Between riffles we were able to row the boats at short intervals. At the riffles there were sand bars and rocks. After we delivered these boats we obtained two old home made row boats and came back down the river. The larger of these row boats was 18 feet long and the smaller one probably 14 feet long. We made the downstream trip in two days. (R. 3017-18, Vol. 16.)

I remember the boat called the Charles H. Spencer which they used for pushing barges from Lees Ferry up to Warm Creek to haul coal. I never made the trip to Warm Creek on that boat but I helped get them started and would help them unload and in other ways after they arrived at Lees Ferry. The Charles H. Spencer made two round trips from Warm Creek to Lees Ferry and another downstream trip to Lees Ferry. The barge that they built to use with the Charles H. Spencer got away from them and went down the river so they used our ferry boat in its place. On one trip they had five tons of coal down in the hull which was never unloaded. The coal they hauled on the barges they used for their boilers and some of it for blacksmith purposes. I suppose they brought seven or eight tons down on the ferry boat. The same people had some other boats one of which was 40 feet long and 6 feet wide and called the Violet Louise. It was equipped with a 40 horse power gasoline motor and had a propeller. I never took any long trips on that boat but have ridden around Lees Ferry in it. It went up to Warm Creek on one occasion and during the flood got loose and I caught it and brought it to land at Lees Ferry. That was about the year 1912 and the boat hasn't been used since. The company operating these boats was called Nome Gold Dredging Company. (R. 3019-24, Vol. 16.) The same company had a Mullins boat made of metal and 23 feet long by 4 feet wide, equipped with a 35 or 40 horse power engine. I saw them go upstream with it but didn't accompany them. They ran the motor at such a high speed that they burned out the bearings and rowed it coming back downstream. They put in new bearings and made an

other trip or two upstream to Warm Creek. Later it was taken to Lake Mary at Flagstaff and used for a pleasure boat. The same company had another metal boat and wooden boat equipped with small engines of not more than 10 horse power. These boats got away and went down the river. On one trip I went four or five miles up the river on the Charles H. Spencer and for three days it was on the sand at a point a mile or a mile and a half above Lees Ferry. (R. 3025-6, Vol. 16.) On my trip upstream with the Stanton boats in 1898 I found that the water below Warm Creek was better than above; not so many rapids or such swift water. The Nome Company had two barges anchored together about a quarter of a mile below Lees Ferry and installed dredge machinery on them. They were dredging sand from the bed of the river. (R. 3027, Vol. 16.) Once I saw the river rise a foot an hour in twenty-four hours at Lees Ferry as a result of heavy rains. There was one year when the rise was greater than ever known either before or since; that was in 1884, and I can just remember. I marked the place to which the river came by a fork in a tree in our orchard. I suppose that mark might be 20 or 25 feet from low water mark. (R. 3029-31, Vol. 16.) Aside from the one trip I took upstream with the Stanton boats, I have only made one trip up the Colorado River above Warm Creek, and on that trip went only five or six miles above Warm Creek in a row boat. All of the fifteen men who went with me on my upstream trip with the Stanton boats came back down the river with me, making the 135 miles in two days. Going upstream with the Stanton boats we poled and rowed some, towing when we came to a good place where we could walk along the bank and in other places rowing. Coming downstream after delivering the Stanton boats there were seven men in one boat and eight men in the other. (R. 3035-8, Vol. 16.) The Johnson outboard motors are equipped in such a manner that the silt in the river doesn't get in and cut the bearings as it did with the boats concerning which I have been testifying. The Johnson motors are equipped with a small pin in the propeller so that if you hit anything instead of twisting the shaft out the pin is cut out and you raise the motor up and shove in another pin and go on. (R. 3039-41, Vol. 16.)

Defendant's Exhibit 12 is in my handwriting and signed by me. I made the following statement in that letter:

"I found the largest size outboard motor, two-cylinder, to do very well. The bearings are cased in so the silt doesn't bother them. A home-made row boat that would carry one thousand pounds with a Johnson outboard motor will go up the river in fine shape."

When I made that statement I had in mind only some little section of the river and referred only to parts of the river where the water was quiet. (R. 3043-5, Vol. 16.) The Johnson outboard motor that I had in mind when I mentioned it in my letter to Mr. Burdick was a 10 horse power motor. (R. 3047, Vol. 16.)

*Frank T. Johnson* testified: I was born at Lees Ferry, in 1878, lived there until 1896, and have been there at different times since then. (R. 3060-1, Vol. 17.) I never saw the steam boat Charles H. Spencer in operation but remember seeing it when it still had steam up. I recall seeing a few wagons and some machinery on the boat but didn't see any coal then. Later I saw coal brought on our ferry boat and saw some coal on the deck of the Charles H. Spencer. I remember seeing the Violet Louise and the scow, and my brother's testimony concerning the Mullins boat corresponds with my recollection. (R. 3063-9, Vol. 17.) In operating the ferry boat, after my return in 1910, we often encountered sand bars which would sometimes extend nearly half way across the river. We could always get our passengers off the boat; had plenty of plank that we would lay across the sand where it was miry. Usually these sand bars would form after the fall rains, in July or August. I have never been up the Colorado River more than about seven miles in a boat. (R. 3070-2, Vol. 17.) In 1921 I was on the survey for the California Edison Company for two months and came down the river from the mouth of Rock Creek to Lees Ferry with four other men in a row boat. There were a number of places where the bottom of the boat would drag on the sand, but I recall only one place where we had to get out and lift the boat off. (R. 3072-5, Vol. 17.) While on this survey trip most of our supplies came overland from Lees Ferry, although we received some supplies at one point by boat. The survey was back from the rim of the canyon, at places 15 miles. We had a pack outfit with the party but returned to Lees Ferry via the river because that was the best and the easiest method of travel. (R. 3077-8, Vol. 17.) At Lees Ferry there is a sort of point which

constitutes an obstruction to the flow of the river, and the sand bar forms on the opposite side from that. I remember seeing Nathaniel Galloway come down the river a number of times—two or three times. He was a trapper and hunter. Once in a while there would be a trapper and hunter come in but I don't recall their names except that I remember Bert Loper. The first one I recall seeing was a man named Mesca when I was about fifteen years old; later, Mr. Galloway came down, and then there were two other men. I later saw Galloway and have a distinct recollection of seeing three other trappers besides him since I returned to the river and up until 1923. (R. 3090-3, Vol. 17.) I don't remember whether Mr. Galloway told me where he came from the first time I saw him at Lees Ferry, but on his second trip he said he had come down from either Green River, Wyoming, or Green River, Utah. I have no knowledge of Galloway or any of the other men going back up the river in row boats. (R. 3098-3099, Vol. 17.)

*John W. Palmer* testified: I acted as assistant fireman on the Charles H. Spencer steam boat when it made its second trip from Warm Creek to Lees Ferry, which consumed from one o'clock p. m., one day until four o'clock the next day. We were stuck on sand bars and couldn't handle the boat until we put out a big log chain which we dragged in front to hold the nose of the boat straight. We weren't towing any barge, and carried wagons and equipment on the boat. The upstream journey consumed two days and we didn't use the log chain on that trip. Later we took about five tons of coal down on the boat, that trip consuming about a day. I then went to Paria to work for the same company. (R. 3104-3107, Vol. 17.) I have been to the small coal mine above Warm Creek, which was the first coal mine the company opened. The last time I was at the mouth of Warm Creek I saw about 100 tons of coal there. I know that the Violet Louise was up at Warm Creek, but don't know much about any of the boats except the Charles Spencer. (R. 3107-8, Vol. 17.) While I was at Warm Creek there were about 15 men working there, and supplies were brought there overland. On one occasion the Charles H. Spencer went about a quarter of a mile upstream from Warm Creek; we couldn't go any further, and that is the only upstream trip I recall. (R. 3110, Vol. 17.) On the upstream trip when I said the Charles H. Spencer couldn't go any further,

I know that we wanted go further upstream because Mr. Spencer said we did, but I didn't know to what point. All I know is that we just started to go up the river and turned around and came back. (R. 3112, Vol. 17.)

*Edward C. Sumner* testified: I have been on the Green River and was on the Colorado River from Hite down to Hanson Creek in the winter and spring of 1897-8 working for the Good Hope Placer Mining Company. (R. 3122-3, Vol. 17.) Supplies came to Trachyte Creek overland, from which point they were boated down the river 15 or 18 miles to Good Hope bar. Our boats were about 16 feet long and 4 or 5 feet wide, and in going upstream they would tow them and when the wind was fairly good they would sail up the river. I have never gone from Good Hope up to Hite by boat myself but have gone from Good Hope to Olympia bar on the river, and on that trip we went right along nicely. Going upstream it was not so easy. At first there was a heavy wind and we put up our sail, which consisted of a piece of carpet, and went along very rapidly; then the wind went down and it became a question of towing. I can't say that there are any rapids between Good Hope and Olympia bars, but there was some pretty swift water, but no really heavy fast water. (R. 3124-6, Vol. 17.) In 1898 Mr. Stanton brought in a drilling machine to test the bed of the river for gold. The only boats there during my time were skiffs. Mr. Stanton built a large, flat-bottomed boat, upon which they carried the drilling machine; they would drill across the bars and then drop the boat down, pick up the machine and go over the still water; on the rapids they would use a cable and pull the machine across. The drilling machinery was pretty heavy and they didn't take too much chance of grounding. I have no recollection of any ledge running clear across the river in the section I traversed. (R. 3127-9, Vol. 17.)

*T. Cummings Bennett* testified: I first went to the Colorado River in 1920 at Hall's Crossing, and thence to Hite on horseback. At that time I was working for the Henry Mountain Oil Company, operating across the river from Rincon, about 100 miles above Lees Ferry. I built a raft at Good Hope bar, about 14 feet square and drawing 7 or 8 inches of water, loaded some casing and six inch pipe on it. When we reached Olympia bar we loaded a wagon and



stove on the raft. On our trip to Olympia bar we encountered difficulties only once, when we were hung up for a few minutes on a sand bar, but the boat swung off out in the channel and we were all right again. Our load was too heavy for our raft so we got a log and made our raft larger and continued on downstream to Bull Frog Rapid and thence to Hall's Crossing, where we landed and unloaded the raft. (R. 3131-5, Vol. 17.) From Hall's Crossing we continued on downstream with a row boat and our raft, lining our boat at a whirlpool below Lake Canyon rapid, and then continuing on down to Rincon. Then, with my uncle and two other men, we went back upstream to Hall's Crossing. At one point below Lake Canyon rapid it was too swift for us to row and we towed the boat up the swift water. We made this upstream trip of about 22 miles in two days, towing where we could because it is easier to tow upstream than row. (R. 3135-6, Vol. 17.) We drilled for oil at Rincon, our deepest hole being 140 feet, and while there some of our supplies came from Hall's Crossing by boat and some came to us overland. (R. 3137-8, Vol. 17.) About October 8, 1920, I made an upstream trip from Rincon with Frank Bennett and W. B. Hay in a 16-foot row boat. We made the ten or eleven miles in a day, rowing and towing. We went up to bring down a raft that had stuck at Lake Canyon rapid and to salvage its cargo. I didn't observe a ledge there; where the raft was stuck; it was only knee-deep, and we had to move the raft about 20 feet to get it into deeper water. The raft was 20 feet long and 8 or 10 feet wide, and loaded with a drill stem weighing 1800 pounds and a few drill bits. (R. 3141-4, Vol. 17.) Different rafts were built on each of these trips, the first raft taking down the gas engine and drill rig, which consisted of an engine and wooden bull wheel and the frame of the rig. The first raft was in three or four sections about 10 feet wide and 40 or 50 feet long; they also had a boat with them. All of the equipment used in our drilling operations was taken down the river on one or other of the rafts or in the boat. The equipment carried on the rafts weighed five tons. (R. 3145-7, Vol. 17.) In getting the raft off at Shock Rapid it was necessary for us to get in the water, and we found it about knee-deep there where the raft had caught on rocks. That stretch of bad water was probably an eighth of a mile long. In November of the same year I made another upstream trip from Rincon to Bull Frog Rapid, a

distance of about 24 miles, and I believe it took us two days to make that trip because we stopped one afternoon to explore some old ruins. At Bull Frog Rapids we built a raft 20 by 10 feet, in two sections, and took it down empty to Rincon. At one place below Lake Canyon Rapid the raft got stuck on a rock and I got out and waded clear across and found a maximum depth of two feet. I made a trip to Hall's Crossing, towing, poling and rowing our boat upstream. We left Rincon after lunch one day and arrived at Hall's Crossing at ten o'clock next morning. I waded most of the distance. (R. 3148-52, Vol. 17.)

*Frank Bennett* testified: I am 64 years old and my occupation has been principally mining. I first went to the Colorado River about December 1, 1897, and worked at the Good Hope and California bars for the Good Hope Mining Company for two or three years. They had a flat-bottomed boat 22 or 24 feet long, with a beam of four or five feet. In July, 1898, I went by boat from the California bar down to the Good Hope bar. We encountered no trouble in going downstream on that trip. (R. 3171-6, Vol. 17.) In addition to the period when I was working for the company, I spent four or five years at the California bar, spending the winters there. I bought an interest in the bar from Mike Ryan, and we had a 28-foot boat and another light skiff that we used. (R. 3179-80, Vol. 17.)

In our operations we took out gold and would either take it out ourselves or send it by registered mail. Once in a while we would make trips between the Olympia and California bars. Aside from using a sail and oars as a method of taking boats upstream, I have had three different motor boats on the river, but that was after I quit working the California bar. We also towed boats, which was an easier method than rowing. The first motor boat I had was in 1902 and I used one of the first automobile engines built, in that boat. It had been used by an oil company; they had tried to construct it as an automobile engine. I tried to get up the Good Hope rapid with that boat; got it up to the top of the rapids but it didn't have power to go any farther. I tried the stern and the side wheel on that boat and the stern wheel was most effective. (R. 3180-3, Vol. 17.) In 1905 or 1906 I used a propeller motor boat, with which I ran up and down the river. Sometimes I was able to run this boat from Olympia bar up as far as Good Hope



bar, where I would load my supplies. At other times I would go up as far as Hite, but I would have to tow the boat over the rapids. It was 22 feet long, 4 feet or more wide, and had a draft of 6 or 8 inches in addition to my propeller, which was 14 or 16 inches. The propeller would strike on the rocks. It had a 12 horse power engine, and during high water sunk at Tickaboo and I took the engine out. In about 1906 I built a motor boat with a tunnel designed to keep my propeller off the rocks. This was a 21-foot boat with a draft of about 16 inches at the stern, and I used the same engine that had been in my other boat. This boat didn't do very well, and I took the engine out and used it as a sail boat; also used oars on it to some extent. That boat is probably still there on the river. (R. 3184-8, Vol. 17.) I have sailed over rapids going upstream and find the water better for sailing when it is at a stage four feet above low water. At one time I put a small outboard motor in a 14-foot boat but the bearings wore out in the muddy water and it didn't really have sufficient power for swift water. (R. 3189, Vol. 17.)

I believe I was on the Colorado River every year from 1897 to 1920 in the section from Hite down to Lees Ferry, but was not boating during all of that time. (R. 3191, Vol. 17.) I recall one experience in 1898 when there was an ice gorge. Hite and two other men were in a boat and I helped them get to shore; they lost their supplies. Several times I have seen ice gorges at different places, and at Good Hope have seen the ice piled 15 feet high on the island. I have crossed the river on ice, but it was where the ice keeps it frozen together, and I have no recollection of ice ever forming there except on the sides of the river; however, an ice cake will catch and then another will come on top of it and they will freeze together. I don't think the ice ever freezes so you have solid ice across the river, but an ice gorge or ice jam may form clear across. (R. 3191-4, Vol. 17.)

Mr. Stanton had a boat built in Wisconsin and shipped to Lees Ferry. I went down the river in a flat-bottomed boat and came back upstream with the Stanton boat. On the downstream trip I had no real difficulty. I "never had any difficulties in going down, as long as we tried to stay in the middle of the river." However, on that trip we were posting notices and would have to run from one corner of the claim to another, and when we would go

into the banks we would quite often run aground. We also had a life boat with us and carried supplies in the flat-bottom boat. "I don't call to mind any time we had any difficulties." (R. 3196-8, Vol. 17.)

I know of two places in the river where there are ledges running across. On that Lees Ferry trip I didn't get acquainted with them, but on later trips down to the mouth of the San Juan I observed them. Mr. Stanton's life boat had quite a keel on it and I recall that it struck while going through Bull Frog Rapid, although nothing was injured. Again, at Shock's camp the life boat got in trouble. There are cracks in the bed rock at that place which are not very wide; we took the life boat over to the right hand side, but still it dragged a little and we helped it over there; that was at the Shock bar. I remember one other place somewhere below there where we had a little difficulty of the same kind; we didn't have any difficulty with our boat but the life boat had a little difficulty. It is shallow at the mouth of Lake Canyon and there is a reef but I don't remember whether it was at that place that we had the difficulty. (R. 3199-3200, Vol. 17.) After delivering the boats to Mr. Stanton at the dredge, just above Bull Frog Rapid, four of us continued on up to Hite, rowing and towing. (R. 3201, Vol. 17.) I believe I saw the first sand waves I had ever seen on that Lees Ferry trip. The sand waves are worse when the river begins to rise in the spring and when it begins to go down. I have seen them at most any part of the river at certain times and they are worse below the mouth of the San Juan. I prefer an intermediate stage of water for navigation; that is, where it is four or five feet above extreme low water. (R. 3203-5, Vol. 17.) In 1901 I recall taking some lumber down the river from Hite to Olympia bar, about 35 miles below. We made three rafts, each 14 feet square, and fastened them together with cables. I loaded 5000 pounds of machinery and equipment on the raft, also all of our supplies, and with eight men we started down the river in June. In avoiding a dam and race-way that had been built at Good Hope, we had to go over to the other side where there was a big swirl and where we touched the rocks but didn't touch hard enough to hurt anything, and had no further trouble and landed our freight at Olympia bar. Once in a while I would go up from there to Hite in my boat and bring down supplies. (R. 3206-9, Vol. 17.) At one

time I moved a Keystone drilling outfit from the California bar up to Good Hope bar, and a few years later took it back down. I took it down in November or December on a raft and in our boat, and it weighed three or four tons. In taking the drill outfit upstream we made two trips. We went up the river with a sail and had the big boat and it was while the river was rising quite rapidly. We used a big canvas for a sail and would wait for the wind. I think our actual traveling time in making that upstream trip was only about a day and a half. (R. 3210-1, Vol. 17.)

At one time I worked a copper property up White Canyon, about nine miles from Hite; I hauled the ore from the mine to the Colorado River with four mule teams and took it across the river in my tunnel boat, and thence over into Green River, Utah. (R. 3212-3, Vol. 17.) I recall going into that country to drill for oil in July, 1920, when I built a raft at Hall's Crossing in three 14-foot sections. We used some of the drill rig timbers in our raft.

I recall no difficulty encountered in taking this raft down the river except at one point where we got into a bad swirl and the raft went out of sight; it was loaded quite heavily and some of the light stuff was not tied on and drifted off, but the raft bobbed up again a little ways farther down and we were not hung up at any other place and made the trip in less than a day. I also recall building another raft at Hall's Crossing and going up the river to Hite, where we picked up material for the raft, added on to it, and then loaded it with supplies; we had considerable trouble with the raft, but I don't remember being hung up anywhere until we got to Shock Rapids, where we unloaded and then got some of the other boys to come up and help us. (R. 3214-6, Vol. 17.) When the last mentioned raft got hung up we stayed below there for the night; I don't believe we found any water more than two feet deep there. I think the ledge at that point went up and down stream about an eighth of a mile. The only other occasion when I got on that ledge was when we had trouble getting Mr. Stanton's life boat through there, and on that occasion I think we only had to work it for a little ways. (R. 3217-8, Vol. 17.)

The channel of the river shifts sometimes. As a general thing, the shift occurs in high water or immediately after high water. If there is some obstruction it causes the current to cross and it may shift over a third or half the width of the

river quite rapidly. I did not always find the channel in the same place and I have known it to change between trips. (R. 3218-9, Vol. 17.)

In October, 1900, I went to Barrett Station, about 12 miles below Bluff, on the San Juan, with a pack outfit. There was quite a little stream there and also at Bluff and below Barrett Station. I went down to the bed of the river to water my horses and there was no real running water in the bed. I only remained there one day and then went back to Comb Wash and Hite. (R. 3220-2, Vol. 17.) At Hite I got a boat and went down to the mouth of the San Juan River, and thence up the San Juan River about 12 miles, another man accompanying me. When I arrived at the mouth of the San Juan River, I found it was unusually low, very low, and we started to row up but only rowed a little ways, and got out and towed. There was considerable current and too many bars for us to row in such low water. After we got up there we had our supper and then came back downstream that night. We had no trouble going downstream. On our upstream journey we had started the sand and made a channel and went right back downstream in that channel. This was about October 15th. (R. 3222-4, Vol. 17.) I have had very little experience in boating on the Green River. Once I went down the river with Captain Yokey; they had a boat called the Cliff Dweller, and one Sunday ran an excursion down a ways and grounded. I didn't stay on the boat and walked back up. (R. 3225, Vol. 17.)

On the occasion when I went up the San Juan River in my boat, I made the downstream trip that evening quite rapidly and had no trouble. (R. 3226, Vol. 17.)

I made my river trips during the years that I was on the Colorado in pursuit of my vocation or in the service of others who were engaged in business, and I was not in that country as a sight-seer or gentleman of leisure. (R. 3231, Vol. 17.)

I shipped several cars of ore from the copper property that I worked near Hite, all of which was taken across the river in boats. Some of the carloads contained as much as forty tons, and I must have shipped 200 tons. (R. 3232-4, Vol. 17.)

The shifting of the bed of the Colorado River and the changing of channels in that river generally occurred during the high water season and immediately following the high

water season. After the river settled down to low or normal water, there was very little change in the channel unless something in the way of an obstruction occurred that would tend to throw it to the other side. Such an occurrence would be unusual. Sometimes there would be floods other than spring high water that would have the effect of changing the channel, but that was rather an unusual occurrence. (R. 3235-6, Vol. 17.)

I have known an ice gorge to last for several days, but as a general rule they break in 24 to 48 hours, and the longest period I have ever known an ice gorge to last was about a week. At the place at Shock Rapids where I observed the ledge extending across the river, I don't know whether the cracks continue up and down the river, but I would say that at that ledge the depth of the river was about two feet at a very low stage of water. (R. 3236-9, Vol. 17.) After the late summer floods following cloudbursts, the sand bars would sometimes change and at other times they wouldn't change; after floods they may change a little at some places and at other places they don't change. (R. 3240, Vol. 17.) In 1898 or the spring of 1899, I would say that there were about 75 or 100 men working along the river in the vicinity at and below Hite; most of them lived in tents. For a long time after 1898 there were twelve men who got mail at the Hite post office, where most every one got his mail. Some of those people lived in little houses, dug-outs, and some in tents. (R. 3241, Vol. 17.)

*William R. Newby* testified: I am a farmer living at Green River, Utah, and was roustabout of the Cliff Dweller when it left Green River, Utah, in August, 1907. We first hit something above the mouth of the San Rafael and after that went along fine until we hit something else, which generally tells the story down to the mouth of the San Rafael. Between there and Valentine Bottom we had difficulty with sand bars and had a better channel in Stillwater Canyon than elsewhere. On occasions we took a line ashore in order to get off and were compelled to take almost continuous soundings to avoid hitting bars more frequently. On the upstream trip we struck a sand bar about a mile from Valentine Bottom but bobbed over it; at one place we got into a pocket and had to back out and go up mid-stream; at Fort Bottom we found more sand bars which we had

to feel our way around; we had difficulty getting around another riffle and finally reached Wolverton Ranch and tied up. We there raised our engines in order to raise the paddle wheel above the bottom of the boat to avoid rocks and went on up to the town of Green River. I don't think the boat drew over 18 inches. I haven't knowledge of any more trips by that boat and think they sold it to some Salt Lake firm. (R. 3242-9, Vol. 17.)

I have made trips on the Green River in other boats but have no knowledge of Tom Wimmer's boat named the Marguerite or the Betsy Ann, and don't know of any boats now tied up at Green River. (R. 3250, Vol. 17.) I remember another steam boat known as the Black Eagle which wasn't half as large as the Cliff Dweller, and I made a little trial trip in that along in 1908 or 1909. It belonged to Mr. Yokey, and I haven't seen it since. During the periods I have referred to I wasn't down to the river frequently; perhaps only once a year. In September, 1909, I made a trip on a side wheel gasoline propelled boat known as the Wilmont. I went sixty miles down to the Narrows in another gasoline boat called the Dispatch. We got stuck on a sand bar before we reached Wolverton's Ranch, camped there on the short, and next morning continued on down without further difficulties until we met the Wilmont at the Narrows. I went nine miles around Bowknot Bend in the Wilmont and then the Dispatch, the Wilmont and the skiff owned by Mr. Wolverton proceeded upstream to Wolverton's Ranch, encountering a few sand and gravel bars. We remained there for three days and then went up to Green River in a day with the Wilmont and Dispatch; we made it up over the Brown riffle without grounding and thence on to Green River, Utah, without any trouble. I made another trip in the Dispatch from Green River, Utah, to Little Valley of about the same character as other trips. On one trip I made in a four-oared boat belonging to Yokey I was hung up on a flat rock close to Little Valley; had quite a little trouble getting loose and then went on down all right. On another trip we abandoned the Slapping Sal at a point below Tenmile Bottom. That was in December, and next spring we got the boat back again. At Trap Ford, above my place at Green River, Utah, the channel has changed 200 yards from its original place, the rocks that used to be there having now disappeared and the riffle being 200 yards below where they used to ford; above there the river has

moved about its width; and, in 1905, Saleratus Wash, which comes in at Green River, Utah, was probably 50 or 60 feet wide and is now 200 yards wide. I don't know of merchandise ever having been shipped to Green River via boat. (R. 3251-60, Vol. 17.)

*Molly Newby* testified: I was on one trip in the Dispatch mentioned by my husband, William R. Newby. I never saw the Black Eagle or Wilmont but saw one of Yokey's row boats and I don't know of any boats on the Green River now, or of merchants or people getting supplies by boats. (R. 3261-3, Vol. 17.)

*Louis M. Chaffin* testified: I have been on the Colorado River from the mouth of the Green to Lees Ferry, my first experience being in 1888 or 1889, at the California bar, to the shore opposite which point we hauled a 60 horse power boiler and other freight. (R. 3265-8, Vol. 17.) In 1892, I was again at the river with Ed Meskin, who was trapping; we built a boat 16 feet long and 3 feet wide at the mouth of Hanson Creek, put our supplies in the boat, and poled and rowed our boat up the river to Hite, also towing the boat. (R. 3268-70, Vol. 17.) Later I went down the river to Hole-in-the-Rock, encountering no obstacle that gave us any great trouble, although occasionally we would get on mud bars. Meskin knew the river well, and this trip was made in the winter. We went back up to Hanson Creek in February; a time or two it was necessary for us to get out into the water, but perhaps we could have poled the boats over those places. (R. 3271-2, Vol. 17.) In 1892 and 1893, there were people operating at Hall's Crossing, and Cass Hite had quite an outfit below Hite; there were also men at Tickaboo and Good Hope bars; probably 25 or 30 men there. In 1894, with two companions, I prospected along the river at various places, rowing and towing our boat on upstream trips. During that period we had a contract to deliver wood and timber to the California bar for Mitchell and Ryan, who were then working it; we would make rafts for this purpose and also load our boat. Supplies would come to Hite overland and we would take them down the river by boat. That year we were working about 35 or 40 miles below Hite. In going upstream, we would row, tow and pole; on one trip, when we had a larger boat than usual, it was difficult to row upstream while the river was rising

in May, but we had no difficulty coming downstream. (R. 3272-7, Vol. 17.)

After the high water goes down it leaves a channel if you can find it, and the channel will remain until a flood comes in from some side canyon and starts the silt moving, after which flood you have to hunt and find a place to go through; for that reason we get on the bars. Such change may come over night. (R. 3277-8, Vol. 17.)

In 1895, we operated on the New Year bar and Moquie bar, during that period boating our supplies from Hanson Creek. In 1896 or 1897, I bought the Shock bar, which we called the Independence bar, located ten miles below Hall's Crossing, boating our first supplies down from Hanson Creek, and later from Hall's Crossing. When the wind was in the right direction, we would sail our boats. I had ten men working for me at Shock bar. We boated our outfit down when the water was rising. I had seven boats and a raft, and one of two 24-foot boats was loaded with iron; in going over Bull Frog Rapid I had a boat sink but it was my own fault. "Other than that, it was the only trouble I had, and I consider that my own carelessness." (R. 3278-82, Vol. 17.) In May, when the water was high, I loaded sixty-odd sacks of oats on a big raft at Hall's Crossing and went down 15 miles below, intending to catch the raft, but when it arrived there were only sixteen sacks left. (R. 3283, Vol. 17.) In the fall of that year, I went downstream with another raft quite heavily loaded, and with the very low stage of water had quite a time at Lake Canyon, having to get in the water and pry the raft off the rocks. The depth at that ledge varied from nothing to over my head. By watching you could get a small row boat over the ledge if it wasn't too long and didn't draw more than a foot of water, but we had to pry our raft off at two or three places, and once unloaded it for maybe 100 yards. In 1894-5, there was something over a hundred prospectors along the river from Hite to Hall's Crossing and more than a hundred signers to our petition for a postoffice. (R. 3284-7, Vol. 17.)

In the fall of 1896 or 1897, Ed Meskin and I made a trip to Lees Ferry in a small row boat. Below the San Juan we encountered a lot of sand waves and at a lot of places had trouble finding our way through and would mistake the channel and get on bars; almost always we found a channel. We then turned around and came back up the river from

Lees Ferry to Meskin bar, poling and working along, and later continued up the river to Moquie bar and the bars along Hall's Creek. We had no serious difficulties coming upstream except the work of towing and poling the boat. In the winter of 1898, I went from Hanson Creek to the Klondike bar, located below the San Juan River, with two big boats, each about 14 feet wide and 18 or 20 feet long; one of these boats was box shape and I put a nose on the other and fastened them together, tandem fashion. I loaded into the boats five four-horse loads of supplies and horse feed; also our scrapers and machinery at Moquie bar; thus loaded the boats drew about a foot of water. This trip was taken in January, 1898; an ice jam had formed so that at one point it had backed the river up for a mile and a half, and in going over Little Giant Rapid the rear boat, which was loaded the heaviest, must have had a hole broken in it for it sank. We saved part of the cargo and loaded it into other boats; we lost our scrapers and other machinery but replaced them with other scrapers and machinery and went on down to the Klondike bar, having trouble with sand bars on the journey. (R. 3287-95, Vol. 17.)

In 1899, we worked at the Stanton dredge. They had a barge which they used to handle their drill machinery up and down the river and also to move freight for about a mile and a half up the river. I never operated this barge myself with a sail but have seen it sail upstream. Between 1899 and 1908, I placer mined in that section, moving my outfit upstream or downstream to the points desired, but, because of the hard work, took only what I had to have on my upstream trips. On the upstream trips we would have trouble at low water with bars. As a rule, the river would be at a low stage during the freezing period and generally in the latter part of February there would be mush ice running in the river, which condition would begin to end during that month, and the river would commence to rise in March. After the river raised a foot or so the effect of the bars didn't bother you and there was always room to get through if you knew where to find the places; after the spring rise commenced there was always a channel. It has been my experience on the river that after the spring rise, about the latter part of March, you could figure on going down the river if you found the right place to go and there was no place where you couldn't find the channel. Every rise or fall of the water would bring about a rearrangement of the

sand bars but would not be accompanied by a change in the main channel or in the gravel bars, but the change would be in sand bars located in still water. (R. 3299-3306, Vol. 18.) "Where the river runs swift, and the gravel beds was, it took a lifetime to make much of a change." A flood during high water would make no noticeable difference. (R. 3308-9, Vol. 18.) I have waded the river at Shock bar and at a place somewhere below the San Juan River with a pair of hip boots without getting wet. (R. 3310-11, Vol. 18.) In 1917, I took a Star drilling machine and a Keystone rig, weighing probably more than five tons, from Tickaboo bar to Hanson Creek, a distance of 18 miles, on a raft and boat. (R. 3311-14, Vol. 18.) In 1904, I made a trip from Green River, Utah, to a point below Cataract Canyon in a 16-foot boat drawing eight inches, with A. G. Turner, who is now operating the California bar on the Colorado River. Down to the San Rafael we had no trouble, and from there down to Cataract Canyon we had difficulty finding the channel. "Maybe we could have looked around and found a channel." Off and on we were hung up on sand bars; if we got in the wrong place and found we could not get through we backed up and found a place where we could get through. When we reached the junction we left one boat there and proceeded up the Colorado River to Moab in the other boat; "I don't remember having any trouble at all going up there. I don't remember ever getting up against anything that was any trouble." There was no place where we couldn't row and pole our boat right on up. (R. 3314-16, Vol. 18.) On the trip back down the Colorado from Moab to the mouth of the Green "I don't remember of anything occurring of any interest out of the ordinary." We had no serious trouble getting through Cataract Canyon although my partner's boat tipped over once. Generally we ran the rapids, but when the water was right bad we took no chances. (R. 3317-8, Vol. 18.) I have made no river trips of importance since 1917. While I was placer mining I would sometimes ship my gold out with the teamsters who brought freight to the river, but as a rule would bring it out myself. (R. 3320, Vol. 18.)

In 1896 I went over to a point called Cottonwood, which was close to Gable Camp on the San Juan River. I traded my horses for a boat and some blankets and went prospecting down the San Juan River in the first part of December. I spent probably a week and I got pretty much disgusted and went on down the river to the Colorado River.

There was quite a bit of sand-waving shallow places which were not very good going with our flat bottom boat. "We got stuck a time or two" on sand bars. After reaching the Colorado River we continued on up the river in our boat to Hanson Creek. We took out no gold from the San Juan. (R. 3322-5, Vol. 18.) The lowest stage of water on the Colorado and San Juan rivers is in December, January and February. (R. 3325, Vol. 18.)

So far as shallow water and sand bars are concerned, the difficulties of navigation, as I observed them on the Green River, are very much greater than on the Colorado River between the foot of Cataract Canyon and the Utah-Arizona line; there are many more interruptions to downstream travel on the Green than on the Colorado below Cataract Canyon. I have never made an upstream journey on the Green River but I would say that it would require more power to go upstream on the Colorado River than on the Green River. Aside from the matter of power, I would say that the difficulties of navigating upstream on the Green River would be greater than on the lower Colorado. (R. 3326-31, Vol. 18.)

I have probably used and operated fifty different boats on the Colorado River. It is generally true that any changes that occur in the channel of the Colorado River occur while the river is rising and settling during the high water season—I refer to the big changes. Where there is a gravel bottom the channel does not change much, but where there is silt it changes in low water; in high water you don't know where those places are; the small changes occur where the water is still. It has been my experience that after the water starts to rise there is a channel and after the water subsides the channel will remain pretty much as it was; your channel is then formed for the season, and unless some condition comes that changes the height of the water, your channel will remain pretty well as it was. (R. 3335-7, Vol. 18.)

*Levi Kendrick* testified: I took one row boat trip from Wolverton's Ranch to Three Canyons, four or five miles below on the Green River. I don't think we had any difficulties. The only boat I know of at Green River now is at Mr. Bedere's, six miles below town. I know Mr. Wolverton has taken supplies by boat to his ranch but otherwise don't know of merchandise being delivered by boat. (R. 3338-41, Vol. 18.)

*Maude Kendrick* testified: I once forded the Green River at Trap ford, about two miles north of Green River bridge, on horseback, in the summer of 1910, and have seen others ford at that place. The water came approximately to the stirrups when I crossed. I once went from the Wolverton Ranch to Three Forks Canyon in a row boat with Mr. Wolverton and his daughter and came back up in a motor boat. (R. 3343-9, Vol. 18.)

*Hugh H. Hyde* testified: I once spent some time at Bluff and have worked at Mexican Hat. In 1921 I was with the Trimble party on the San Juan River as rod man. The water varied at different seasons of the year; sometimes when the river was high we didn't attempt to go swimming and in the summer it got real low. Once, just west of Bluff, I took bucks across the river and the water didn't go over my riding boots. On one occasion, about the year 1916, I heard a noise up Cottonwood Wash and saw what appeared to be a wall of about five or six feet of water rolling down that wash, carrying trees, etc., with it. Cottonwood Wash empties into the San Juan River. I have seen the San Juan River rise four or five feet in an hour. It carries more sand and sediment during summer floods than at spring high water. I have seen sand waves and when in swimming have swum over them. At points five or six miles both ways from Bluff I have skated on the river, and we generally have skating every year. (R. 3350-8, Vol. 18.)

I know that some members of the Trimble party went down the San Juan River to get some supplies at the mouth of the river and bring them back up the river. I don't recall whether or not Mr. Christensen went down but I do remember that someone went down and brought supplies back up from the Colorado River when our camp was about six miles from the mouth of the San Juan. (R. 3358-9, Vol. 18.)

I am one of the persons who appears in the photograph lettered B on Plate 19 of Exhibit 56; the water became so muddy that the fish swam to the edge of the river and we were killing them with sticks; I have never seen the fish in that condition at any other time on the San Juan River. (R. 3359, Vol. 18.)

*Elliott Bird* testified: I am a surveyor with the U. S. Land Office and was with a survey party from the Paria River to the Arizona line, and in making this survey we got

clear over to the Colorado River; our supplies came overland, as did our supplies when, in 1923, I was with a party surveying around Hall's Crossing; on the last mentioned survey I didn't get down to the water or off the high land. (R. 3370-1, Vol. 18.)

I was with the survey party from Moab to a point ten miles below Shafer Well No. 2—a government survey party; we then had our headquarters at No. 2 Well and obtained our supplies by boat and pack train. We used an 18-foot row boat equipped with an outboard motor in our survey operations; when our motor failed us and we were unable to row upstream, we would tow it up. I made an upstream trip on the Moab Garage barge and at several places we had trouble with sand bars, three times taking cables to shore. On one occasion we were hung up two hours and had to drag the boat upstream for about 150 feet. (R. 3373-8, Vol. 18.)

*H. T. Yokey* testified: I have built and operated so many boats on the Green River that I have forgotten how many I have operated, my first experience being in 1903 when I went 125 miles down the river to Cataract Canyon in a 15-foot row boat with a 3½-foot beam. On the upstream trip we rowed and towed. This was a hunting trip and I took similar trips for two or three years. I helped launch the City of Moab and when we got down to the confluence in that boat and up the Colorado as far as the Slide we were unable to make it up the Slide at the flood stage then existing in the river; we retraced our steps and tied the boat up at Halverson's ranch. On the upstream trip we hit a sand bar a few times but went on over them. The round trip consumed approximately ten days. At high water it takes a good craft to go up the Slide, whereas at ordinary water there is no difficulty at that point. (R. 3394-7, Vol. 18.) After this trip the owner decided to take off the upper part of the boat, remove the tunnels, and to extend it 10 feet in length so as to make it a 61-foot boat and to put in steam power. After these alterations were made the boat was named the Cliff Dweller, and we went down to Valentine Bottom, 100 miles below Green River, Utah, having a very good downstream voyage. Our upstream trip coming back was better than the downstream trip. Once in a while we would run on a sand bar. On the return journey we went clear up to the town of Green River. In going over the riffles, because of the length of the boat, its bow would jerk around and the stern come up and lift the wheel out of

the water, and a man would take a line ashore and get the boat off in 20 or 30 feet so the wheel would strike the water and we would go on. (R. 3398-3401, Vol. 18.)

After my trip in the Cliff Dweller, I built a boat called the Black Eagle that was 40 feet long with a 6-foot beam and a draft of 7 or 8 inches. It was equipped with a water tube boiler and a 20-horsepower engine. On a trip I made with that boat down to a point within 10 miles of Valentine Bottom, the water tube got full of mud and it blew up. I came back upstream with Mr. Wolverton on the Wilmont, taking the boiler and engine out of the Black Eagle, and later bringing them up to Green River, Utah. (R. 3411-13, Vol. 18.)

I was employed by John F. Richardson of the Reclamation Service to take some machinery down the river for use on the government survey, and took Mr. Richardson down to the head of the Cataracts in a 14-foot boat having a 6-horsepower engine. I built a barge 32 feet long by 8 feet wide, put 500 or 1000 pounds of supplies in the barge at Green River bridge, and went down the river. I got another launch that I had used at Halverson's ranch, ten miles below; at that point we loaded the barge with more supplies that had come there overland. I had no difficulty going down to Wimmer's ranch. After I had finished loading the barge at Halverson's ranch, we lashed it to my launch and took it down to the mouth of the Green River. (R. 3415-8, Vol. 18.)

After we made the round trip to Valentine Bottom with the Cliff Dweller, its owner, Mr. Lumsden, told Mr. Anderson and me that we could go ahead and operate the boat during the season at our own expense; Anderson and I started in in good faith to do this, but when Lumsden made the sale of the boat we released him from his agreement. We thought some changes should be made in the boat and we were going to be allowed to keep all we could make out of it during the next season. When we started down the river with the Cliff Dweller we had seven tons of coal on board and I am sure that it then drew about 20 inches. (R. 3419-21, Vol. 18.)

I have lost track of the number of times I have been down to the mouth of the Green River in boats; some years since 1903 I have made from three to five trips and other years not more than once or twice. If a party came along I was always ready to take them down. (R. 3423, Vol. 18.)

Some years there are spots between Green River, Utah, and the mouth of the Green where at low water you couldn't



find a channel for a 24-foot boat drawing a foot of water, because at those points the river might be split up into two or more channels; if you had all the water in one channel you would have sufficient water there. I don't know how much water the Wilmont drew. Wolverton did most of his running up and down the canyon with that boat, and he would know more than I would as to whether there is any stage of water when that boat could not go up and down the Green River, and I wouldn't care to express an opinion as to whether the Wilmont would experience trouble at any stage of water between the mouth of the San Rafael and the mouth of the Green. (R. 3424-5, Vol. 18.) Three years ago I was unable to get my boat that didn't draw over a foot of water up the river at Little Valley; there is no other instance when I couldn't get up and down the river with a boat having a draft of one foot, and therefore I "always came back to the home port," and had always before that been able to find a channel sufficient to permit a boat drawing a foot of water to travel through. As a general thing, even at the shallow places that I have described, there is no difficulty in finding a deeper channel, but sometimes it is pretty hard to find; you are always able to reach your destination. When the river rises if you go through and agitate the sand it cuts a channel. When you come over that same route a day or two or three days later, it is my experience the channel is enlarged and the current will go into one channel instead of spreading out into two or more. (R. 3426-31, Vol. 18.) If I go downstream when the river is falling and make a channel, in making a trip after that I have no hesitation about coming back; I know where I am all the time and come right on through. I have done it and can do it again. Right today, if I knew that a boat hadn't been down the Green River this year and if somebody wanted me to take two thousand pounds of supplies down the river I would tackle the job if there was compensation enough, and I would reach my destination in the course of time; and after that trip if some one else should come along and wanted me to repeat it I wouldn't have nearly as much hesitation about taking on that job. I would feel that after the first trip had been taken the later trip would be easier. (R. 3441-4, Vol. 18.)

The barge that we built carried a load estimated at ten tons down to the junction of the two rivers where we cached it for the government party. (R. 3448, Vol. 18.)

I now have a 22-foot boat made of 14-gauge iron and wire; it has a beam of 5 feet, an 18-inch propeller and the skag below is over 10 inches; it draws too much water and I am figuring on putting on a stern wheel and intend to put this boat in the Green River and operate it there, and I expect to go down to the junction and thence up to Moab in that boat. (R. 3448-9, Vol. 18.)

Walter E. Mendenhall testified: I am seventy years old and spent most of my later life in the neighborhood of the San Juan and Colorado rivers. In the summer of 1893 I went by team and wagon from Lake City, Colorado, first to Bluff and thence down to the mouth of Comb Wash with a companion who was an old river man. We made a 14 or 15-foot boat having a draft of about 8 inches loaded and an 8 by 10-foot raft, and put them into the San Juan River at Comb Wash or Chinle Creek, which was right close by, and went down the river in the latter part of July or August of that year. I don't remember how many feet of water there were at Comb Wash at that time, but recall that Indians forded there on horseback and I don't think it was necessary for them to swim their horses, but I didn't notice particularly. Savage handled the raft and I handled the boat; we had our camp outfit and tools in the boat. At one point on the downstream trip the raft became fastened so solidly to a rock that we had to take it apart to get it off; I went below and caught the pieces of lumber as they came down. We didn't rebuild the raft because we were at about where we wanted to stop. We made camp 8 or 10 miles below Comb Wash where we put in our water elevator at the edge of the river to lift the water, and remained there for four days or a week. A flood came down one night after we had finished putting our pump in and washed it and our elevator away before we could save them. We had only panned a little sand with a rocker, and walked up to where we had left our team and wagon and went back to our home in Colorado. I believe we left our boat with some people who were there in the canyon; there were perhaps twelve or fifteen prospectors there at that time. (R. 3452-9, Vol. 19.)

In October, 1893, my father and brother accompanied me back to just below Comb Wash, bringing our team and wagon with us. All of the river bed in that section had been located so we couldn't get any ground to work, so we went down into the lower canyon where we got a boat, remaining there for nearly a year, my father and brother stay-



ing all through the winter of 1893-4. We brought in the iron for a small machine I had devised for saving gold and took several men down with us. (R. 3459-60, Vol. 19.)

I first went down to Nokai the latter part of August or September, 1894. I made my boat at Bluff and there put it into the river. It was 15 feet long and probably 3½ feet wide. We had discussed the feasibility of going down the river with boats and taking our work outfit with us on through to the Colorado River. I started out alone with this scow to find out if we could get through the canyon with our outfit. I made it all right and got through to the old Gable camp, going first to our camp and then proceeding on down the river. The water was at a fair stage for low water season; I went through pretty well but had to line the boat down a number of places; I made the trip quickly and don't recall whether it consumed one or two days to our camp. We then cleaned up the bar we were working on, rigged up our outfit and five of us started down the river with four boats, having built three other boats at our camp. One of our boats was probably 16 feet long and 4½ feet wide, drawing 8 or 10 inches as loaded. The others were 12 and 14-foot boats. It was quite hard at first, with our heavy outfit, to get through the canyon because there are many rapids and much swift water, and we had to be careful and frequently line our boats. We encountered no difficulty to speak of with sand bars although we might have had a little trouble at Clay Hill Valley where there is a wide channel. There is no sand to speak of in the canyon because the swift water keeps it pretty well washed out there. We prospected on our way downstream and went clear to the mouth of the San Juan River with the four boats we started out in and picked up a fifth boat before reaching the mouth. (R. 3463-70, Vol. 19.) We didn't have very much trouble in going through the country in and about the mouth of Nugget Creek. We may have had some trouble with sand but I don't recall it. We went through there on the water and we didn't have to portage or anything like that. I don't recall that it was necessary for us to get out of our boats. We encountered a rapid at the mouth of Copper Canyon and one at the mouth of Nokai Canyon, but we had comparatively smooth water until we got to the mouth of Piute Canyon; there are also two rapids at Piute Creek and a bad rapid ten miles below the mouth of Piute Creek. At the mouth of the San Juan we had a little trouble getting across

a sand bar and in finding a channel for our big boat but we were only a short time getting through and swung into the Colorado and thence up that stream to a point just below the Hole-in-the-Rock, rowing and towing to suit our convenience on the upstream journey. On our San Juan River trip we portaged a large part of our cargo at two points, to wit, Piute Rapid and the bad rapid I mentioned, below Piute Creek. (R. 3472-5, Vol. 19.)

We went to the California bar and remained in that vicinity until March or April, 1895. There were probably fifteen or twenty other men then at that bar. In the spring of 1895, three of us took three boats and started down the Colorado on a general prospecting and exploring trip and continued on down to Lees Ferry. At that time there were men working at the Tickaboo and Good Hope bars, also at Red Canyon. On our trip to Lees Ferry we contended against "some of the river elements, winds, and some not large rapids, good deal swift water, but we didn't call them rapids." I don't remember encountering any sand bars. "Of course, there were sand bars, but none that interfered with us except perhaps in landing we would find some sand near the shore; didn't bother us." (R. 3480-3, Vol. 19.)

In 1895, when on our way to Lees Ferry, one of our boats was loosened by the wind; it had in it all our supplies and equipment and it floated off downstream; next morning about a half mile downstream we found it stranded on a sand bar with no damage done and our entire cargo perfectly secure. (R. 3486-9, Vol. 19.)

In 1907 we started on a boat trip from Richardson Valley, located 10 or 15 miles above the Cisco pumping plant, with one 14-foot boat and an old 14 or 15-foot scow, and went down the Colorado River to Moab. Right at the mouth of Castle Creek there is a rapid and also at the mouth of Salt Wash the water is fairly rough, but not bad. From Moab we continued on down to Cataract Canyon, prospecting as we went. We didn't intend to go through Cataract Canyon but did continue on down to the eleventh rapid. There we noted an inscription:

"F. H. Wright passed here in 1876; lost one boat in this rapid."

Later I met Wright, who was a miner and prospector, and he told me something of his trip. At the eleventh rapid we loaded all of our outfit into the boat, left the scow

there and went back up the river with our boat and outfit to Moab, rowing when we could and towing when there was a sand bar or place along which we could walk: we also poled some. On this upstream trip we continued to prospect and occupied about two weeks in going back up to Moab. (R. 3490-6, Vol. 19.)

In 1916 my partners and I decided to go down to Hite, build a boat and go down to the mouth of the San Juan River, and thence up that river to some country we wished to prospect. We went to Hite and built the boat and went down the Colorado River to the Narrows, where we remained six weeks or so. We encountered an ice gorge on the Colorado and decided to try to reach the San Juan, which was open and clear, by going overland; however, we couldn't get across and gave up our plan. (R. 3496-7, Vol. 19.) By the time we got back to our camp on the Colorado the ice gorge had gone out but we didn't have much food left and decided to go back up the river. (R. 3498, Vol. 19.)

In 1916 my partner and I built a boat at Green River and started down the Green River in February while the ice was flowing in the river. We encountered some sand bars but nothing of any consequence; "they didn't bother us any." A short distance below Green River, Utah, the cake ice lodged in the riffles, which bothered us a little. Upon arriving at the junction of the Green and Colorado, we went up the Colorado to Moab, having the usual upstream trip, which was rather hard and tedious; it was pretty much heavy rowing. That year the ice was frozen in the canyons above the junction of the rivers until sometime the latter part of February; it freezes in those canyons during all severe winters. (R. 3500-4, Vol. 19.)

In the late winter of 1928 I went to the mouth of Nugget Creek on the San Juan River. We took lumber and heavy canvas with us and constructed a boat, launched it, and started down the San Juan River. We encountered no rapids between Nugget and Piute Creek, the Piute Creek rapid having disappeared and those at Copper and Nokai Canyons were covered up with sand. We had fairly swift water there and it was fairly deep at the mouth of Copper Canyon—from three to five feet. You can't tell about depths unless you happen to measure it with an oar. At the mouth of Nugget Creek the river had more sand in it than it formerly had. We remained at Piute Creek as long as our supplies lasted and then walked out overland to our

camp, across the divide where the Indian that took us in had agreed to meet us. (R. 3504-7, Vol. 19.) Whenever we were on the San Juan River we would note the sand wave condition, which is a characteristic feature of that stream. I don't think I have ever seen waves rise more than three feet, but they might have reached a height of four feet. I have seen sand waves but not nearly so pronounced on the Colorado—mostly below the mouth of the San Juan. (R. 3508-9, Vol. 19.) In navigating the river through sand waves I generally work to get along the outside edge of the waves where the water is shallow and the waves not so high; I wouldn't go down the sand waves broadside if I could help it. (R. 3512, Vol. 19.)

From 1922 to 1924 I was on the Colorado River working placer ground both above and below Moab and went up and down the river in boats while thus engaged; that is the only way you can go, practically. The boating to which I have just referred extended from about  $3\frac{1}{2}$  miles above Moab bridge to a point twenty-two or three miles below the bridge. (R. 3513-4, Vol. 19.)

When I was on the San Juan River in 1894 I took out probably four or five thousand dollars worth of gold, shipping some of it to Durango and some of it directly to the mint. (R. 3514-5, Vol. 19.) In 1893 and 1894 there must have been 100 or 150 men working claims up and down that river. I don't know where the other miners who had their boats came from in those boats or how they got them down there. I think some of them came down the river; probably some brought the lumber down and built them. I saw men coming down the river in boats. I can't say whether they came down from above Lime Creek, but they came down the river and passed our camp to the different places where they were working. I haven't seen men go very far up the river in boats because it was too hard work and they would rather go out by the trail. I can't say how far upstream others have gone in boats but we went up on two or three occasions a distance of probably four or five miles in our boats. Most of the miners had boats. (R. 3517-8, Vol. 19.)

In August, 1894, I took a scow down from Bluff loaded with supplies. When we started down the San Juan River with out four boats we figured that the load in the larger boat was about a ton; that of the smaller boats was less. (R. 3521, Vol. 19.)

When we came down the Colorado River in August or September, 1907, past Castle Creek and on to Moab, we had no trouble getting through the rapid water existing at the two points I mentioned, and I would say that you could take a reasonable load of supplies down that stretch of river between Castle Creek and Moab and there wouldn't be any difficulty in arriving down there if you always kept in the current. (R. 3521-3, Vol. 19.)

In all my years of experience on the Green, Colorado and San Juan rivers, I have never lost a boat, and the only serious mishap I have ever had is the occasion I have referred to, when my boat carrying my supplies and equipment was loosened by the wind and drifted downstream onto a sand bar, where next day we recovered it with no damage done. (R. 3528, Vol. 19.)

When I returned to the San Juan River, in 1928, I saw two outfits of placer prospectors there and I saw oil men at different places. (R. 3528, Vol. 19.)

*Homer J. Hite* testified: I went to Hite in 1888. Found a log cabin and half a dozen men there engaged in placer mining. We freighted a boiler and two vacuum pumps to Hite, there loaded them on a scow 20 feet long and 10 feet wide, drawing 5 or 6 inches, and boated them 18 miles down the river to Tickaboo bar in April or May, 1889. I didn't make that river trip. Before then I had been down in the vicinity of Good Hope and Tickaboo in a row boat. There are a number of rapids on that stretch of river. Coming back upstream with the row boat, we towed most of the way, and at the rapids had to get out and pull the boat up. (R. 3560-7, Vol. 20.) A postoffice was established at Hite in 1889 and I was postmaster. There were about 20 or 25 people, who got their mail there, living in an area containing fifty square miles. There were two trappers down the canyon every winter who got mail at Hite. Six or eight men were working at North Wash. I was down there nearly eight years. (R. 3568-70, Vol. 20.) During that eight years I went down the river as far as Aztec Rapids; that trip was in 1894. I think the highest rise we had on the river was 21 or 22 feet. Rises in the river were occasioned by the melting snow and by freshets, cloudbursts, etc. Spring high water from melting snows begins in April and ends early in July. (R. 3572-3, Vol. 20.) During July and August the stage of water is more variable than at any other period. Any obstruction in the river would create a change. In Sep-

tember and October the water was usually stationary and low until spring except when a rise might be caused by a rain. In February and March the water would usually rise again. High water and also extreme low water and cold weather would stop our operations sometimes for a week and sometimes for two months. There were no power boats during my time there; the miners used small flat bottom home-made boats in which to go up and down the river. My party worked principally on bars between Tickaboo and Good Hope and always above high water mark; we never worked on the river bed itself, and water never flooded the top of the Tickaboo or Good Hope bars while I was there. I only recall the Stanton, Brown and Best parties coming down the river in boats from Green River, Utah. (R. 3574-8, Vol. 20.)

The trappers I spoke of trapped beaver and otter principally. At times I saw them with their skins, which they would bring up to Hite in their boats and there prepare the hides in the spring. This continued during the eight years I was there. In coming upstream with my boat I towed part of the way and occasionally used a bed blanket for a sail. On two occasions I saw other men using a sail. (R. 3579-81, Vol. 20.) In building the scow I mentioned, I used 2-inch lumber on the bottom and inch lumber on the sides, the bends being 2x6's. There was a 10,000-pound steam boiler and two pumps, weighing 1,000 pounds each, which I loaded on to this scow, in addition to some supplies and a crew of six men. (R. 3582-3, Vol. 20.)

On one occasion I made a trip from Green River, Utah, down to a point 40 or 50 miles above the mouth of the Green River. I had a flat boat similar to the one I used on the lower Colorado for taking machinery downstream, although not so large. This Green River trip was made late in August, and we went down to Valentine Bottom, taking two milk cows on the boat. We had to unload them at the Green River bridge, before we could get across the bar there, and again loaded them on the boat at Wheeler's Ranch. Just below Wheeler's Ranch we again got stuck and unloaded the cows and proceeded on downstream, occasionally getting on a bar. I don't recall seeing anything but row boats on the Green River except the ferry boat. (R. 3587-91, Vol. 20.) On the Green River trip Mr. Valentine, his son, three daughters, and two granddaughters, aged about seven and twelve years, accompanied us. The women and

children went down in row boats and we carried the household goods, equipment and supplies of the family on the big boat. (R. 3600-2, Vol. 20.)

*John P. Hite* testified: I went down to Hite in 1888 with my brother, Homer J. Hite, and when he left I succeeded him as postmaster there. (R. 3605-7, Vol. 20.) I made two downstream trips from the Dirty Devil to Lees Ferry and one upstream trip. My first trip was with Stanton, when six of us went down with three row boats. We located the river bed from the Dirty Devil to Lees Ferry. There were a number of rapids on that stretch of river, including a very shallow rapid at Smiths Fork, where we had to drag our boat a ways. The trip was made in the winter time when the river was very low. There is a rapid at the mouth of each side stream. (R. 3608-12, Vol. 20.) The boats we used were keel boats, and we brought them back up with us and also brought a big launch upstream. Mr. Stanton had expected to bring this launch up on its own power but it was helpless and we were 26 days getting it up to the dredge. The engine in the launch would run but it didn't do good work. Coming up we would row, taking advantage of the eddies at the side of the river, but we had to tow at all of the rapids and were an entire day getting the big launch up over Aztec Rapids. (R. 3612-4, Vol. 20.) My nephew correctly described the scow or barge that we built for moving our equipment, and they didn't have any trouble getting down the stream. In taking supplies down to Tickaboo we would occasionally use pack animals if a boat was not handy, but most of the time we used boats. (R. 3614-7, Vol. 20.) I never did any work on the dredge but did quite a bit of boating for Mr. Stanton. I used ordinary row boats that were shipped in from San Francisco, and we operated those boats over the whole river between Hite and Lees Ferry except that in coming upstream we had to drag them over the rapids. On the return trip from Lees Ferry we took three of the Stanton boats clear up to Hite and there obtained two loads of material. (R. 3620-3, Vol. 20.) I made a number of trips between Hanson Creek and camp with those keel boats and had no difficulty in getting them upstream; it was comparatively dead water and we almost had to row going downstream. Between North Wash and Hanson Creek there were rapids but that stretch was tolerably free from sand bars because there is more swift water there than in other places in Glenn Canyon. I

observed that different stages of the water caused a rearrangement of the sand bars and after high water or floods down side canyons there would be a change in the channel of the river. I wouldn't say that the changing was daily, weekly or monthly. The sand is working continually. I have seen sand waves there. (R. 3624-7, Vol. 20.) I went to Hite in 1905, farmed there until September, 1914, getting our water from Trachyte Creek. We had difficulty with the ice once. I have seen a lot of ice floating down in the winter time and when it gets into a small place and freezes it sometimes gives difficulty. Almost every year there will be ice gorges. (R. 3628-9, Vol. 20.) I have ridden horses across the river at Dandy Crossing in winter but never at any other time. (R. 3632, Vol. 20.)

They spent four days working on the engine of Mr. Stanton's launch at Lees Ferry but they didn't get it running; that is, it would run, but not in the water, and after we got started on the trip it didn't run at all. (R. 3633-4, Vol. 20.)

There was a placer boom on the San Juan River and those placer miners came on down to the Colorado River. I remember one or two parties came up the Colorado as far as Hite in small boats. (R. 3635, Vol. 20.) I made one boat trip down to Lees Ferry with a man named Turner right after high water in 1909 or 1910, who was a prospector and a "river rat," and we had a very good boat that Mr. Stone had left at our place. In 1905 I made a boat trip to Lees Ferry with a man by the name of Wyschuhn, for the purpose of relocating some claims. I think we could have made the trip in three days if we had kept going; we had no accidents but we stopped to make locations. (R. 3639-43, Vol. 20.) After Turner and I reached Lees Ferry, Turner took his boat back up the river and I later saw him at Hite with that boat. (R. 3646-7, Vol. 20.)

*Lester A. Shaw* testified: In 1914 I was employed as boatman by the U. S. Reclamation Service with the Richardson party on a salary and I also furnished boats. I had a 14 or 16-foot motor boat called "Belle of Shannon," which drew 6 or 8 inches of water empty. I launched the boat at Green River, Utah, went down to Wimmer's Ranch where freight and equipment had been loaded on a barge, and continued thence down the river with the party between Green River, Utah, and Wimmer's Ranch. Particularly as I was alone and knew nothing of the river, I frequently got

into the wrong channel and would have to get out and push, and my boat occasionally scraped. At Wimmer's Ranch two of the party, with their personal equipment, got on my boat and we continued down to the mouth of the Green River, and continually had experience with sand bars. I would get stuck with my boat and I think that on occasions I got out and helped with the larger boat which, as I remember, did get stuck occasionally in going through the lower places in the river when there might be one or two channels and we might get into the wrong one and have to go back and get into the other one. I would say that I got stuck two or three times a day. (R. 3652-S, Vol. 20.)

While drilling operations were in progress I believe I made one boat trip up the Green River and two up the Colorado to Moab. As I remember it, the difficulties on the Colorado River were similar or possibly worse than those on the Green. (R. 3658, Vol. 20.) I made an upstream trip when we took the drilling equipment out; there had been high water and the sand bars had changed their position; however, it was easy to work backwards off the bars and get to the channel going upstream but there were places where we had to get out and pull and push. (R. 3662, Vol. 20.) Exhibit 477 is a photograph taken at the junction as we started out. (R. 3672, Vol. 20.)

*John F. Richardson* testified: I am a civil engineer in the War Department and had charge of the 1914 government party which was investigating the matter of a reservoir site at the junction of the Green and Colorado rivers. (R. 3675-7, Vol. 20.) The latter part of June, 1914, I made my first trip down from Green River, Utah, in Captain Yokey's motor boat. (R. 3678-9, Vol. 20.) I had with me a government map dated in 1910 (Exhibit 480) which is a part of the report of Lieutenant Leeds. (R. 3680; 3713-5, Vol. 20) and consulted survey made by Lieutenant Leeds as I went down the river; I found no riffles that did not appear on the maps I had with me, which pretty well covered the situation. (R. 3685, Vol. 20.) On that trip we went to a point a few miles below the junction, in a day and a half or two days, and came back up in four or five days; and it seems to me that we encountered quite a few sand bars coming upstream. (R. 3688-9, Vol. 20.) During that summer I made a trip from Moab down the Colorado to the junction in a motor boat having a draft of about 15 inches, and I made the upstream trip to Moab a number of

times. That stretch of the Colorado was essentially like the Green River; the current was a little swifter and carried more suspended matter; we went up the Slide under power; it seems to me that we encountered sand bars going up and down that stretch of the Colorado but I will not be perfectly sure about it. (R. 3695-6, Vol. 20.)

In the fall of 1915 I made a boat trip from Hite to Lees Ferry with Mr. Wimmer looking for reservoir and dam sites; we encountered riffles at the mouth of the San Juan and there was so much mud in the river that it stopped our boat from leaking. (R. 3696-8, Vol. 20.)

*Hugh D. Miser* testified: I am a geologist with the U. S. G. S., and was with the 1921 survey on the San Juan River, and prepared Water Supply Paper No. 538. We launched our boats about four miles below Bluff, and the actual survey under Mr. Trimble's direction began there. At that point the water was only a foot or two deep. (R. 3728-32, Vol. 20.)

The first place that we had any difficulty with the rise of the water was at the "Narrows." We had no difficulty going down that section of the river between Chinle Creek and the Narrows and the boats did not ground at any place through that section, and did not really ground at any point until after we had passed the mouth of Moon Light Creek. We portaged one rapid at Mile 77.5 and the boats were taken through the rapid at that point empty. (R. 3733-4, Vol. 20.) At about Mile 82.7, above the mouth of the San Juan, a boat struck a boulder in a rapid and was cracked from end to end. (R. 3736, Vol. 20. See Blake's statement, supra, as to defective construction of this boat.)

When I use the word "rapid" I include what some people term riffles and include all water that is worse than real swift water. (R. 3743, Vol. 20.) (At pages 3743-5 of the record the witness indicates thirty-seven places on that portion of the San Juan River traversed by him where the party encountered a "rapid" as defined by him.)

Between Moon Light Creek and Piute Creek the channel of the river is fairly wide and the water spread out so that in a great many places the channel was shallow and the boat grounded; this would happen a great many times during the day. I don't know that we sounded the channel to the maximum depth. (R. 3749-50, Vol. 20.) On one occasion, a few miles above the mouth of Piute Creek, we had to pick up one end of one of our boats and lift it around

until we got the boat into deeper water; at numerous places we had to drag the boat, but that is the only place on that stretch where I recall that we had to do any lifting of the boat. (R. 3751-2, Vol. 20.) At the mouth of Piute Creek we had to portage our supplies around the first and second rapids and take the boats, at least my boat, through empty; at the rapid located 11.4 miles above the mouth of the river it was necessary for us to portage all of our cargo. I recall no other difficulties with rapids. (R. 3753-4, Vol. 20.) We encountered a few small floods, the gravest of which didn't exceed 6 or 7 feet, and the crest of the flood would usually pass in a few hours. When the river rose two feet there would be sand waves and we kept off the river. (R. 3756-7, Vol. 20.) We saw no boats other than our own. At Clay Hill Crossing the main channel of the river shifted during a flood from the middle of the channel to the bank and then back to the middle of the channel within a few hours, and at Piute Farms, where the channel is over 3000 feet wide, the main current shifted from some place near the middle of the channel over to the bank and then back to the middle of the channel. During this flood a stretch of land 75 feet wide was washed away next to our camp. (R. 3760-1, Vol. 21.) We camped at Piute Farms, where our boat grounded in numerous places, for from four to six days. Loper and I made a boat journey down the river past Piute Farms and then towed the boat back upstream; going downstream we rowed at most of the places, although the boat grounded. This journey was from a place near Clay Hill Crossing down to the mouth of Nokai Creek, a distance of about eleven miles, and coming back upstream we towed all the way and grounded numerous times at Piute Farms, although our boat didn't draw more than 6 or 7 inches. (R. 3763-4, Vol. 21.) Loper and I on one occasion towed our boat from the mouth of Piute Canyon to Spencer Camp, a distance of 17 miles, when the water was at low stage; the upstream trip consumed fourteen hours. We found quicksand in a few places and some whirlpools that were not dangerous to tow around; there were many shallow places where we would have to look for a deeper channel; these shallow places were at what you might call "crossing bars" where the main current would be on the outside of a bend. (R. 3766-8, Vol. 21.) We brought back downstream in our boat 400 pounds of supplies, consuming five hours' time coming down. Except the supplies that we took down

the river with us in our boats from Bluff, which lasted until we got to Goodridge, all other supplies came to our party overland. (R. 3769-70, Vol. 21.) Our work was completed when we reached the mouth of the San Juan, and on the afternoon of October 5th I, with four others, started for Lees Ferry, arriving there October 8th. We encountered no difficulties on that trip except that on a few occasions our boat grounded in shallow water. (R. 3772-3, Vol. 21.)

In my report of this expedition (Exhibit No. 56) I recall stating that the San Juan "has numerous rapids, though they are small," the greatest fall of a single rapid being only 13½ feet, this being the so-called "13-foot rapid" located 11½ miles above the mouth of the river. I also recall making the following statement in my report concerning this San Juan expedition:

"The voyage was attended by strenuous labor and hardships, such as must always be expected in exploring an unknown canyon with its rapids in an uninhabited region." (R. 3774-7, Vol. 21.)

On our downstream trip from Spencer Camp with the boat load of supplies Mr. Loper and I rode in the boat about half of the time, and during the other half of the time we were out of the boat trying to locate a channel and pulling the boat through shallow water; at times we had difficulty in finding where the deep water was. (R. 3782-3, Vol. 21.)

*Kelly W. Trimble* testified: I am a topographic engineer employed by the Department of the Interior, and in 1921 was engaged in making a plan and profile survey of portions of the Colorado and San Juan rivers, the witnesses Blake, Loper and Miser being members of the party of which I was chief. (R. 3865-7, Vol. 21.) Our boats would hold only enough supplies for ten or fifteen days and carry our equipment and ourselves; therefore we loaded enough supplies at Goodridge to carry us to Slick Horn Gulch and there took on enough supplies to carry us through to the next point. (R. 3869, Vol. 21.)

(It was stipulated (R. 3872, Vol. 21) that Mr. Trimble would testify with reference to the operation of the boats substantially as did the witnesses Blake and Loper.)

At the mouth of the San Juan some supplies were left for my party which, as I understood, had come down the river in boats from somewhere near Hite. Later supplies

were brought to be by boat at a point a few miles below the mouth of Aztec Creek. (R. 3878, Vol. 21.)

I had and studied a map of the San Juan River before starting on the 1921 expedition, but if I had had a map of recent date like Exhibit 10 before I started down the river it would have been of very material aid in navigating that river. (R. 3879-80, Vol. 21.)

*William R. Chenoeweth* testified: I am a topographic engineer employed by the Department of the Interior. In 1921 I was on the profile survey from the mouth of the Green to the mouth of the San Juan. We had different kinds of boats at different times. Leaving Green River, Utah, on September 12, 1921, we had four 18-foot boats with a 3½-foot beam and an 18-inch draft, one boat having an outboard motor. We reached the mouth of the Green on September 15th. There were rapids between Green River, Utah, and the mouth of the San Rafael, but I recall no difficulty in getting our boats through, and recall no difficulty in Labyrinth or Stillwater Canyons, and don't recall encountering any sand bars. We commenced our survey at the mouth of the Green. On Sheet 13 of Exhibit 10 I have indicated rapids encountered, and islands. We continued this survey on down through Cataract Canyon. (R. 3881-91, Vol. 21.)

Before the trip I have mentioned, to wit, in July and August, 1921, we went overland to the Colorado River at the mouth of the Dirty Devil, and continued down to Hall's Crossing, where I left the river and went overland to Green River, Utah, to get an outfit for the trip and survey mentioned above. After getting through Cataract Canyon that we surveyed I passed on down the Colorado River to the mouth of the San Juan and helped Mr. Fowler in the survey at Navajo Creek, and observed that a rapid I had seen on my first visit there at the mouth of North Wash, which as I remember then had about a 5-foot fall, had distributed downstream and I don't suppose there was any perceptible fall. At the mouth of the San Juan I met an old man with a large, clumsy row boat coming downstream, and he said he had come down from Grand Junction, Colorado. (R. 3891-7, Vol. 21.)

*John Bernard Reeside, Jr.*, testified: I am a geologist employed by the U. S. G. S., and between August 4th and August 10th, 1926, made a boat trip from Moab to the mouth

of the Green River in a 16-foot boat having an outboard motor. The purpose of this trip was to make a reconnaissance along the river banks. We left Moab at 10:30 a. m. on August 4, 1926, and we had traveled downstream 31½ miles, our boat grounding at a number of places, our worst grounding being at a place a few miles above Kane Creek, where we took the outside curve of the river, which ordinarily would be the deepest part, and were compelled to push and pull our boat for about a hundred yards to get into sufficiently deep water. On August 5th we continued on down to the junction, 30½ miles below, making no stops that I recall, although there were a number of places where I had to get out and wade to find a sufficiently deep channel. From the junction we went up the Green River three miles and had such difficulty in finding a channel that we turned around and came back, went up through the Slide on the Colorado, and camped for the night. We remained at the Slide on August 6th, and next day continued up the river, having difficulty in getting through rocky places at the mouth of Salt Wash. (R. 3921-7, Vol. 21.) We couldn't determine the age of the Slide; it might be a hundred or a thousand years old. The day we left the Slide we camped at Mile 22 and grounded a few times, making the twenty miles in nine hours. On the remainder of the journey up to Moab we frequently grounded, and at places I waded to find a channel, our worst experience being just below the dock at Moab where there had been a flood down Court House Wash which carried rocks, mud and logs into the river. (R. 3927-35, Vol. 21.)

I would say that the difficulties encountered in navigating that stretch of the Colorado between Moab and the mouth of the Green are about the same on the upper half as on the lower half of that stretch. (R. 3948, Vol. 22.)

*Ray Bonner Worthy* testified: I am an engineer and was in the government surveys on the trip referred to by the witness Sawyer between July 10th to late August, 1914, that trip covering the stretch between Green River, Utah, and the mouth of the Green. In making the survey over that section we crossed the river back and forth after leaving the mouth of the San Rafael and observed sand bars; sometimes there would be two or three channels going through a bar, and our problem would be to pick the proper channel. We would travel along the shore line pretty close, work from



side to side of the river and make very frequent landings. (R. 3949-56, Vol. 22.)

*Alvah T. Fowler* testified: I am a topographic engineer with the U. S. G. S., and was on the 1921 survey from Lees Ferry up to about Mile 51, having nine men in my party most of the time. I started upstream from Lees Ferry on July 4th with a row boat operated by Jerry Johnson and equipped with an Evinrude motor. We didn't move our camp from Lees Ferry until a large motor boat arrived there and then moved upstream eleven miles, using our small boat for that purpose, the Evinrude motor in which got out of order and broke down entirely. We were at different camps above Lees Ferry and our supplies were brought up the river to us from Lees Ferry in a boat operated by Mr. Marrs. On one occasion I saw his boat stuck and the crew were wading around trying to find a channel. While there I saw only one old prospector in a boat aside from the government parties. A rise in the river occasioned by rains would cause changes in the channel within 24 to 48 hours; I remember noticing this at Mile 41. (R. 3957-69, Vol. 22.) My survey extended back from the river about ten miles and it was necessary for me to have pack trains and I brought supplies with my pack outfit when our survey work was proceeding back from the river. (R. 3980, Vol. 22.)

*Raymond C. Seitz* testified: I am a topographic engineer with the U. S. G. S. (R. 3982, Vol. 22.) In October and November, 1912, I was with a party that made a survey from Moab on the Colorado River down to the mouth of the Green River. Below Moab we used a large flat-bottom boat 10 feet wide and 30 feet long for two days, and we also had two row boats. We found the big boat on the beach near Moab bridge and used it for a houseboat until it sprung a leak and sank, and then had delivered to us an 11-foot boat with a 5-foot beam and a 10-inch draft, which was put in the river at Moab and brought down to where we were working. (R. 4017-25, Vol. 22.)

On the stretch of river between Moab and the mouth of the Green, I made no observations with reference to the channel or sand bars or anything of that character "other than when we were pulling in shore and leaving shore." We took all of our supplies with us from Moab. (R. 4022, Vol. 22.)

*Herman Stabler* testified: I am chief of the Conservation Branch of the Geological Survey. (R. 4036, Vol. 22.) I have crossed the San Juan, Green and Colorado rivers at different places and I have made a boat trip from Hall's Crossing to Lees Ferry. (R. 4041, Vol. 22.) On this boat trip, made in early September, 1922, I think that we stuck several times; I think every time we were on the river. (R. 4054, Vol. 22.) At one place only, bed rock extended clear across the river and our boat scraped in the best channel that we could find where the water must have been less than a foot deep for a distance of 50 feet or more. (R. 4055, Vol. 22.) We would often run into sand bars unawares and once were stuck for several hours. We were traveling down the river at a little too great a speed and went pretty well up on the bar. In a silty river like this there is a tendency for a bar to form in the middle of the stream with a channel on either side and it is quite hard when coming downstream with the muddy water to tell which channel to take. We had four open row boats 18 feet long, with a 4-foot beam and a draft of 6 to 8 inches. (R. 4059-60, Vol. 22.)

*Selden Spencer Nye* testified: I am with the U. S. G. S. and on September 26, 1926, with another man made a boat trip from Green River, Utah, to the mouth of the Green in a 16-foot boat having an Evinrude motor, our purpose being to map the geology of the canyon. In the first 21 miles we had a great deal of difficulty because of the rapids, and at the mouth of the San Rafael were compelled to wade and drag the boat over gravel because it was so difficult to find a continuous channel at that point. Thence down to the mouth of the Green there was only one riffle, which wasn't bad, but we had trouble avoiding sand bars and we were in the water a good deal searching for a continuous channel. From the mouth of the Green up to Moab, because of a rain, the water was deeper and we just had enough power to make it up through the Slide. We did not encounter any sand bars until we got upstream 15 or 20 miles above the junction and we had the most trouble at a point a mile below the Moab bridge. Our boat drew about a foot and a half of water. (R. 4181-6, Vol. 24.)

Neither I nor my companion had ever been on the rivers before and had no knowledge as to the location of channels. We quite frequently went ashore. We could not see where the channel was every time and were quite often



fooled as to its position. Where we had trouble at the mouth of the San Rafael the stream had divided and we started down a channel that became shallow and were confronted with the alternative of going back up the channel we had come down or dragging the boat across the bar into deeper water. (R. 4188-91, Vol. 24.)

*Joseph A. Ross* testified: My first trip on the Green River was in 1889. There were six of us in three row boats and we went about 50 miles below Green River, Utah, on a hunting trip. Down to the mouth of the San Rafael we had difficulty with gravel bars; sometimes we could push off with our oars and at other times we would get out in the water and push. This trip was at low stage of water, in September. We rowed and towed our boats back up to Green River. (R. 4196-8, Vol. 24.) In July, 1893, I made another trip in a 16-foot scow with a load of 500 pounds, the boat drawing five or six inches. We went down to a point 8 or 10 miles above Valentine Bottom to do some prospecting; had a better boat down there and rowed and towed upstream on the return journey with that boat. (R. 4199-4201, Vol. 24.) In September, 1893, I went down to Valentine Bottom to bring the Valentine family who were living there up to Green River, Utah. I used a boat 16 feet long and possibly 4 feet wide that I got from a trapper who had left the boat at Green River, Utah. Going down we had pretty good sailing, now and then hitting a bar as you always will. On the upstream trip we brought Mr. and Mrs. Valentine, their daughter who is now my wife, and my sister. The upstream trip was at a low stage of water in the autumn, and I think we took seven days coming up to Wimmer's Ranch, rowing and towing. At that point the passengers got out and went overland to Green River and I continued on up with the boat to Green River, Utah. The Valentine family lived down at Valentine Bottom for a year and their son would at times come up with a boat and take supplies down to them in a boat; these trips for supplies were made throughout the year. I don't recall that Valentine ever got supplies overland. (R. 4202-5, Vol. 24.) Again, in November, 1893, I took the owner of a mining prospect down to his property and back up to Green River, Utah. Between Green River, Utah, and the mouth of the San Rafael, we possibly grounded a time or two and below there we would find too shallow water and be compelled to

help the boat off. On the upstream trip we had to come through much ice that was running on the river which made it especially difficult. (R. 4205-6, Vol. 24.) Between 1893 and 1905 I made other hunting trips, with similar experiences to those I have described.

In July, 1901, I made a trip in a row boat when the water was very low from Green River to the head of Cataract Canyon with a surveying party that intended to build a sanitarium at Cataract Bottoms, with similar experiences to those I have already described. (R. 4208-9, Vol. 24.)

I was engineer on the Undine on its first river trip. We had a crew of seven or eight or more men, and on the downstream trip struck sand bars, some days being hung up for several hours and other days making good headway. I believe the boat had a 22 horse power engine. On the trip from the head of Cataract Canyon up to Moab the bars didn't give us much trouble because we would strike them at the lower side. (R. 4210-6, Vol. 24.) I was one of the pilots on the first trip of the City of Moab when we went down to the junction and three miles up the Colorado. That boat was too awkward, too heavy and had too much draft. I think its draft was about two feet. Between Green River and the mouth of the San Rafael we grounded three or four times but not badly and encountered sand bars in Labyrinth and Stillwater Canyons. We were possibly six or seven days coming back upstream and, because of shallow water, stopped at Halverson's Ranch and remodeled the boat, making it into a steam boat and calling it the Cliff Dweller. We then went in the Cliff Dweller from Halverson's Ranch up to Green River, Utah. We had a little trouble, but that trouble should have been avoided. (R. 4218-23, Vol. 24.) I went down to Valentine Bottom on the Black Eagle, made a trip with Mr. Oppenheimer in the Paddy Ross, a 27-foot boat with a 6½-foot beam and equipped with a 14 horse power engine; there were four men on the boat. One man had his sister who was going down to his mining claim with him to spend the winter. We took their winter supplies on the boat with us. My wife accompanied me. We struck sand bars and worked our way through. I have also been on boat trips in the Wilmot, a boat 26 or 27 feet long with a 6-foot beam and equipped with a 4 horse power gas engine. We had to help the Wilmont over the riffles. (R. 4223-8, Vol. 24.) I have also made trips in the Marguerite. Sometimes I can pick the deep water with accuracy;

other times it is impossible. At certain stages of water a man accustomed to the river can locate a sand bar even though it is as much as a foot under water; there is always a little break in the water surface that one not experienced wouldn't notice. I have seen the channel change on the Green River and have seen it change from day to day. I have observed it while the change was in progress at times when the water is dropping to its lowest level, when the top of a high sand bar is exposed and the water is receding; even then one may get into a pocket. There are places where there are several channels and you can not pick the deepest channel with certainty. (R. 4230-5, Vol. 24.)

I have taken dozens and dozens of river trips in smaller boats besides those I have mentioned in my testimony, and possibly some other trips in small power boats. All but two of my trips in the larger boats have been for compensation; not so many of the trips in smaller boats were for compensation, most of them being for pleasure. In about 1893 I took some supplies down to people who were for several years engaged in mining operations on the east side of Green River. (R. 4235-8, Vol. 24.) I am a carpenter and have built a good many row boats and have helped with the construction of larger motor boats; these boats were built for other people and were used on the Green River. (R. 4241, Vol. 24.) The more experience you have on either the Green or Colorado rivers and the better and more recent knowledge you have of them the more readily you will be able to navigate and the fewer difficulties will be encountered by you. (R. 4246, Vol. 24.)

Where the river is of average width through a section where the stream is confined, you don't have any trouble with boats of the drafts I have seen used; channel difficulty is encountered where the stream is not confined and breaks up and becomes braided. At such places, if a man is not familiar with the stream or hasn't been going up or down it recently so as to know just which ribbon of the stream to take, he may get fooled and take the wrong channel going downstream; coming upstream he is in better position to select the right channel. (R. 4255-6, Vol. 24.) There is not always a channel. (R. 4258, Vol. 24.)

I haven't been on any river trip where I didn't succeed in reaching the place I started for except the one trip I have mentioned with the City of Moab, and on my own boats and on the boats of any party with which I have gone

and on all power boat trips the only time in my experience when I did not reach my destination was that trip on the City of Moab. (R. 4260-1, Vol. 24.) It was usually in August or September when we found the braided channel condition. (R. 4262, Vol. 24.) When the wind is blowing you can easily find the deep water by observing the waves. (R. 4267, Vol. 24.)

*Ella Ross* testified: In September, 1892, we went from Green River, Utah, to Valentine Bottom with two row boats and a scow and remained there for one year. On the downstream trip we encountered sand bars many times, I couldn't say how many. My brother used to come up to Wheeler's Ranch in a light row boat and bring our supplies to us at Valentine Bottom in his boat; he made very few boat trips from the Wheeler Ranch to Green River, Utah. In 1894 I went from Wimmer's Ranch to a point below Valentine Bottom, known as Turks Point, and my recollection as to experiences with sand bars is similar to that testified to by my husband, Joseph A. Ross. (R. 4271-6, Vol. 24.)

On my trip in the Paddy Ross I piloted the boat part of the distance downstream, I should judge for about 30 miles. I had never before piloted a boat on that river and had never before in my life piloted a motor boat. (R. 4276-7, Vol. 24.)

*Chris Halverson* testified: In 1889 or 1890 I helped operate a ferry boat at Green River, Utah, and thus helped during the high stage of water for three or four years. I wasn't taking any interest in river traffic but don't know of any merchandise being received by Green River merchants via the river. I have taken cattle across the river in the stretch from below the mouth of the San Rafael up to Book Cliffs. In high water they would swim and I have crossed along there on the riffles without swimming them. The cattle seemed to understand the riffles and would follow the course where the water was shallow; we guided them to a certain extent so they would not get off the riffle and into deep water. (R. 4285-90, Vol. 25.)

We now invite attention to testimony of witnesses produced on behalf of defendant:

*K. D. Williams* testified: I am a merchant residing at Bluff, Utah. In 1924 I was employed as chain man with the

government survey party then sectionizing the lands adjacent to the San Juan River and meandering the bed of that river, Charles F. Moore being chief of that party. I joined the survey party at Moon Light Creek and that year we continued our survey down to within six miles of the mouth of the San Juan River. Our supplies came by truck from Kayenta, Arizona. In a very few places we could have gotten supplies from the river up to the rim of the canyon in that section but, except at a few places, it would have been decidedly impracticable. At most places it would have been impossible to get a pack outfit down to the river, and after reaching the rim we would have had to carry our supplies back as far as 18 or 20 miles from the river in order to supply our party. We had a boat in our party which was used by us for carrying our supplies between points whenever practicable. We carried supplies by boat from Nokai to Spencer bar. (R. 4327-31, Vol. 25.)

During the period between September, 1924, and May, 1925, while I was with the party I saw no section of the river where the water in the channel was less than waist-deep. I observed no difficulty in any of our boating operations on the river. While meandering the river during that period we would go up and downstream in the boat for distances of three or four miles. When using the boat I did not get hung up on sand bars or have any difficulty in navigating. We used the boat for crossing men and supplies at Nokai and at Piute Mesa and in carrying supplies from different points. We used the boat going upstream as well as down, but carried no supplies upstream. (R. 4332-4, Vol. 25.) I resumed my work with that survey party in December, 1925, and remained with the party until May, 1926. Our work was largely back from the rim of the canyon, but our boat was again used where it was practicable to do so. (R. 4334-5, Vol. 25.) I have had experience with motor boats, using them on the Colorado River during 1926 and 1927 almost daily from Moab to a point about 12 miles above the junction of the Green and Colorado. From my knowledge and experience with motor boats and from my knowledge of the San Juan River, I would say that a motor boat could be run on that stretch of the San Juan River with which I am familiar at any time that I have been there and that there would be no great difficulty in going up or downstream with a motor boat. (R. 4336-9, Vol. 25.) I have been on the San Juan River at the mouth

of Slick Horn Canyon, Grand Gulch, Navajo Canyon and at the mouth of Comb Wash, and at those points the condition is just about the same as on the other stretches of the river that I have worked along. (R. 4340, Vol. 25.)

Between May and December, 1926, I was with the government survey party on that stretch of the Colorado River between a point about one mile below Moab and Lockhart. We used the same row boat we had used on the San Juan, also 15-foot outboard motor boats and Moab Garage Company motor boats. Charles F. Moore was chief of that party. In meandering the stream it was necessary to go to shore at almost every bend in the river. (R. 4340-2, Vol. 25.) I was again on the Colorado River with the same survey party from May until December, 1927, when our work was between a point a mile and a half below Moab and a point six miles below the mouth of Indian Creek. We would usually be on the river a part of every day. I made a number of trips from Lockhart to Moab in 1926, and in 1927 made ten or fifteen trips between Moab and Lockhart, on three or four of which trips I drove the boat. On one occasion I saw a large boat of the Moab Garage Company stuck on a sand bar for about four hours, and I saw it stuck on eight or ten other occasions for periods ranging from five to fifteen minutes or half an hour. With the small motor boats I was never held up more than minute or so and did not have to get out and push my boat off, nor have I seen such an incident when other people were operating the small motor boats. (R. 4343-6, Vol. 25.) In addition to our own boats and those of the Moab Garage Company, there were five or six boats plying the river while I was with the survey party on that stream. (R. 4346-7, Vol. 25.) I saw all sections of the San Juan River between Clay Hill Crossing and a point about six miles above the mouth of the San Juan, and in that stretch there was no place that I would call a rapid; in places the water ran quite swiftly and there were rocks, but I could bring a motor boat through those places; there were places I couldn't row a boat up but I believe a motor boat could come up. (R. 4348-50, Vol. 25.) There was no place on the San Juan River where we were hung up by a sand bar; we stopped against bars but it was no trouble to go around them and find a place out. I operated our boat. I would say that we were stuck on a bar a dozen times all told. Where it was convenient to get our boat into an eddy we could row it upstream, but

in the channel we couldn't row it up and towed it. (R. 4350-2, Vol. 25.)

The smaller boats I operated and saw operated on the Colorado River were not stuck on sand bars; they would be stopped but not stuck so as to get in trouble in getting off. On two of my trips I wasn't stopped at all on a sand bar and on the other trips I was merely stopped as a result of getting out of the channel. I noticed no changes in the channel of the Colorado River. On the San Juan River I observed some changes in the channel. I observed a change in the channel at the mouth of Nokai Canyon and at the mouth of Copper Canyon. It changes there every time the water comes up or goes down in a great flood; but there is not a complete rearrangement of the sand bars, and there are places where there is no change at all; for instance, at Zahn's Camp and at the mouth of Piute Canyon. I have also seen the channel change at Piute Farms. (R. 4355-8, Vol. 25.)

*William J. Nix* testified: I am a carpenter, and between 1893 and 1895 lived in Bluff and made five or six boats for miners, who took the boats down the San Juan River with their supplies. There were other men in Bluff who made boats for miners during that two-year period and some of the miners made their own boats. They were a crude sort of row boat, 22 feet long, 3½ or 4 feet wide, and with a draft of about one foot loaded. (R. 4360-4, Vol. 25.)

*G. W. Perkins* testified: I live at Blanding, Utah. I have been in the cattle business all my life and have run my cattle west of Bluff to a point ten miles west of Mexican Hat. I went to that section in 1880 and have been riding the range since I was big enough to do it. I have never had any occasion to use boats on the San Juan River and have crossed the river only in connection with my cattle operations. I have crossed at Bluff, and I know of no place on the river where it is more shallow than at Sand Island right near Bluff, where the river is very wide. I have crossed the river there, also at Mexican Hat, below Mexican Hat, above Mexican Hat, at Gable Camp, at Comb Wash. I have been down to the river at Copper Canyon where there were a few Piute Indians farming. I remember one year

when the river was dry; this lasted during a period of from ten days to two weeks; I recall no other such occasion. Aside from that occasion when the river was dry I have never crossed the stream when the water did not come up near a horse's belly; those crossings were in low water. I have crossed cattle just above where the Goodridge bridge is now located, such crossings being usually in November when the water is quite low and the horses and cattle had to swim. Even at Sand Island I have no recollection of making any crossing when the water did not come up near the horse's belly. (R. 4371-6, Vol. 25.) Just below the mouth of Chinle Creek, where the river is quite wide, there is a good, hard bottom crossing where I have gone over with a wagon. I have crossed cattle there at Mexican Hat and just below Mexican Hat. The first two times we crossed at Mexican Hat it was necessary to swim the cattle. (R. 4382-4, Vol. 25.) I once crossed the San Juan at Moon Light in a boat. (R. 4385, Vol. 25.)

*H. C. Perkins* testified: I am in the sheep and cattle business and live at Blanding, Utah. (R. 4388, Vol. 25.) I have had occasion to cross the San Juan River frequently and have crossed it at the mouth of Chinle Creek, Comb Wash, Mexican Hat, also at a point five or six miles above Mexican Hat and at Sand Island, just below Bluff. I know of no other place on the river where it is as wide or as shallow as at Sand Island, where I have frequently crossed. Aside from one occasion when the San Juan River went dry I have never seen that stream at its lowest stage the water wouldn't come up to a horse's belly in crossing. I do not remember ever seeing the river at Sand Island as low as it was in 1928 except on the occasion when it went dry. I was in my car south of Bluff and south of the river at that time, and by crossing at Sand Island could save a 50-mile drive around via the bridge; I hired a team to pull my car across the river, and on that occasion the water came up to the bellies of the horses. (R. 4390-2, Vol. 25.) I have been up and down the San Juan River from Bluff to the mouth of the river, at different points. (R. 4393, Vol. 25.)

(It was stipulated that *Mr. Dan Perkins* would testify substantially as did the witness *G. W. Perkins*. R. 4395, Vol. 25.)

A. S. Woods testified: I am 53 years old, went to Bluff, Utah, when I was a boy and lived there until 1905, and now reside at Monticello. I have been in the cattle business all my life. As a boy, I saw miners on the San Juan River in their boats and observed a number of boats at different places on the river; some of the boats were being moved up and down the river and others I have seen stationed at the side of the river. I recall seeing two different boats taken down and put on the river at Bluff. I have seen miners in their boats at different points on the river and in later years, when I was riding the range, I have seen boats at Comb Wash, Gable Camp and Mexican Hat section. I saw a boat going upstream at a point near Comb Wash. There were four or five men in that boat and they towed in places and in other places rowed upstream. (R. 4397-9, Vol. 25.) When I was a boy at Bluff boats were made there and taken down to the river directly south of town. (R. 4400, Vol. 25.) I have rafted wood, taking 20 or 30 cord on the raft from points 6 or 8 miles above Bluff down to Bluff. (R. 4400-1, Vol. 25.) Since I began riding the range I have crossed the river at Sand Island, which is about a mile and a half or two miles west of Bluff, and at Comb Wash, Mexican Hat and Gable Camp, and have ridden the range down to the mouth of the San Juan and have followed the stream on the south side from Gable Camp clear to the mouth, at various points being right at the river. Except on one occasion, when the river went dry, I do not recall any time or place on the river when the water was not from two or two and a half feet deep to swimming water; I am speaking of the very lowest stage of water. Except during the low water stage, you can not cross the San Juan River without swimming your horse. I have crossed the river in most all the months of the year, including the winter time; possibly during two months in the high water season we would not cross the river. Swimming a river is not a very difficult or unusual feat for cattlemen. (R. 4401-6, Vol. 25.)

I only recall two occasions when floods came down the river so that it overflowed its banks and came on to the higher ground above its channel; these two occasions were in different years. Our ordinary form of summer rain is not a cloudburst. (R. 4407-8, Vol. 25.)

William Hyde testified: I am 53 years old, now live at Monticello, and in the early '90s lived at Bluff for three years. During the three years I lived at Bluff I saw boats taken down to the river south of town, and I saw miners in their boats with their supplies start down the river from Bluff. I have seen a number of different boat parties of this character leave Bluff—10 or 12, possibly more. I also saw carpenters building boats at Bluff. (R. 4432-4, Vol. 25.)

Seven or eight years ago another man and I left Moab in November with two row boats on a trapping expedition and continued down the river into Cataract Canyon as far down as the fourth or fifth rapid. We trapped there for a little over a month, and then brought our boats back up through the cataracts and to Moab in February. On this trip we took all of our supplies and camp outfit with us from Moab. On the return journey we took our furs with us in our boats and shipped part of them to Denver and part to Grand Junction. Our furs included wild cat, fox, coyotes and beaver. In coming back up through Cataract Canyon it was difficult, and we towed. (R. 4434-8, Vol. 25.) On that trapping expedition I passed another trapper from Colorado in a row boat; I also passed Mr. Turner, who was trapping. I had very little trouble with sand bars; I have run on to them when I wasn't watching where I was going, but never got into trouble if I was paying attention. (R. 4439-40, Vol. 25.)

The following year I left Green River, Utah, about October 1st with another man. We had two boats and trapped for beaver along the Green River to the junction, and thence went up the Colorado River to Moab, arriving there in February. We carried our beaver skins in our boats with us and shipped them from Moab to Salt Lake City. The year before the Colorado River didn't freeze, although we had a little mush ice running on our way out, but the next year the Green River froze for about thirty days, it being an exceptionally cold winter. However, the Colorado did not freeze that winter, there being only a little mush ice in the stream. During the time the Green River was frozen the ice was from one to two inches thick—not thick enough for me to slide my boat over. Ice was the only difficulty encountered on this expedition. (R. 4441-5, Vol. 25.)

On my second trapping expedition I didn't find the channel in the Colorado River exactly the same as it was

the year before; it changes. Any one will accidentally run against a sand bar at times; I did so, but had no trouble. On my first expedition I wasn't hung up on a sand bar more than two or three times on the round trip. I rowed my boat upstream most of the way, although at lots of places I towed it. (R. 4446-7, Vol. 25.) In coming down the Green River we had no trouble at any of the rapids and did not ground at any place. I don't recall getting on any sand bars on that river except when setting my traps. (R. 4449, Vol. 25.)

*Frank H. Karnell* testified: I am 58, and first came to the San Juan country in 1904, going to the San Juan River at Mexican Hat to placer mine. I rafted a camp stove from a point 12 or 15 miles above my camp down to my camp in the latter part of August, 1904. I made one 25-mile boat trip down the river to Soda basin that year and used the boat up and down the river as we moved camp and worked the bars. At different times we would move our camp upstream from one to five miles, and in so doing would row and pole the boat. When I took trips up the river I would take my supplies in my boat. (R. 4452-6, Vol. 25.)

In the spring of 1905 I took the boat I had been using up the river to its owner and went to Bluff and built a boat 16 feet long with a 7-foot beam and drawing 8 or 10 inches of water. The first boat I used drew about 7 or 8 inches. When my boat was built I bought about a thousand pounds of supplies at Bluff and took them down in my boat to my camp between Chinle Creek and Mexican Hat. In March, 1906, another man and I went to Bluff and built two more boats, one of them 18 feet long with a 6 or 7-foot beam, and another 16 feet long with a 5-foot beam. We loaded those boats and a third boat with supplies, camp outfits, rockers, tools and wheelbarrows and went down the river, stopping first at Mexican Hat. The river was then at a very low stage of water. After a few days we continued our boat trip on down to Mendenhall Gooseneck and, after working the bars there for a time, continued on down to Honaker's Trail. There I sprained my ankle and went out, leaving my boat and supplies with my partners, who agreed to take it with them on down to a point between Slick Horn Canyon and Grand Gulch so I could get it there when I came back. Later I went back and found my boat at the

agreed place. (R. 4457-61, Vol. 25.) After getting my boat. I continued on down the river to the mouth of Grand Gulch. This was in December. (R. 4463, Vol. 25.)

In September, 1905, I saw Messrs. Calhoun and Clay with their boats at Bluff City, to which point they had come from somewhere above. I later saw them at my camp down the river and they continued on down the river from there with their boats and supplies. (R. 4461-3, Vol. 25.)

In 1909 I went from Chinle Creek down to Mexican Hat with another miner and we took with us in our boat seven or eight hundred pounds of supplies. (R. 4463-4, Vol. 25.)

Beside the trips I have detailed, I have made other boat trips up and downstream; I have traveled both up and downstream over the section of the San Juan River between the mouth of Chinle Creek and a point close to Honaker's Trail. I made a boat trip from Zahn's Camp up to Gable bar. In going upstream we would row and pole our boats and sometimes would tow the boat at a riffle. I would estimate that I have seen probably twenty separate parties go down the river in their boats from Bluff; I have seen eight or ten parties pass our camp just below Chinle Wash in addition to the parties I have seen at Bluff. Most of my trips have been made in the fall, winter and early spring months; placer miners do not work much during high water; until the water gets low the bars are covered up. (R. 4464-5, Vol. 25.)

I would say that the minimum depth of the channel of the river as I have seen it at Chinle Creek and points below was about 3 feet. I have encountered difficulties with sand bars which I have encountered when we came out of a box canyon into a large open space where there would be a sand bar dividing the stream; unless we were careful we were very liable to run our boats up on the sand at such places, and it would take something like fifteen minutes to get off; this wouldn't happen often. I have always been able to find a channel. (R. 4466-7, Vol. 25.) I always could make better progress going upstream by poling than by rowing. There is some swift water in the San Juan River but I was able to negotiate those rapids with my boat; the greatest length of any rapid water which I encountered was probably a hundred yards. (R. 4468, Vol. 25.)

When I first went in there to placer mine I took a team and wagon and kept them there all the time and

brought most of my supplies overland. When I left the river, after spraining my ankle, I went to Bluff with my horses. When I got through with my work down there I left the boats on the bars and came out overland because that is the easiest way. (R. 4469-70, Vol. 25.) In the canyon the river is so confined that it is impossible for it to change its channel. Outside the canyon it may change its channel once in three years; sometimes two or three times in a season. (R. 4471, Vol. 25.) Above the canyon, by which I mean above Chinle Creek, I would say that the channel is unstable, but below Chinle Creek that is not true, and below Chinle Creek there are no sand bars to speak of. (R. 4473, Vol. 25.)

*William E. Oliver* testified: I came to Blanding from New Mexico in 1911, and am a cattleman, and since 1911 have had occasion at times, when riding the range, to go to points at and below Bluff. In 1912 I saw two men in a boat above Bluff and next morning saw them proceed on down the river from Bluff in their boat. Five or six years ago I saw two prospectors on the river in a boat at a point about two miles below John's Canyon. (R. 4475-8, Vol. 25.)

*John L. Hunt* testified: On October 15, 1910, I went with a companion from Fruitland, New Mexico, to Copper Canyon in a boat; I went for the purpose of trapping and my companion was a placer miner. We remained at Copper Canyon two months and then went overland to Kayenta, Arizona, and thence home. That route was as close and much easier than to go back up the river with our boat. While at Copper Canyon I saw three different boat parties; they went on down the river. (R. 4478-81, Vol. 25.)

In 1920, I moved to Bluff and was in the mercantile business there for five years, during which time I delivered supplies to two placer miners who came to the river at Bluff in their boat; I don't know to what place on the river they proceeded. Their boat was 14 or 15 feet long and about 5 feet wide. Since I have lived at Bluff, I have not seen any boats made there. On the boat trip my partner and I took we had no difficulties to speak of; I have no recollection of more than two occasions when we got on to a sand bar. I think our outfit weighed about 600 pounds. We didn't portage or line our boat at any rapid and got through all right. (R. 4482-5, Vol. 25.)

*J. H. Woods* testified: I am 54 years old and spent the early part of my life at Bluff. In 1894, I went to work for Mr. Bryce at Mexican Hat, and placer mined from there down to Honaker Trail. We went from Mexican Hat to Honaker Trail in boats, carrying our supplies and equipment in them, the load in each of our three boats being about 1500 pounds. The boats were 14 feet long by 7 feet wide, and had a draft of 10 inches loaded. Occasionally placer miners would pass us in their boats. Residents of Bluff were stockmen and farmers and didn't do much in the way of mining. Placer miners who passed in their boats had their supplies and equipment with them. Generally there would be four men in a boat. Their boats were pretty much the same as ours and were built for freighting. I saw eight or ten separate parties of miners pass us and go on down the river. At that time the gold boom was still on and I was on the river for a period of about six weeks. We took out some gold and the venture paid pretty well. (R. 4489-96, Vol. 26.)

On our boat trip from Mexican Hat to Honaker Trail we encountered a number of rapids. I didn't see any pack trains come down the Honaker Trail bringing supplies to placer miners. (R. 4498-9, Vol. 26.) I recall encountering no difficulties in taking our boats through the rapids and we did not get hung up on any sand bars or meet with any obstructions to our navigation of the river. (R. 4503-4, Vol. 26.)

*Anna M. Bayles* testified: I went to Bluff in 1888 and lived there for nine years, at three different times being employed as a clerk in the Co-op store. I remember the gold placer mining boom on the San Juan. I recall seeing three boats built at Bluff and taken down to the river there. While I was clerking I sold supplies to miners many, many times, and know that miners bought supplies and took them down the river in boats. I saw their boats on the river, and Defendant's Exhibit No. 15 is a picture of placer miners and their boat; it was taken some time in the '90s. After the boom was over placer miners would generally come down every winter from Colorado and placer mine; some of them went in boats, some with pack outfits. I have seen quite a bit of San Juan gold and we accepted it in the store in payment for goods. It would be in the form of what they called a retort—a solid piece melted. I have two rings



on my finger made out of San Juan gold; the red stone in one of them is a San Juan garnet. The store, so far as I know, never received merchandise shipped via the river. (R. 4512-21, Vol. 26.)

*Anna A. Thompson* testified: I am 45 years old and lived in Bluff until 1907. When living there I clerked in Adams' store and many times sold goods to miners. I know that boats were built for miners at Bluff and taken down to the river close to Bluff. We would accept the gold "re-torts" as payment for merchandise. My husband came down the San Juan River from Fruitland, New Mexico, in a boat about 1905, and mother later sold that boat to a miner to take his supplies down the river from Bluff. I have forded the river on horseback several times and each time the horses swam and I got my feet wet every time I crossed. (R. 4523-7, Vol. 26.)

(It was stipulated that *Mrs. Mary Jones*, if called as a witness, would testify substantially the same as did Anna M. Bayles. R. 4529, Vol. 26.)

*Zeke Johnson* testified: In summer I act as guide and take parties to points along the Colorado and San Juan rivers; I have done this since 1907. I spent most of four years on the San Juan River; first went to the river in 1894, at Copper Canyon. Then I saw the boat shown in Exhibit No. 16 at a point about a mile upstream from the mouth of Copper Canyon. Exhibit No. 16 was taken at the lower Gable Camp called Zahn's Camp. Copper Canyon is between 8 and 10 miles upstream from Gable Camp, so that the boat had been taken up the river from where I first saw it when this picture was taken. The boiler and engine loaded on to this boat weighed eight or ten thousand pounds, and I helped carry several hundred pounds of other material when the boat was unloaded above Copper Canyon. (R. 4531-6, Vol. 26.) While I was there I did a little rafting on the river up and down from Honaker Trail for two or three miles. I saw other parties come down the river in boats carrying their supplies with them; sometimes there would be two or three parties in a week, sometimes a party would pass every week or two, and at other times there would be five or six months elapse between parties. (R. 4537-8, Vol. 26.)

I have been on the San Juan River on boats at other points than I have mentioned and have been to the San Juan

and Colorado rivers at every accessible place from Bluff to Lees Ferry, crossing them in various places. In going up or down the San Juan River in boats or rafts I never had any particular trouble or difficulty and never got stuck on sand bars. Where I worked along the river there weren't any sand bars to speak of. I did some rafting on the river. (R. 4538-9, Vol. 26.) Where I have forded the river with horses the water has come up above their bellies and at times the horses swam the river. I remember the year when the river was dry, and, aside from that year, I never saw any point on the stream where the water was less than 150 or 200 feet wide and it was that narrow only at places where it was confined between canyon walls. (R. 4541-3, Vol. 26.) It is my opinion that the San Juan River, wherever I have seen it, is adapted to the use of boats carrying two or three tons of supplies up and downstream. (R. 4544-6, Vol. 26.) We never worked any dirt that went less than \$10.00 a cubic yard; some went \$22.00 a cubic yard, and there were even richer pockets. Our mining operations were profitable; it was flour gold and the main practical difficulty was lack of hydraulic or heavy machinery to handle the dirt. (R. 4547-8, Vol. 26.)

I never boated on the Colorado River except to ferry across. (R. 4550, Vol. 26.)

At Zahn's Camp I would go up and down the river to get wood; sometimes I would row, at other times pole and sail upstream; I never had to tow. Our supplies came overland. (R. 4566-7, Vol. 26.) While at Gable Camp I had a team and wagon and preferred to go to Bluff for supplies in that manner than to take a boat upstream. (R. 4533-4, Vol. 26.)

*C. L. Christensen* testified: I lived in Bluff from 1890 to 1896, and acted as Indian interpreter during that time. For a time I clerked in a store. About 1893, I took a skiff 16 feet long and 18 feet wide, loaded with about 2000 pounds of supplies, from Bluff to Rincon. On that trip I encountered sand waves for three or four hundred yards, but had no other difficulty. Later, I took another skiff load of supplies from Bluff to Rincon. I spent two months at Rincon, and during that time saw a raft containing about 5000 feet of lumber pass on down the river in charge of a party that was operating down at Gable Camp. (R. 4586-9, Vol. 26.) For nineteen or twenty-one days I worked at Mendenhall



Trail, below Mexican Hat, for Mr. Mendenhall. I rode a horse down, but Mr. Mendenhall went down from Bluff in a skiff. For two months during 1895, I clerked in Adams' store, sold merchandise to miners, and saw 'hem take the supplies down the lane to the river at Bluff. (R. 4589-92, Vol. 26.) I knew a man called Old Rocky, who trapped up and down the San Juan River, catching lots of beaver. (R. 4593, Vol. 26.) Once when I was at Hall's Crossing on the Colorado River, I met a trapper by the name of Mesken, who trapped up and down that stream. (R. 4594, Vol. 26.) On the occasion when I encountered sand waves, the supplies did not get wet. (R. 4598, Vol. 26.)

*Harry Taylor Howland* testified: I went to Green River, Utah, in 1893, and took a prospecting and trapping trip thence down the river to a point near the junction, where we got fox, wild cat, beaver and coyote furs. Our boat was 16 or 18 feet long, with a 3½-foot beam. We brought our skins back up the river to Green River in our boat, being gone about sixty days during December and January. In August, 1894, I went trapping down the Colorado River from Moab to the junction and thence up the Green River to Green River, Utah, bringing in some furs similar to those I obtained on my first trip. In 1895, I took a Denver man and two other men from Green River to Moab, receiving compensation from the Denver man for this trip. My partner and I came in our boat back down the Colorado and up the Green River to Green River, Utah, doing some trapping on our way back. In 1897, I took my wife and young baby, my father and another man and lady on a 25-mile trip down the Green River and return. In 1897, I moved away, but returned in 1903 or 1904, when I made a few short boat trips to Wolverton's Ranch. Again I moved away and returned to Green River, Utah, in 1908 or 1909. I then went on a trip in the Marguerite from Green River to Moab when the Salt Lake business men made that trip. In 1910, I went down to the mouth of the Green and up the Colorado to Indian Creek and return with my wife and three boys, ranging in age from fourteen to six years. I had an 18-foot boat, with a 4-foot beam, on this trip, Defendant's Exhibit No. 17 being a picture of that boat. I had arranged with Mr. Wolverton to meet us with his power boat and tow us up the Green from the junction but got 35 or 40 miles upstream before we met him and he towed us from that point up to

Wimmer's Ranch. We had no life preservers with us on any of these trips, including those taken by the women and children. Just after the last mentioned trip, I entered the employ of the D. & R. G. W. Railroad Company, and have since only made a few trips to points 25 miles down the river from town. (R. 4603-16, Vol. 26.)

In March, 1928, I went from North Wash to Lees Ferry with the Galloways in open boats. On that trip we did not ship any water and encountered no difficulties. I recall encountering no serious trouble on any of the trips I have referred to except that if we got out of the channel we would strike a sand bar. We had no serious trouble. (R. 4616-9, Vol. 26.) It is easier to tow than to row upstream, and coming upstream with non-power boats I would change off, but would tow more than I would row. Occasionally Green River freezes over in winter, but it doesn't occur every year. (R. 4622-3, Vol. 26.) On the lower Colorado River trip we didn't encounter what I would term rapids. On neither the Green nor Colorado do the channels shift about unless there is some flood; the channels generally appear in the same place every year, although there may be some obstruction in high water that will divert the current and change the channel. I can't say that I haven't been on a sand bar on any trip. That is my signature on Exhibit 630. It was prepared by Mr. Ryan, and I aimed to tell him substantially the same facts that I have detailed here as a witness and did not tell him anything substantially different than I have told here today. I don't remember encountering any sand waves on the lower Colorado River trip. (R. 4624-32, Vol. 26.)

*H. J. Howland* testified: I am 29 years old and have lived at Green River, Utah, most of my life. I recall no difficulties on the trip I took with my father in 1910 down the Green and up the Colorado to Indian Creek and return. As I grew older, I had occasion to make other Green River trips. In 1915, I went down to Valentine Bottom in October and came back the first of December. This was a trapping and hunting trip with my brother, and we brought back with us in our boat fox, coyote, badger and other furs. Next year, between October 22nd and the first part of December, we made substantially the same trip, bringing our furs back with us in our boat. We encountered no difficulties. (R. 4634-7, Vol. 26.)

In 1921, I was with Mr. Wimmer on the lower Colorado when he was carrying supplies to the survey party. We made several river trips from Hall's Crossing, generally carrying four or five hundred pounds but at times as much as a thousand or fifteen hundred pounds on the boat. I accompanied my father on his trip with the Galloways from North Wash to Lees Ferry. During my boating experience on these rivers I have never had any difficulty with non-power boats except the work incident to coming upstream. There is no need of getting stuck on sand bars if you follow the channel. With the power boat on the lower Colorado we encountered no difficulties at all. At Bull Frog Rapids I had to help the motor boat with the oars, but that was the only difficulty we had. On several occasions we went up over Bull Frog Rapids with that two-horse power engine. (R. 4637-40, Vol. 26.)

I have not been on the Green River in a power boat except right around the bridge, and in the other boats in which I have taken my downstream trips I don't recall touching bottom at the riffles or bars between town and the mouth of the San Rafael; we may have scraped a rock at some place but not because of shallow water. When coming upstream on these trips we may have struck a sand bar because you usually take advantage of the back water when you are rowing upstream and will continue on even though you know there is a sand bar there with the hope of getting around it. Those are the only sand bars we got on during my trips. (R. 4640-3, Vol. 26.) Most of the time on the lower Colorado we would have to help our motor boat up Bull Frog Rapids, but some times we made it up over those rapids without helping the boat. (R. 4645, Vol. 26.) I do not remember any place in the river where there is a ledge of rock clear across the stream near Lake Canyon; I have heard of it, but we did not touch bottom there. (R. 4647, Vol. 26.)

*Mrs. H. T. Howland* testified: I am a sister of Mr. Joseph Ross, and was on the trip with him when he went down to Valentine Bottom to bring out the Valentine family. I recall no difficulties with sand bars on that trip, and my recollection corresponds with that of my son and husband as to the 1910 trip to Indian Creek. (R. 4651-3, Vol. 26.)

*George H. Franz* testified: I am a freight contractor at Green River, Utah. In 1921, I went to the junction and

return with a party of geologists in one of Captain Yokey's power boats. It was 5 or 6 feet wide and about 24 feet long. There were eight in our party and they employed me to take them down to the junction. No other member of the party had ever been on the river before to my knowledge and that was my first trip on the river (except to cross in a boat there at the town) and it was the first time I ever operated a motor boat. Every one took a turn at piloting the boat and I operated the engine. It was late in the summer or early fall, when the water was at a low stage. The engine in this boat was a wreck when we started out and was rated at about six-horse power. We had no trouble keeping in the channel of the river and the only difficulty encountered in going downstream was that once we stuck on a sand bar for four or five minutes. The geologists were met at the junction by another power boat, their destination being Moab. I came back up the Green River with my boat and tied it up at Little Valley, four miles below town, that being the point where I had obtained the boat and from which we started on our river trip. On my upstream journey I encountered no difficulty in navigating the stream. On the downstream trip the party stopped to examine the country at different places and we consumed five days; I made the upstream journey in 2½ days. (R. 4653-9, Vol. 26.)

*Guy Sterling* testified: I am a civil engineer. In 1908 I made a boat trip from Green River, Utah, to the head of Cataract Canyon and return using a 30-foot boat with a 5-foot beam, equipped with an engine and propeller; the boat belonged to Milton Oppenheimer, whom I employed to take me down so that I could make an examination for a tentative damsite below the junction of the rivers. On the upstream trip we consumed 2½ days, reaching a point 15 miles below Green River, Utah. When we reached that point something about the engine broke. I camped there that night and Mr. Oppenheimer went to Green River and came back with a stern wheel boat, 12 or 15 feet wide and from 30 to 35 feet long, propelled by a steam engine. He towed the boat in which we had made the river trip up to Green River, Utah, making the 15 miles between 9:00 o'clock a. m. and 2:00 o'clock p. m. We encountered no sand bars on the downstream trip and I recall no trouble of any character going down. On the upstream trip the only difficulty or

mishap encountered was the breaking of the engine of our first boat; we encountered no trouble from sand bars or with rapid water. In July, 1907, I made another trip from Green River, Utah, to the head of Cataract Canyon and return in a gasoline power boat. On that occasion we met with no mishap of any kind and encountered no difficulties. (R. 4681-7, Vol. 26.)

The stage of water was approximately the same on each of these trips, although probably a little higher on the 1908 trip. (R. 4687-8, Vol. 26.)

*Jesse M. Branson* testified: In 1897 and 1898 my father, with whom I was associated, was operating a sawmill on Castle Creek and supplied the Moab country with lumber, rafting the lumber on the Colorado River between the mouth of Castle Creek and Moab during those years. Between 1902 and 1909 our sawmill was on Fisher Point in the LaSal Mountains and during that period we again shipped lumber to Moab, rafting it on the river from the mouth of Castle Creek down. Our mill on Castle Creek was 16 miles and our mill on Fisher Point was 22 miles from the river, to which we hauled our lumber with teams. The size of our rafts would depend on the size of lumber ordered and would average around 64 feet in length by 16 feet in width and we would carry down from 10,000 to 15,000 feet of lumber on a raft. During the years that we were rafting there we sent down approximately ten rafts of lumber per year. Ordinarily there would be two men accompanying each raft and sometimes we took two rafts down together containing about 26,000 feet of lumber. These raft trips were taken between June and December and we have rafted lumber during each of the months of the year from June to December. (R. 4709-14, Vol. 27.) During that time we would sometimes go down to Moab with a wagonload of lumber, but only a very small portion of our lumber was taken to Moab in any other way than upon rafts on the Colorado River. It was a cheaper and easier method of transportation because two men could run 10,000 feet of lumber in one or two days on a raft, whereas it would take six or seven 4-horse teams and six or seven men to transport the same amount overland. Aside from losing about 3000 feet of lumber from one raft, we had no mishap in which we lost any of the lumber rafted by us during those years and all of our rafts got through. (R. 4715-17, Vol. 27.) I have gone down from Castle Creek

to Moab in a boat. On other occasions I have gone down part of the way; we had some cattle on the river bottom about 6 miles below Castle Creek and I would go down to look after them. On our return journey we would take the boats back upstream. I would take a trip clear to Moab merely for pleasure and as a sort of vacation. Over the riffles I would tow the boat—at the Narrows—for a distance of about a quarter of a mile. It was not necessary to wade the stream while towing. I had some brothers who went with me on those trips. The shallowest place on the river I have seen was at Nigger Bill riffle, where the water was up to a man's waist. (R. 4718-21, Vol. 27.) Once in a while, in bringing down a raft, it would get stuck on a submerged rock, but this wouldn't occur on every trip and it was not a common occurrence. None of our rafts ever were stuck in the mud or on sand bars. We have had difficulty with mud getting in between the boards. The only effect of this was to make the lumber soggy and cause the raft to draw more water and to run slower. Our rafts were made out of lumber and were not log rafts. We never had to tow them downstream and the only power used was the current. (R. 4727-9, Vol. 27.) We did not have trouble with ice in the winter. After accompanying a raft down we would go back up to the sawmill with a team and wagon. In bringing a raft down I have had occasion to get in the water when it got stuck on a rock in order to shake it loose. (R. 4731, Vol. 27.)

*Thomas G. Wimmer* testified: I am 62 years old and live in San Diego, Cal. In 1900, I engaged in the sheep business north of Green River, Utah, and there had a small row boat. In 1904 or 1905, I moved to Green River, Utah, and bought a ranch at the mouth of the San Rafael. During that time I took several short boat trips with Mr. Wolverton. After I bought my ranch below town, Mr. Wolverton built for me a boat that I called the Marguerite. It was 33 feet long, 7 or 8 feet wide, with a light draft empty. When loaded with more than three tons its draft was in excess of 2½ feet. At one time I had a stern wheel on it, at another time a propeller, and at another time both side and stern wheels. It was propelled by a gas engine. I got this boat in 1906 or 1907 and took my last trip in it in 1915. (R. 4732-7, Vol. 27.)

About 1910 I went into the general hauling and delivery business at the town of Green River and then had printed advertisements of my business, which I circulated, and I solicited business for river transportation and engaged in that business. (R. 4737-8, Vol. 27.) I made trips with the Marguerite between my ranch and Green River, Utah, whenever I had occasion to do so from early spring on through the season so long as there was no ice. For a time my family were on my ranch, but I used to take them to Salt Lake during the school year and did not take trips so frequently after they ceased living at the ranch. I took the 1914 government party out about Thanksgiving time. I have made trips between my ranch and Green River every month from March to November, unless there was ice in those months, and I don't think there was ice during those months of the year. A conservative statement, which is rather under than over the number, would be that I have made fifty round trips between my ranch and Green River in the Marguerite. My first trip in the Marguerite from Green River, Utah, to Moab was just about Thanksgiving Day, 1909, when I took twenty-five business men on that journey. Aside from the trips I took to the junction when hauling for the government, I recall three round trips to that point and there might have been more. (R. 4742-5, Vol. 27.) I took my family in the Marguerite down to the junction of the rivers and back and on another occasion. In 1915, I took some engineers down there and back for compensation. I also took Mr. Richardson on a round trip for compensation. (R. 4745-6, Vol. 27.) When I was boating freight under contract with the government in 1914, I only made a few of the trips down to the junction. I can't give an estimate of the aggregate tonnage hauled by me under that contract but we would take down eight or ten tons at a trip on the scow, including coal, drill rods, supplies, etc. The Marguerite would start from Green River, Utah, and so would the catamaran scows. We would leave the other scows at the ranch, where they would be loaded with freight delivered there overland. There was a fine traction engine road built to my ranch from Floy, Utah, which was on the railroad and the coal taken down in the scow would be unloaded at Floy and not at Green River, Utah, and hauled from Floy to my ranch, 16 miles away. I took down the river one carload of coal, but I can't state the size of the carload. (R. 4747-9, Vol. 27.) I made a number of trips with

my family in the Marguerite to points below my ranch when I didn't go clear to the junction; I can't tell how many trips; I went whenever we wanted to go. I also made other trips for compensation for different parties to considerable distances below my ranch. I took one trip down 75 miles to bring out some engineers who were there. In 1924, I made two round trips from Green River, Utah, to Moab in a row boat equipped with an Evinrude motor. I took another round trip to Moab in 1925. All three of these trips were for compensation. The motor used was 4-horsepower. The last trip was taken at Thanksgiving time when the water was at a very low stage. (R. 4750-3, Vol. 27.) I remember the following power boats on the Green River: Cliff Dweller, City of Moab, two power boats belonging to Mr. Oppenheimer, two belonging to Mr. Wolverton, three that Mr. Yokey owned, one owned by Mr. Ladd, one owned by Mr. Blake, one owned by G. W. Shores, one owned by George Beebe, and both Mr. Shaw and Mr. A. I. Anderson had power boats. There were a good many row boats used on the river and nearly all the ranchers had a boat. I personally have had no experience except with power boats. (R. 4753-4, Vol. 27.)

In 1915, I entered the Colorado River at Hite and went from there to Lees Ferry in a row boat with Messrs. LaRue and Richardson. In 1921 I was boating on the lower Colorado River delivering supplies to government parties in an Evinrude motor boat which had a 2-horsepower motor. During that expedition I covered the river to a point 30 miles below Halls Crossing, also going on trips above Bullfrog Rapids probably twelve or fifteen times. I went up those rapids with my boat by helping it with the oars a little bit and without getting out and pushing or using a line. I began this work in the latter part of August or first of September and was engaged down there until late that fall. I met the Chenoeweth party about 30 miles above Halls Crossing but I can't remember how far upstream from Bullfrog Rapids I delivered supplies. I went to the mouth of the San Juan carrying three men, bedding, weighing 500 pounds and 600 or 700 pounds of supplies. I made other trips downstream to points below Halls Crossing, once taking a 600 or 700 pound load to Rock Creek. Thus loaded the boat drew more than a foot of water and as loaded on the trip I have mentioned to the mouth of the San Juan its draft was 15 or 16 inches. I made a round trip from Halls Crossing to Escalante and other short trips. (R. 4755-61, Vol. 27.)

As we were going down to Lees Ferry on our way out in 1921, I saw the California-Edison boat. It couldn't get up the river with its load of supplies. It had a good engine but a very small stern wheel. I loaded some of the supplies into my boat and took them up to the party that need them. (R. 4761-2, Vol. 27.)

In 1922 I again went to Lees Ferry and thence up to Halls Crossing with four boats in our party. The witness, Freeman, was in this party. Two of our motors went bad and with the other two motors we took the four boats upstream, taking a supply of gasoline for the round trip, our oil and supplies. I think each boat had a load of 700 pounds. There was plenty of water in the river. We had difficulty in getting up one place. I took up my boats just as they were but a man got out and held the nose of the boat, guiding it. (R. 4765-8, Vol. 27.) Both Messrs. Jones and Freeman simply wore their engines out by not taking care of them. I had no trouble with my motor and with a simple device avoided any difficulty from sand or in keeping my engine cool. In 1921 I had no trouble with my Evinrude motor and didn't use a pump at all in my cooling system. They put radiators on some of the larger boats, using no river water at all. However, the river water doesn't injure your engine, but if sand gets into a pump it may injure it. The simple device I have described avoids any navigation trouble on account of mud or sand in the water. (R. 4769-73, Vol. 27.)

In 1923 I went to Lees Ferry and thence to Warm Creek in the same boat of the California-Edison Company that I had seen before when it couldn't get up the river. They had consulted me with reference to changes in the boat, had taken out the 10-horsepower engine originally installed in it and put in a second hand engine out of a Ford car; they changed the paddle wheel from a 4-foot to an 8-foot wheel and put the paddles much farther apart. (R. 4774-6, Vol. 27.) Mr. Marrs operated the boat on that upstream trip and we had no trouble; it went up the stream fine, had no difficulty in going up any water we encountered and was not stuck on any sand bars. The same is true of the return trip down stream. (R. 4798, Vol. 27.) If you have a 4-foot paddle wheel and a 2-horsepower engine, it might work because it wouldn't turn the wheel so fast that it wouldn't be able to hold some water. If the paddles are too close together, or if the paddle wheel is too small, it will turn so fast that you will get no power.

With a big engine a small paddle wheel will act like a propeller and will not get hold of much water. (R. 4778-9, Vol. 27.)

From my ranch up to Green River, Utah, there is swift water at a number of places and in navigating upstream on that stretch it is simply a matter of power except at the Brown riffle, where it is dangerous because washes come in on opposite sides of the river at that place and there are rocks which must be avoided. However, I have never had an accident there or any trouble except that occasioned by the strong current. I have never failed to make it upstream through those riffles in the Marguerite except when I had engine trouble, which occurred on three different occasions. (R. 4781-3, Vol. 27.) On the stretch of river between my ranch down to the junction and thence up to Moab and return I have never had any serious trouble. I never was stuck on sand bars with the Marguerite. In going up through the Slide I had no difficulty. (R. 4783-4, Vol. 27.) In all my experience on that portion of the Colorado River below Cataract Canyon I recall no instance where I had any trouble except on one occasion in going downstream with the government party. My son and I were running a race and he was beating me; I attempted to take a short cut and lodged on a sand bar. That is the nearest to any trouble I ever had in navigating that portion of the Colorado. I know of no conditions there which make it impracticable or unsafe to operate a properly constructed power boat up and downstream. I think I could do anything on that portion of the Colorado River below Cataract Canyon that I have done on the Green River with the same boats. (R. 4784-6, Vol. 27.)

Some of the side washes are very large and at times quite large floods come down them and deposit a large amount of silt—sometimes rock. This usually occurs in the fall of the year when the river is lower and will push it over a little bit, making a narrow place with rapid water. I have not seen such conditions created where a channel has not been left through which boats of the type I have operated could pass up and down. As the river washes it away the condition created by these side floods disappears. In Labyrinth and Stillwater Canyons I have never seen the channel so narrow or so low that I couldn't go up and down in the Marguerite. Nor did I ever meet with a condition that stopped my progress in that boat. I have seen both the

Green and Colorado Rivers where for some distance the stream is divided, and on the first trip downstream at such a place you can't always tell which is the proper channel. Usually at a bend the long way around is the proper channel and we try that first but are sometimes fooled. On a straight stretch in the river where there is a braided channel I have never had any trouble and was always able to locate the proper channel. (R. 4787-90, Vol. 27.) In going downstream for the first time during a given year you may come to a place where the water divides into two or more streams and one may look as good as the other; you may go down one for a distance and find that it becomes shallow and the water from it may go over a shallow bar into one of the other channels so that you can't continue down. Coming upstream it is much easier to pick the right channel than going down. In my experience I have never found a condition where there was not a channel if I knew where to find it. If I have made a recent trip down the river I know where I will find the channel unless in the meantime there has been a big flood. (R. 4791-2, Vol. 27.) The swiftest part of the water may or may not be in the channel of the river. As the water rises at may strike a rock bank which will cause a current across the river in a different place from the low water channel. (R. 4795, Vol. 27.) When I stated that was never stuck on a sand bar with the Marguerite I didn't mean that I had never hit a sand bar with that boat; I meant that I always got through. (R. 4802, Vol. 27.)

Defendant's Exhibit No. 20 is a photograph of the engineers going down the Colorado River from Halls Crossing. Defendant's Exhibit No. 19 is a photograph of the Marguerite and a scow we used to haul the government freight down to the junction of the rivers while drilling was there in progress. (R. 4803, Vol. 27.)

There were water wheels constructed on the edge of the Green River; they were of permanent construction and I know of no instance when the water did not reach up to those water wheels so they could be operated or where the course of the river so changed that the water wouldn't reach the water wheels. (R. 4806, Vol. 27.)

As to the comparative cost of land freighting and river freighting, I know that it cost me less per ton mile to haul freight on the river than overland. (R. 4808-11, Vol. 27. The witness here gives data upon which he bases the

foregoing conclusion; also at R. 4840-9.) My experience has been that overland freighting in that section of the country is accompanied by more hazard than carrying freight on the river. The roads are not good and you can only load 1000 pounds to a horse. (R. 4811-12, Vol. 27.)

On the upstream trip when the witness Freeman was in the party it was only necessary to tow once; that was at Bridge Canyon. (R. 4816, Vol. 27.) I was not in the water at the ledge near Lake Canyon but know of its existence and there is a cut through the ledge there about 30 feet wide and our propeller didn't strike the ledge, although it was running when we went up over that place. (R. 4818-20, Vol. 27.) I don't think there is much difference between the water below Bridge Canyon and that above Bridge Canyon on the lower Colorado. (R. 4821-2, Vol. 27.)

I don't think the low water channel shifts; the current shifts. In making a trip down the river this year you will find the channel in the same place as last year; as to sand bars, I am not looking for them—I try to find the channel; the sand bars don't amount to much. (R. 4838-9, Vol. 27.)

One of the government men asked me to make the statement marked Complainant's Exhibit 631. I was later subpoenaed by the government and regularly attended court in Los Angeles under government subpoena. When I say in that exhibit that we are more liable in exceedingly high water to run across a bar in the center of the stream because of the channel (which should be current) going to one side or the other, the bar to which I refer is what we term a permanent island which is submerged in real high water. During high water you can run in almost any part of the water on that river; if we get careless and do not try to follow a channel but simply go downstream we might hit one of those submerged bars. During high water you aren't really hunting for a channel. (R. 4850-1, Vol. 27.) When I say in said exhibit that you cannot depend upon boating in the winter because the ice will form, I mean that sometimes the water freezes in winter and it is pretty hard boating there at such times; you can't depend on boating the river in the winter because some years the ice will form and some years it won't. (R. 4851-2, Vol. 27.) When I say in said exhibit that boating operations from Moab to Green River for commercial purposes such as the hauling of farm produce and freight is not a feasible proposition now or ever, I mean that it is 35 miles from Moab to the

railroad over a truck highway and 200 miles to Green River by boat and I don't call it feasible to haul 200 miles when you can haul 35 miles by truck. (R. 4853, Vol. 27.)

There are more rapids on the Colorado River between Halls Crossing and Warm Creek than there are on the Green River between the mouth of the San Rafael and the mouth of the Green. I would say that there is practically no difference between the last mentioned section of the Green and the last mentioned section of the Colorado in going downstream because there is plenty of water in both sections. Going upstream the current is a little stronger on the Colorado than on the Green so that in coming upstream on the Colorado a little more power would be required than in going upstream on the Green. (R. 4855-7, Vol. 27.) The practicability of navigation up and downstream on the section of the Colorado River just mentioned is substantially the same as on the Green River. (R. 4858, Vol. 27.)

*Mrs. Allien Russon* testified: I reside in Salt Lake City, am 22 years old and was born at Moab, Utah. When I lived in Moab I made several boat trips on the Colorado River and have seen many others at Moab use boats up and down that river. My first power boat trip was about May 7, 1925, when I went from Moab to Well No. 1 and return on the large Moab Garage boat. The boat was not stalled at any place and there were no navigation difficulties. The first part of September of the same year I made a trip from Moab to Well No. 1 and return in a small motor boat, two boys and another girl being with me. So far as I am aware no member of the party had had any former experience with motor boats or on the Colorado River except one of the boys who said he had made one trip. That boy piloted the boat on the downstream trip except for two miles, when I piloted it. We encountered no sand bars or other difficulties on that trip. (R. 4865-70, Vol. 27.)

*W. F. Reeder* testified: I first went to Green River, Utah, in 1921, and for a time made my home at Elgin on the east bank of the river opposite Green River, Utah. (R. 4870-3, Vol. 27.) In August, 1902, I went down the Green River to the head of Cataract Canyon and back with a companion in a row boat 16 feet long and 4 feet wide, taking our supplies with us. Between 1902 and 1906 I took these trips on the Green River to the junction and on one trip

went to the junction and thence up to Moab. These were all trips in row boats and I made an additional trip in a power boat. On each of the occasions when I went to Moab we there re-supplied and came back in our boats to Green River, Utah. In going upstream in row boats we rowed and towed and when the wind was favorable we sailed. (R. 4873-9, Vol. 27.)

In October, 1914, we went from Green River, Utah, to Hite with Charles Russell. We ran all of the rapids in Cataract Canyon but one, which we portaged because Russell had lost the oars on his boat; we recovered the oars later. (R. 4884-5, Vol. 27.)

There are sand bars on the Green River that you can run on to in row boats if you aren't careful, but we always had plenty of water. Going upstream we row, take advantage of the eddies at the side and keep out of the deep water, thus sometimes running on to a sand bar from which you can push off and have plenty of water. What I have said is also true of my row boat trips on the Colorado River. I recall encountering no difficulties on the power boat trip I took and we did not get hung up on a sand bar a single time. Mr. Wheeler had a ranch, now called the Wimmer ranch, and I made several trips up and down the river with him. I never had a mishap on any boat trip I have taken and no trouble or annoyance except the ordinary work of getting up and downstream. I always reached the destination I started for. (R. 4887-9, Vol. 27.)

I took these prospecting trips with Mr. Wheeler in 1902 and 1903. My trip with Russell was for the purpose of taking moving pictures. I had had a lot of boating experience on other rivers before I went to Green River, Utah. (R. 4890-4, Vol. 27.)

*A. L. Chaffin* testified: I am 44 years old and went to the Colorado River in October or November of 1898 or 1899 and remained on the river about four months until the following spring. There were then five men working on the Moquie Bar. Our supplies came overland to Hanson Creek and were boated thence to the Moquie Bar in a 16-foot row boat, which we rowed, poled and towed. (R. 4899-4901, Vol. 28.) In the spring I left the river and came back to Hanson Creek in October and again worked on the Moquie Bar, where we received our supplies as above stated. Our boat drew about 15 inches of water loaded. During that



stay on the river Mr. Ryan came down from the California Bar and I went with him up to Good Hope about 21 miles away for the mail, rowing, poling and towing Ryan's boat. (R. 4903-5, Vol. 28.) That fall William Mitchell brought a load of supplies to the mouth of Hanson Creek, installed a steam boiler and engine in his boat, and took three tons of supplies and mining equipment thence down the river to the Klondyke Bar. His boat was about 26 feet long and 10 feet wide and drew from 18 inches to 2 feet of water loaded. (R. 4905-7, Vol. 28.) Frank Bennett and Mike Ryan, who were then operating at the California Bar, used to come down to see us and we would go up to see them during that time, using light draft, nonpower boats. In the early part of 1901 or about that year, Stanton's party, with two or three boats, posted notices on placer claims in the river and went down by our camp, carrying camp outfits and supplies in their boats. During that period Andy Strauss with two boats, five men and two ladies came down the river from Dandy Crossing and continued on down to Hall Creek. We made a boat trip down to the Strauss camp that winter. The Strauss boats wouldn't draw over 8 inches of water unless heavily loaded. (R. 4907-10, Vol. 28.) Bert Seaboldt was operating on the Good Hope Bar and Ryan and I made a trip there for the mail that season. The people who were operating the Good Hope Bar made various trips up and down the river for supplies to Dandy Crossing and would bring mail down to Good Hope Bar, and some of us would go up to Good Hope in a boat and get the mail; sometimes we would bring mail for the Strauss party down to our camp and they would come up and get it from us. (R. 4911, Vol. 28.) On upstream trips we would row where there was easy water; in the smooth water we might tow or pole, depending on conditions. While it is all work it would be a relief to change from roing to towing or poling. (R. 4912, Vol. 28.) I left the river in the spring and went in again about May or June of the next year, working for the Moquie Mining Company, which was operating the Olympia Bar. We built a boat at Hite which was 28 feet long, 8 feet wide, and had sides about 3½ feet high, which was named the Lucy B. We took that boat and two other boats and a raft down the river from Hite to Olympia Bar, 33 miles below, loading about two and a half tons of supplies and mining equipment on the big boat and about 1500 feet of lumber and some

grain on the raft. We encountered no difficulties on that trip and I don't recall that we were hung up at any place. I then stayed down there on the river until about 1904. (R. 4914-19, Vol. 28.) During that last mentioned stay on the river I made some upstream trips with the Lucy B., which had an old automobile engine in it supposed to develop about 6-horsepower. I don't think the engine developed over two or three horsepower. Sometimes it would pull pretty good, but if it got a little too warm it would stop, and if the wind was blowing the tubes wouldn't heat and it would stop; the engine would stop going either up or downstream. I made trips in that boat carrying supplies, mining equipment, lumber, rails and other types of freight to different points on the river. Among the trips I made were trips to Good Hope Bar and to Moquie Bar. (R. 4919-21, Vol. 28.) After we removed the engine from Lucy B., I made several trips with it; once to Dandy Crossing for a load of supplies that I brought back to Good Hope. There we built a raft and took a 2-ton load on down to Olympia Bar. We had no difficulty in going upstream with the Lucy B., sailing a good deal of the way, and on the down trip journey we had no difficulty. (R. 4922-3, Vol. 28.) We made a trip with the Lucy B. to where Strauss was operating at the Anderson Bar below Halls Crossing, there got a load of pipe, and came back upstream. We sailed most of the way back and sailed practically up Bullfrog Rapids when there was a lull in the wind and we had to help the boat a little distance. From there on to Olympia Bar we sailed most of the way. I made several other trips besides those I have mentioned. We made several trips up to Good Hope Bar for mail, sailing upstream. (R. 4923-4, Vol. 28.) I never encountered any trouble with sand bars except when going upstream, keeping close to the shore in order to avoid the current and get easy water. My boat never encountered a sand bar when it was in the channel of the river. (R. 4924-5, Vol. 28.) I recall one trip in a small boat from Olympia Bar up to North Wash where we picked up a third man and went on up to Dark Canyon, rowing, towing, sailing and poling. (R. 4925, Vol. 28.) In 1903 or 1904 I acted as watchman at the old Stanton dredge and for six or seven months ran a trading post on the river. My first supplies came in at Hanson Creek and I boated them down to the dredge; other supplies came to the river at Wilson Creek. I used a scow with a stern wheel on it that was equipped



with a 4-horsepower engine for bringing up one load of supplies and also for carrying wood; that scow was 14 feet wide and 28 or 30 feet long. I took loads of stuff to trade to the Indians for blankets, baskets and pottery. I would ferry the Indians across the river and after we had finished trading would take them and what they had back across the stream. (R. 4926-30, Vol. 28.) I have sailed up all portions of the river between Halls Crossing and Hite except a 4-mile stretch above Red Canyon. I did no sailing going downstream. (R. 4931-2, Vol. 28.) I was away from the river for about a year, returning in 1904 or 1905 to the Moquie Bar. At that time I took a trip in the Lucy E. to Olympia Bar, bringing back camp equipment. I did some work for Cass Hite at Tickaboo and Red Canyon, making two or three river trips from Red Canyon to Dandy Crossing for supplies. I made a raft trip with a load of from 1000 pounds to a ton on the raft, towing the raft behind a 16-foot boat. (R. 4932-5, Vol. 28.) After the holidays that year I made a boat trip down to a bar below the mouth of the San Juan River with a man we called Klondyke and then came back up the river to Cass Hite's, poling practically all the way, although we rowed and sailed some. Klondyke was an expert poler. This was in December or January; we had no trouble with ice and we had no difficulty getting up the rapids except the hard work of poling, and we poled up through every rapid without getting out of the boat or towing. I know a place near Lake Canyon where there is a ledge of rock that extends out into the river, but there is a channel there perhaps 20 or 25 feet wide, and on this trip our boat did not strike there, although the water was at low stage. (R. 4935-9, Vol. 28.) I was on the river in the latter part of 1905 and the early part of 1906, operating the Adams Bar at Red Canyon with Frank Bennett. We got our supplies by boat from Hite. (R. 4939-40, Vol. 28.)

After leaving the river in 1906 I was not back again until 1925, when for about three months I placer mined on the California Bar. I made a boat trip up to Olympia Bar and got some mining equipment, and I also went down to the old dredge and got some things, using a 16-foot boat. (R. 4940-1, Vol. 28.) During the 19 or 20 years that I was away from the river I noticed very little changes in the river or its bed. It looked about the same and everything seemed natural. Sometimes when big floods

come down a side canyon carrying material into the river the river will be pushed towards the opposite bank for a short time, but there will always be a channel there. Sometimes deposits of sand and silt from side canyons will extend out into the river for a few days but the natural flow of the river is so much larger than any of those side floods that the main stream carries on; there is always a channel and I have experienced no difficulties in navigation because of conditions resulting from floods down side canyons. During my visit to the river when I was watching the dredge I remained right there for about two and a half years, not being away for more than a week or two at any time. (R. 4942-4, Vol. 28.) Aside from my experiences on the Colorado I have had experience with power boats in Utah, Oregon and California, and have operated them in those states. In my judgment a 20-horsepower motor would take a 24-foot boat with a load of a ton or more up to Hite on the Colorado River without experiencing any difficulty at any of the rapids on the portion of the river with which I am familiar. (R. 4944-51, Vol. 28.)

I was only 12 or 13 years old when I first went to work on the Colorado River. I have never gotten on sand bars going downstream and don't recall ever getting into the water to get off a sand bar. A very few times I have seen other people operating boats get in the water to get off a sand bar. Occasionally when going upstream when you are in the easy water you will run on to a bar, but you can usually get off the bar by using a pole. I remember occasionally at Hanson Creek Rapid a boat would hit on a rock and some member of the party would get out and help it off, but that did not happen frequently and I never saw it happen at Trachyte or North Wash Rapid. (R. 4951-4, Vol. 28.) When I spoke of being able to go up the river with a 20-horsepower boat with a ton load, I meant that it could go upstream with that load at any stage of water. (R. 4955-7, Vol. 28.) After I quit operating the trading post a man by the name of Newby operated it for about a year. (R. 4962-3, Vol. 28.) I have never forded the river on foot but horses have swum across it. (R. 4964-5, Vol. 28.) I have made trips up and down the Colorado River in all stages of water, including the spring floods and the summer floods that come from heavy rains. If we had supplies to get, I went and got them. It was harder work in high water and I avoided such trips as much as

I could. May and June are the high water months. (R. 4967-8, Vol. 28.) I have only noticed very slight changes in the channel down there; a flood might bring in a sand bar but it would not be in the main channel and these changes did not have any effect that you would notice on the river bed or the bars. (R. 4968-9, Vol. 28.)

*Thomas Fotheringham* testified: I am 62 years old and was on the Colorado River in 1888 and 1889. We hauled lumber, supplies tools and machinery down to Hole-in-the-Rock, there built a boat 38 feet long and 16 or 18 feet wide with two decks. We slept on the lower deck and had most of our provisions down there. On the upper deck we had a carpenter shop and blacksmith's shop, with anvil and tools and did our cooking on that deck. We loaded on to the boat a tub 5 feet high and 6 or 8 feet in circumference which had four paddles and used it in our placer operations. We also had a hydraulic pump, screens, two amalgamating boxes with seven amalgamators in each. The boat had a load of two or three tons. We also built a small skiff. After we got our boats built and loaded we started down the river in December, 1888, first stopping at a bar 8 miles below. While working that bar we had additional supplies shipped overland to Hole-in-the-Rock and brought them down to the bar in our small boat. We next took our boats and cargo down to a bar located 10 miles below the mouth of the San Juan River and worked that bar for about two months. One member of our party went farther on down the river in the skiff and located another bar 15 or 20 miles farther down where we could use the hydraulic pump. The rest of us didn't want to go downstream with the big boat because it was then high water, but he insisted and we started down. The high water made it impossible for us to handle the big boat. It was so big and bulky that we couldn't pull it in and make a landing there and we continued on down the river, landing just above Lees Ferry. We made a little money in our operations. While we were there on the river two men came downstream in a boat and stayed with us overnight. I also saw three different outfits of trappers. Two different boats with two trappers in each boat were going downstream when we saw them and another boat with two trappers was going upstream. The first trappers we saw had a load of furs and the other two parties had furs but not so many as the first party. Our

principal trouble there on the river was in not having a few sand bars out in the middle of the stream to stop us when we went downstream the last time; we just kept right on going. When coming down to the first bar we worked or when coming down to the second bar we worked or when bringing in the supplies with our skiff, we were not hung up anywhere and had no trouble with sand bars. (R. 4975-90, Vol. 28.) I helped take the little boat upstream. We rowed it and did not tow it. All of our upstream trips were in low water. The river did not freeze that winter. Our big boat drew about 18 inches of water loaded. (R. 4991-2, Vol. 28.)

*Clarence E. Baldwin* testified: I am 49 years old and Mr. Clark who has testified in this case and I are the principal owners of the Moab Garage Company, for which company the witness Virgil Baldwin, my brother, worked. I have personally operated some of our boats and looked after all of them, checking on the freight and equipment. The first boat I operated was called the Punkin Seed; it was a passenger boat, 20 feet long, 9 feet wide, with a draft of 20 or 22 inches under ordinary load. It was equipped with an old Ford automobile motor and Defendant's Exhibit No. 21 is a photograph of that boat. In it we carried groceries, small freight and passengers. It took about four hours to go with that boat from Moab to Lockhart and seven or eight hours for the upstream trip, depending on its load. (R. 4996-5003, Vol. 29.) We had another 20-foot boat with a 4½-foot beam, equipped with a Ford automobile motor that we called the Black boat. I operated that boat for seven or eight months between Moab and Shafer No. 1 and No. 2 Wells and Lockhart. It was used for passengers and small freight and in it the trip down to Lockhart consumed about four hours and the upstream trip seven or eight hours. We had another boat 26 feet long and 6 feet wide, equipped with a Chandler motor. In Defendant's Exhibit No. 22 the Chandler boat is shown next to the bank of the river and the large boat there appearing is our barge. The Chandler boat drew 19 or 20 inches of water empty and about 2 feet loaded. It was used principally for hauling passengers and for small freight. I have hauled as high as ten passengers and 2500 pounds was a fair load for that boat, but I have had on it as much as two tons. I have taken trips down to the junction and back, also

to Lockhart and the wells in that boat. When I went to the junction it was low water stage; I had no difficulty in getting up or down the Slide. It ordinarily took about four hours to go from Moab to Lockhart in that boat and six or seven hours to come back upstream. (R. 5003-9, Vol. 29.)

In operating the Punkin Seed we would occasionally hit a sand bar and I don't think we were ever held up on a bar with that boat more than five minutes. I believe I got out of that boat on one occasion when we were delayed about ten minutes. In operating the Black boat I also hit a sand bar once in a while but don't think I was ever held up more than ten minutes with that boat. On the occasion when I was held up ten minutes with the Punkin Seed it was because I missed the channel a little. There was a channel there and if I had followed it I wouldn't have been delayed even that ten minutes. Whenever I had my delays on the Black boat it was because I missed the channel. When operating right along we would hardly ever have any trouble with either the Black boat or the Punkin Seed, and trip after we would never touch anything. During the six or seven months that I operated the Punkin Seed and Black boat, I made from one to four round trips a week. During the sixteen months that I operated the boat equipped with the Chandler engine, I never had any serious difficulties with sand bars or other obstruction to navigation. Except when I burned out the bearing on the Chandler the longest time I remember being delayed or held up from sand bars or other causes was not over thirty minutes; there were only three or four such occasions when I was delayed as much as thirty minutes. With that boat I would get on a sand bar for a minute or two or perhaps five minutes on about one trip out of ten. Difficulties were less frequent in operating the other two smaller boats. (R. 5009-13, Vol. 29.) I would say that a conservative statement of the number of round trips while operating the three boats I have mentioned would be one hundred and I have made those trips during every month in the year. (R. 5014, Vol. 29.) We also had a barge, shown in the photograph Defendant's Exhibit No. 22. The passengers on the boat were the State Federation of Ladies' Clubs. We also had three outboard motor boats. (R. 5014-15, Vol. 29.) Defendant's Exhibit No. 25 is a picture of our barge with a party of geologists and oil men on board and was taken while a meal was being served. Defendant's Exhibit

No. 24 is a picture of Shafer No. 1 Well and the machinery, equipment, lumber and structures there appearing were taken down the river on our barge. Defendant's Exhibit No. 26 shows a part of the barge as it was traveling down the river. The boat appearing on the deck of the barge is a square end canoe in which we at times used an Evinrude motor. (R. 5017-18, Vol. 29.) After the first trip with the barge my brother Virgil was practically in charge of it. (R. 5019, Vol. 29.) On those portions of the Colorado River with which I am familiar, its channel is always very near the same place except when heavy rains come down a side canyon, at which time the channel will be changed there for a week or ten days and then return to its original place; in a few days the river does its own housecleaning. When there has been a flood down a side canyon we would occasionally be bothered by a sand bar at that point on the first trip, but after the first trip would have very little difficulty. It was a part of my duty to keep track of the running of the boats and I endeavored to perform that duty. (R. 5020-1, Vol. 29.) Virgil is my mother's youngest son and she kept a diary of his boat trips. We got in the habit of referring to that diary whenever any question of dates or checking up on trips arose. Up to the time she quit keeping her diary there had been approximately two hundred trips made with the big boat. Last month (November, 1929) we made seven round trips, four between Moab and Lockhart and return, three between Moab and Shafer No. 1. Well and one between Moab and Shafer No. 1-A Well. A conservative estimate of the tonnage hauled up and down the river by our company since it started river navigation in 1925 would be 3500 tons. We have hauled hundreds of passengers on all of the boats. These boat operations were commercially profitable to us. There was only one occasion when I was ever stopped in our operations; that was when the barge was caught in an ice jam. (R. 5022-6, Vol. 29.) We first charged \$1.75 a hundred from Thompson on the railroad to Shafer No. 1. Well; later the charge was \$1.00 per hundred, and most of our tonnage delivered there was at the lower rate. Our rate from Thompson to Well No. 2 was \$1.25 a hundred. We hauled the freight from Thompson on the railroad to our dock at Moab on 5-ton trucks over good road maintained at public expense. The cost to us of our land haul per ton mile was greater than the cost per ton mile of our water

haul. (R. 5026-52, Vol. 29. At the pages indicated the witness gives facts showing the cost of the land and water haul.) I am familiar with the country adjacent to the Colorado River between Moab and the mouth of the Green River and in my opinion it would not be feasible or practicable to build a road so as to make that country accessible to trucks. (R. 5033-8, Vol. 29.)

Complainant's Exhibit No. 632, being a schedule of rates filed with the Public Utilities Commission of Utah by Moab Garage Company in 1926 was received in evidence. (R. 5057-8, Vol. 29.)

I don't recall any freight to amount to anything being carried on the river except in our boats and the Moab merchants have not used the river to bring in their supplies or take them out. (R. 5061, Vol. 29.) After you learn how to do it, I would rather navigate the river in high water. In coming upstream we run our boats in the easy water and take advantage of the eddies, and in so doing have very little trouble with sand bars in high water. In thus coming upstream you are more liable to run into sand bars. Our boats had no trouble making headway against the current in high water, although we wouldn't make headway in the swiftest places. We have been unable to make headway at those places only while we were crossing the river; then we wouldn't make much headway. We were always able to hold the boat upstream and we never let it be whipped around or encountered any trouble from any such cause. (R. 5066-7, Vol. 29.) The Punkin Seed would make three or four miles an hour upstream; the Chandler five or six miles an hour when loaded; and the Black boat was not quite as fast as the Chandler and a little faster than the Punkin Seed. Those upstream speeds would be made at any month of the year and during either high or low water. (R. 5069, Vol. 29.) Our Black boat is still at Moab, ready for use, although we have not used it for the last year. The Chandler boat is still there, but we have only made two trips with that boat this year. (R. 5071, Vol. 29.) At certain times of the year there is a bar at the mouth of Mill Creek which has given us trouble, the trouble generally being in July and August when they have big storms. After a storm we will be bothered there for a week or ten days. (R. 5074, Vol. 29.) I have run up the river with the Chandler boat beyond Nigger Bill to a point about 6 miles above Moab. The riffle at Nigger Bill doesn't

amount to anything. (R. 5078-9, Vol. 29.) There were other people besides oil men and geologists who went down on our boats. We hauled camp outfits and equipment down the river for cattle men who had camps between No. 1 and No. 2 Wells. We hauled hay and grain or anything they happened to want down to them. On one occasion we hauled 200 fence posts down there. (R. 5083-4, Vol. 29.) On the trip that I mentioned with the Chandler boat above Moab, I had no trouble and did not get caught on any sand bars. (R. 5084, Vol. 29.) Any trouble we have encountered with sand bars or other conditions at or below our dock at Moab has not been of sufficient gravity to cause us any great expense or to seriously consider moving our dock farther downstream. We weren't bothered much with sand bars except during July and August and with few exceptions we made our regular trips. (R. 5085-6, Vol. 29.) I have seen the Colorado River frozen over at Moab only once; that was in the winter of 1924-5. Every year it is filled with ice cakes which generally come in March and April when the ice along the shore thaws loose and floats down. We have never stayed off the river on account of ice flowing in it. (R. 5086-7, Vol. 29.) In 1910 two other men and I engaged a power boat belonging to E. T. Wolverton, which had a propeller in a tunnel. In October we went in that boat from Wolverton's ranch down to the mouth of the Green, thence up the Colorado River to the vicinity of Lockhart, where we hunted deer and then returned in the boat to the place we started from. We went up through the Slide under power and although we hit a sand bar once in a while we had no trouble to speak of. (R. 5089-90, Vol. 29.)

*Bessie Walker* testified: I am 18 years old. In 1926 I went with seven other people in a small Moab Garage boat from Moab down to the oil wells and back. My sister, who is now 14, and another girl about my own age, were in the party. On the upstream trip we three girls drove the boat four-fifths of the way and we encountered no trouble in going down or back upstream. (R. 5092-4, Vol. 29.)

*Albert Beach* testified: I am 40 years old and have lived in Moab for about 25 year. For some years I have been in the employ of Moab Garage Company. When I was a boy at Moab there was an old fellow they called Rocky who trapped on the Colorado River. Hy and Ed Turner also trapped on the Colorado and after their river trips I know

they brought furs into Moab. (R. 5094-5, Vol. 29.) During 1927 and 1928 I worked on the barge of Moab Garage Company with Virgil Baldwin. At certain times and certain places we had trouble with sand bars occasioned by floods coming down a side canyon. It would take three or four days for the river to wash away the material and get back to its original channel at that point. After the first trip through there we could get up and down without any trouble and we did not have trouble with sand bars at other points. There were two places where we had trouble with sand bars on two occasions when we had floods during the time I worked on the bars; one place was at Kane Wash and the other at a place lower down. I made thirty or thirty-five round trips on the barge and I should judge that we got on a sand bar four or five times during that period, the longest delay being for two hours at Kane Wash. The next longest delay was for about an hour at the wash below, and on the other occasions that we got on a bar we were only delayed a minute or two. (R. 5096-5101, Vol. 29.) I worked on the barge for about a month along in July or August, 1927, when the water was at low stage. The rest of my trips on the barge were in September or October, 1928. (R. 5102, Vol. 29.) On the occasion of the two longest delays which I have mentioned we took a line ashore to get the boat off the bar. (R. 5104, Vol. 29.)

*Emeline Coote* testified: I am a music teacher and live in Salt Lake City. In 1907 I accompanied Mrs. Wetzell, and Mr. Wetzell, then Supervisor of Music in the Salt Lake public schools, on a trip from Green River, Utah, to the Wolverton ranch in Mr. Wetzell's motor boat. We encountered no difficulties or troubles of any character on either the down or upstream trip, neither of us got out of the boat at any time, and we were not stuck on any sand bars. There was one place where the water was a little swift. I was raised in Ontario, Canada, and have operated boats on many of the rivers there. (R. 5109-11, Vol. 29.) In October, 1907, I went to Moab and had two boats built. I made a trip with Mr. and Mrs. Wilson from Moab upstream to a point a little above Jensen on the Colorado River. Mr. and Mrs. Wilson used a pair of oars and I sculled with a single oar. In going up or downstream over that stretch of the Colorado the only difficulty encountered was at the mouth of a stream that comes in where there was a swift current; at that point I just made a long

leg and cut the current. (R. 5112, Vol. 29.) My trip up the Colorado River was made in October, 1907, and, as I remember it, Jensen's ranch to which we went is about 12 or probably 13 miles above Moab. (R. 5114-15, Vol. 29.)

*Otto Empey* testified: I am 48 years old, my folks moved to Moab when I was four or five years old and I left Moab in 1918 or 1919. As a boy at Moab I saw trappers on the river and have seen Rocky Powers come up the river in his boat with his skins after a trapping expedition. He trapped there for five or six years and had no other occupation that I know of. I also remember Ed Turner, Hy Turner, Charlie Turner and another trapper named Louis Petzell, who would bring their furs in their boats to Moab after a trapping expedition. I saw other boats on the river besides those of the trappers, have gone on hunting trips in my own boat, and others went down the river on hunting trips in their boats. I never had any difficulty or trouble with sand bars on the Colorado River. (R. 5116-19, Vol. 29.) I remember the Branson boys rafting lumber on the Colorado River over a period of 5, 6 or 7 years, maybe longer. As I grew older I rode the range some. At different times I have probably seen 8 or 10 of the Branson rafts. I remember a man named Brown and another man named Welsh who lived 12 or 15 miles up the river from Moab and who came down the river in their boats. Later I have seen what I suppose were the same boats upstream, tied along the banks of the river at their homes. (R. 5119-21, Vol. 29.) I made a trip 10 or 12 miles upstream from Moab and back in the Undine. The boat tried to go up the riffle at that point and while using the capstan engine at that point the rope broke and we returned to Moab. That night they purchased a new rope and again went upstream, but I did not accompany them. I later saw the Undine after it was wrecked. (R. 5121-4, Vol. 29.) I have taken cattle across the Colorado River in low water when it was not necessary for them to swim; even at the very lowest water we always selected the shallow places where the water would come up to about the point of the shoulders or belly of the cattle. (R. 5125-7, Vol. 29.) Some years the Colorado River would freeze at Moab so that we would have skating. Then it would go probably two or three years and we wouldn't have any skating. I have seen the river frozen clear across five or six times. (R. 5128-30, Vol. 29.)

*Charles A. Gibbons* testified: I first went to Hite on the Colorado River in the eighties but remained there only two or three days. I saw Cass Hite and five or six other men. They had a raft 20 or 25 feet long by 16 or 18 feet wide, loaded with a boiler, engine, supplies, tools, etc. The boiler was about 12 or 15 feet long. I don't know the weight of the load on the raft. I saw them start out on their river journey. (R. 5132-5, Vol. 29.) Seven or eight years later I again went to Dandy Crossing and did some construction work for the Cass Hite Placer Mining Company at Good Hope Bar. At Tickaboo Bar I then saw the boiler and engine that I had seen leave on the raft on my first visit. While I was at Good Hope Bar equipment, hay, grain, scrapers, plows, etc., were brought down the river in boats and rafts from Dandy Crossing. (R. 5135-9, Vol. 29.) In 1899 I freighted a drill, lumber and supplies to Dandy Crossing for Mr. Stanton. They made a big barge on which to carry their drilling outfit and put at least a 10-ton load on it. Later I saw the drill at different points on the river, the lowest point at which I saw it being 5 or 6 miles below Dandy Crossing. I didn't handle any boats during the period of which I am speaking. In 1900 I hauled a dredge and some other equipment and supplies for Mr. Stanton to a point just below Hanson Creek. The estimated weight of the dredge was 180 tons and it was all hauled on barges and boats up the river a half or three quarters of a mile to the point where it was set up. (R. 5140-3, Vol. 29.) On my visits to the river I saw boats going up and downstream. In going upstream they rowed their boats a good deal of the way; over the heavy water they had to tow for a distance where they couldn't take advantage of the big current in the riffles. In 1916 I took a boat trip from Red Canyon to Hite and return with Mr. Turner who brought back 300 or 400 pounds of supplies for my cattle outfit in his boat. I paid him for this service. On the upstream trip we sailed most of the way and I don't recall running into any sand bars. We towed up one or two riffles, including Trachyte Rapid. (R. 5143-5, Vol. 29.) When I was down to the Colorado River in 1916 there were prospectors working in a good many different places up and down the river. (R. 5150-1, Vol. 29.)

*Henry Grimm* testified: I have lived in Moab for about 36 years. In August, 1898, I went upstream from Moab about 22 miles in a 24-foot boat, having a beam of about 5 feet.

with a load of 500 pounds. On our way up we camped at the mouth of Castle Creek and next day went about 2 miles farther upstream. We did not tow the boat but rowed it all the way upstream, including that stretch of water at Nigger Bill and at Castle Creek. We had two sets of oars. We came back downstream to Moab with a raft containing about 6000 feet of lumber, trailing the raft behind our boat. At the mouth of Castle Creek the raft was stuck on a rock for about fifteen minutes but we got it off and had no other difficulties on our return journey. (R. 5180-4, Vol. 29.) Although I personally saw only one raft of lumber, I know that for a period of 8 or 10 years Moab lumber was hauled in wagons from the river up to town and there was no other way for the lumber to get there on the river except by rafts. (R. 5185-7, Vol. 29.)

*Francis M. Shafer* testified: In November, 1888, my brother built a raft at the mouth of Cisco Wash, 35 miles upstream from Moab and we loaded on to it a chest of carpenter tools, some trunks, bedding, supplies, material for a rocker, etc., all aggregating in weight at least 500 pounds, and started down the river to do some placer mining at the mouth of Castle Creek. There was brush and trees at the mouth of Castle Creek and we went on down without observing that creek until we finally reached Nigger Bill Canyon, 3 or 4 miles above Moab, and became satisfied that we had passed our intended destination. We there tied up our raft and walked into Moab for the night. Next morning we came back to our raft and continued on up to the mouth of Castle Creek, where we found a 14 or 15-foot row boat. We got in the boat, went back to our raft, transferred our cargo from the raft into the boat, and rowed the boat thus loaded the entire distance back up to the mouth of Castle Creek, except at two rapid stretches of water where we towed it. (R. 5192-6, Vol. 30.) We encountered no navigation difficulties on our downstream trip with the raft or in our upstream trip with the boat, except the work incident to towing the boat at the two places and rowing. I think our boat drew at least a foot of water and would say that at any point in those rapids the water was at least 2 feet deep. (R. 5198-5200, Vol. 30.)

*Henry E. Blake* testified: In 1909 I went to Green River, Utah, and built a 24-foot boat with a 6-foot beam, equipped with a 14-horsepower engine and a submerged propeller.

That year I made several trips on the Green River with two other men. A. I. Anderson accompanied us down to his ranch on the Green River and no member of the party beside Anderson had ever before made a river trip. We encountered practically no delays on the trip. (R. 5204-7, Vol. 30.) We did no towing on that or any subsequent trip with that boat. We encountered no difficulty on the return journey from Moab. This trip was taken at the crest of the extreme high water. Our traveling time from Moab to the junction was five hours and thence up to Green River, Utah, we made about 5 miles an hour. From the junction up to Moab our running time was about eight hours. (R. 5208-11, Vol. 30.) My next trip was to Townsite Bottom in July. We took down some supplies for Mr. Anderson, also a barrel of gasoline. In September of the same year I made another round trip from Green River, Utah, to Moab. On neither of the last mentioned trips was any trouble encountered except when I landed at one place I ran on to a slight bar. My September trip to Moab was for compensation. In August of that year I constructed another boat which I called the Utah and the September trip to Moab was taken in the Utah. My first boat which I called the Ida B. had a draft of approximately 22 inches and the Utah's draft was 18 inches. On the return trip from Moab in September we brought back 1000 pounds of peaches. (R. 5211-13, Vol. 30.) On the occasion when Mr. Wimmer took a party of Salt Lake business men to Moab, I left Green River, Utah, with twelve or fourteen passengers in my boat, and as I went down the riffle just below the railroad bridge, my view was considerably obstructed and I struck a submerged rock. It required two days for me to repair my boat and I then left with seven or eight passengers and a lot of supplies. Aside from the accident to my boat I had no special trouble or delays on that trip. (R. 5215-17, Vol. 30.) During this period I took several picnic parties on short trips up the river. (R. 5218, Vol. 30.) In 1910 I started to work at the pumping plant and ceased operating my boats. (R. 5219, Vol. 30.) When I went to Green River I had in mind operating freight boats up to 100 feet in length and with a minimum capacity of a carload and was one of the persons who endeavored to induce the government to improve the navigability of the Green and Colorado Rivers so that we could run those big boats without obstruction. I was unsuccessful in my endeavor to get the government to spend the money. (R. 5222, Vol. 30.)

*Albert I. Anderson* testified: I first went to Green River, Utah, in 1908. I was then investigating certain oil ground 18 or 20 miles west of Townsite Bottom. Four of us went from Green River, Utah, down to Miller's Canyon at Townsite Bottom with two row boats, each carrying a load of about 900 pounds. The draft of the boat was 10 or 12 inches. We were met at Miller's Canyon with a pack outfit and horses and went thence to the oil ground in which we were interested. (R. 5230-3, Vol. 30.) In March of the next year I made the same trip in a row boat with 100 pounds of supplies. Later I returned upstream to Green River, Utah, with that boat. In April, 1909, I made a trip with Mr. Oppenheimer in the motor boat Paddy Ross down to Sheep Trail, where we met Lieutenant Leeds and his party and we then returned upstream to Green River, Utah. (R. 5234-6, Vol. 30.) I made a trip with Mr. Blake in the Ida B., and on one of my trips with Mr. Blake we towed a row boat behind his motor boat up to Green River. On one trip with Mr. Oppenheimer we took a row boat along with us. On some of Mr. Blake's excursions there were as many as twenty-five or thirty people on his boat; it was so crowded that nothing but heads were sticking out, many small children being on board. In November, 1909, I made a trip from Green River to Moab and return with the Hughes party; we made this trip in the Paddy Ross boat. (R. 5237-8, Vol. 30.) In 1910 I made another trip in a row boat loaded with supplies from Green River, Utah, to Townsite Bottom. (R. 5239, Vol. 30.) On one occasion I went down to Townsite Bottom in a row boat and came back up to Green River in Ross Wheeler's boat. On another occasion I went from Townsite Bottom to Green River, Utah, in Ed Prothero's boat. (R. 5241-2, Vol. 30.) I made a trip in the Navajo to Tuxedo Bottom, 110 miles below Green River, Utah. In 1914 while the government drilling operation was in progress at the junction of the rivers, the government employed me and my boat, and in it I made several trips to Moab and return with surveyors. I was on the upstream trip when the drilling outfit was taken out. (R. 5242-5, Vol. 30.) I never encountered any difficulties or obstructions to navigation during my experience on the Green and Colorado Rivers. The nearest I ever came to getting stuck on a sand bar was when I made a trip down the river with Messrs. Richardson and LaRue; but we hardly stopped, just touched the bar and went right on. I know of no fact or con-



dition on the Green or Colorado Rivers in those sections with which I am familiar where in operating boats of the character that I have operated and seen operated on those rivers. a man familiar with the river and keeping a reasonable lookout rested under any necessity of encountering obstructions or delays. (R. 5246, Vol. 30.)

*William Cooley* testified: I am 72 years old and worked for Mr. Branson when he was cutting timber on Castle Creek and Fisher Point. On Castle Creek he cut timber between September, 1897, and May, 1898. I worked for him at Fisher Point in the fall of 1902 for two or three months and in the fall of 1903 and spring of 1904, when I quit his employment. During that period lumber was hauled by wagons to a point about two miles above the mouth of Castle Creek on the Colorado River and rafted thence to Moab. I accompanied two rafts down the river in 1897, one raft in 1898, one in 1902 and one in 1903. I was a sawyer, and I know that during that period other lumber besides that in the rafts I accompanied was hauled to the river from the saw mill on Castle Creek and later from the saw mill on Fisher Point. Teams would leave with loads of lumber for the river about every other day. (R. 5249-53, Vol. 30.) After I quit Mr. Branson's employ I lived up near Cisco for about four years, and during that period had occasion to drive down to Moab once or twice each year. The road follows the river, and on these trips I passed within 300 feet of the landing where the rafts started down the river. Mr. Branson had a house and corral there and I was very friendly with him and his family and saw them almost every time I passed. In driving down to Moab and returning I would almost always see lumber there at the landing; sometimes there would be twenty or twenty-five thousand feet piled upon the bank there and in varying amounts at other times. On these trips to Moab I stayed overnight at Branson's place at times and saw wagon loads of lumber come down and unload there. (R. 5254-6, Vol. 30.) We encountered no difficulty on any raft trips that I took down the river. When the water was at low stage they would take from ten to fourteen thousand feet on a raft; at a higher stage they would take twenty or twenty-five thousand feet down. These rafts were always in three sections, the aggregate length of which would be from 48 to 54 feet, the length, however, depending on the length of the lumber

we had to haul. (R. 5256-7, Vol. 30.) The raft trip down to Moab during the spring high water consumed from 2½ to 3 hours; at low water the trip required as much as ten hours, the water being slower at that time. Two men would accompany a raft. This lumber brought about \$22.00 per thousand feet in Moab during the years I worked for Mr. Branson. (R. 5258-9, Vol. 30.)

*Dave Johnson* testified: I worked on the big barge of the Moab Garage Company for seven months without missing any shifts between December, 1925, and June, 1926. During that period we hauled to the wells of the different companies and tried to average our load so that we would take down about 18 or 20 tons and have hauled as much as 22 tons at one load. On a single trip we have taken 18 or 20 tons of coal down. Virgil Baldwin piloted going downstream and I usually piloted coming upstream. On our upstream trips we would haul bent tools, such as stems and bits that needed repairing, and two or three occasions hauled crude oil. On one of those occasions we brought up 16 barrels of oil, each weighing about 400 or 450 pounds. There was considerable upstream freight. (R. 5260-4, Vol. 30.) In high water we had scarcely any trouble operating the barge either up or downstream and there was not much difficulty with sand bars when going upstream in low water. We frequently traveled on the barge at night and during the time that we were making two round trips every three days we would have to travel late or else camp on the river somewhere. We have left points down the river and started upstream with the intention of tying up on the stream over night and concluding the journey next morning. (R. 5264-7, Vol. 30.) At times we had delays which usually occurred in low water. I would say that on half of our trips the barge was not delayed either in going up or coming down the river because of sand bars or other obstacles to navigation. (R. 5267-8, Vol. 30.) The longest delay I remember encountering at any place while I worked on the barge was not more than two or three hours and I do not recall a single time when we left Moab that we did not reach our destination the same day. On about two occasions we have left a point down the river with the intention of going clear through to Moab that day and failed to do so. (R. 5270, Vol. 30.) Among other freight we transported supplies for cattle outfits and have moved their



camps to different points downstream. Defendant's Exhibit 29 is a picture of the boat when we were carrying some horses. (R. 5271, Vol. 30.) At times the barge would be kept down the river for several days, during which time we would be engaged in boating between different points downstream. At times we would have to remain downstream with parties of geologists or other parties for three or four days; these parties usually took their meals on the boat and used it as headquarters; they would make trips into the country on both sides of the river, come back to the boat that night, and perhaps next morning we would take them to another section at which they desired to land. (R. 5272-3, Vol. 30.) We made trips down to Lockhart, also several trips below No. 2 Well. The river water in no way affected our engine. We used river water in our radiator without any necessity of letting the water settle before putting it in the radiator. We had a tank connected with the radiator and our cooling system was practical and effective. (R. 5274, Vol. 30.)

*Isaac W. Stark* testified: I am 47 years old and for a time lived in the Green River section. I made a trip with Mr. Wolverton on the Wilmont to Moab and also from his ranch to Green River, Utah, and return. I also made many short row boat trips up and down the stream. When a man is coming upstream in a row boat with his back to the current he will sometimes nose into a sand bar. On my Moab trip in the Wilmont I recall only one instance where we were stuck on a bar, as a result of trying to avoid an eddy. We were some minutes poling off the bar but did not get out of the boat. (R. 5275-8, Vol. 30.) The pictures contained in Defendant's Exhibit No. 31 were taken at different points along the Green and Colorado rivers, between Green River, Utah, and Moab. (R. 5278-82, Vol. 30.)

*Knox Patterson* testified: I have taken three round trips from Moab to Well No. 1 on the big barge of Moab Garage Company and have also taken two or three trips on smaller boats of that company. I recall no obstacles or difficulties being encountered by the big barge on either of my trips and none were encountered on my trips in the smaller boats of that company. My first trip on the barge was shortly after No. 1 Well blew in, and my other trips were in the succeeding months.

Some time about 1910 or 1911 I went with fishing parties in a power boat, built there at Moab by Merkins. It looked more like a box than a boat, being 15 or 18 feet long and 6 or 8 feet wide. I don't know the horsepower of the engine. On these fishing trips there would be twelve or fifteen people on the boat and we would go down the river six or seven miles below Moab and then come back upstream. We encountered no difficulties with respect to sand bars or other obstacles or obstructions to navigation. I think these trips were taken in August. (R. 5284-7, Vol. 30.)

*Hyrum H. Turner* testified: I am 79 years old, and have lived in Moab between twenty and thirty years. When I first arrived there I had a few cattle but sold them and came back to Moab and engaged in trapping. I generally used a boat pointed at both ends, and always poled my boats. I have trapped down the Colorado River from Moab to the head of Cataract Canyon from four to six times, bringing my furs back up to Moab in my boat. We never did any towing except when we got tired of poling, and never from necessity except at the Slide, where it was too deep for my pole. On the trapping expeditions I have mentioned I would have a load of six or seven hundred pounds in my boat. (R. 5288-92, Vol. 30.) I have been on ten or fifteen trapping expeditions from Moab down as far as the junction of the rivers, getting mink, fox and coyote furs. I have also trapped beaver on the river for the State of Utah. I have trapped from Moab down to the junction and thence to a point at least 50 miles up the Green River. (R. 5292-3, Vol. 30.) I have never been bothered with sand bars on any of these trips; there was always a channel, but in poling upstream we would hunt the still water; might strike a sand bar, swing right off, and go on. (R. 5293-4, Vol. 30.) One season I trapped on the Colorado River from the mouth of the Dolores down to Moab, and another year from Westwater to Moab, bringing my camp outfit and furs down with me in my boat on both occasions. I have rafted logs on the Colorado River from a point about 8 miles above Moab down to Moab bridge. (R. 5294-5, Vol. 30.) I worked on the barge of the Moab Garage Company for about six weeks when they first started to operate. We, of course, got on sand bars, which we expect on any river; sometimes we might be held up for an hour, sometimes a little longer, but we were never detained

very much or so that we could not make the round trip in two days. The only thing I know of that has ever been done toward improving the navigability of the Colorado River was the shooting out of an ice gorge on one occasion. (R. 5295-8, Vol. 30.) I can go up the Colorado River as far as Cisco in a canoe like my own and have come up in my canoe from the junction without any trouble. (R. 5301-2, Vol. 30.)

*George H. Chaffin* testified: I am 50 years old, and first went to the Colorado River in March, 1895, and worked on the California bar for about thirty days, the supplies for my party being boated to the bar from the mouth of Hanson Creek. In 1896 or 1897 I again entered the river at Hanson Creek and worked on the Moquie bar, our supplies being boated from the mouth of Hanson Creek to that bar. During that season I made boat trips between Moquie and Tickaboo bar, rowing, poling, sailing and towing upstream. I have sailed up Tickaboo Rapids without aiding my boat, and at other times have aided with my pole. Between Tickaboo and Moquie bars my boat loads were about twelve or fifteen hundred pounds. In transporting timber we generally used rafts 10 or 12 feet wide and 20 to 24 feet long. (R. 5305-8, Vol. 30.) In 1898 we again worked on the Moquie bar, boating our supplies from Hanson Creek. In April, 1898, I went down the Colorado River from Moquie to Independence bar, also known as Shock bar, located about 15 miles below Hall's Crossing, with a party of eight; we had a boat and a raft and carried with us grain, supplies, machinery and rails. We had about 2500 pounds of load on our 20-foot boat and carried a thousand or fifteen hundred feet of lumber and three or four hundred feet of rails on the raft. We encountered no obstacles or obstructions to navigation and were not hung up on sand bars, rocks, rapids or otherwise. I remained at Shock bar from sixty to ninety days and had occasion to go up and down through Shock rapids. (R. 5309-11, Vol. 30.) In 1899 I again worked on the Moquie bar and made a trip thence to Good Hope bar, sailing and poling the entire distance upstream and did not get out of my boat. I have sailed up Bull Frog, also Smith, rapids without the aid of a pole or without rowing or towing. (R. 5312-13, Vol. 30.) In 1900 I worked on the Moquie bar, also at the Stanton dredge. During each of the years I was on the Colorado, up to and including 1901,

I saw other boats besides those of our party in use upon the river and going up and downstream with men and supplies. I went down the river to the Strauss party, about a mile below Hall's Crossing. I rafted lumber from Moquie Canyon to the Stanton dredge, encountering no trouble. About the spring of 1901 I helped Mr. Bennett build a raft and boat, and we took machinery, groceries and grain down to Olympia bar. Later I rafted some timber from the mouth of Tickaboo to Olympia bar. The only difference between rafting in high water and at the lowest stage would be that you would have to build the raft lighter and larger at the lowest stage. (R. 5314-7, Vol. 30.) During the years that I was on the Colorado I frequently made trips up and down the river, 15 or 20 miles each way from camp, making some trips up as far as Dandy Crossing, which was 35 miles from Moquie bar. While there I worked some of the time for myself, some of the time for Mr. Stanton's company, for the Moquie Mining Company, and for L. M. Chaffin. I have gone down the river below Shock bar and 12 or 15 miles below Lake Canyon but have never observed any ledge of rock in that section extending clear across the river. There is a channel through the ledge located near Lake Canyon, which channel is about 40 feet wide. (R. 5318-21, Vol. 30.) I have been on the river below Hite in every month of the year except August. In poling I have had opportunity to observe depths of water, and I know of no difficulty or obstacle that would prevent or make difficult the navigation, either up or downstream, of that portion of the river over which I have done boating with a boat drawing two feet of water. Most of the boats I saw there were made by the miners who were working on the bars. Supplies came to the river overland. (R. 5321-6, Vol. 30.)

*Edward T. Wolverton* testified: I am 67 years old, and went to Green River, Utah, in 1900. (R. 5327, Vol. 30.) In 1900 I made a round trip from Wimmer's Ranch to the junction of the rivers in a row boat having a draft of about 9 inches. This was in February, at a very low stage of water, and the minimum depth I found in the channel was two feet. The same year I made a round trip from my ranch to Green River, Utah, towing the boat up the riffles and rowing it the remainder of the distance. Next year we built an 18-foot row boat, with a 3-foot beam; we success-

fully sailed that boat upstream, and its draft as loaded was about two feet. (R. 5331-3, Vol. 30.) In 1903 I built the Wilmont, which was slightly over 27 feet long, with a 5½-foot beam. Its draft empty was about 10 inches, and with loads its draft was up to 3 feet. It was a stern wheeler and at first was equipped with a four-horse power engine. With that engine I couldn't go up the riffles between my ranch and Green River without assisting the boat, but with it I made two round trips to the junction of the rivers and one round trip to Moab. We had very little trouble on those trips but the engine didn't have enough power. (R. 5333-5, Vol. 30.) Both of the above mentioned trips to the junction in the Wilmont were for compensation. (R. 5337, Vol. 30.) The next year I installed a 7½ horsepower engine in the Wilmont and changed it from a stern to side wheeler. After this change I made one round trip to Moab on personal business and another round trip there with tourists for compensation. I also made several round trips from my ranch to Green River, Utah, and had no difficulty in negotiating the riffles. I had no difficulty with the current on making progress on either of the Moab trips. (R. 5338, Vol. 30.) In 1903 and 4 we carried in the Wilmont considerable supplies from Green River, Utah, to my ranch, and from my ranch to a point 25 miles below, where the Utah-Nevada Copper Company was operating a low-grade copper property. We carried lumber and all sorts of supplies for the use of that company. (R. 5341-2, Vol. 30.) We later built two scows for hauling copper ore, the largest being 30 feet long with a 12-foot beam and the smaller one 20 feet long with an 8-foot beam. I then installed a 14 horse power engine in the Wilmont. I hauled several tons of copper ore in the Wilmont to Green River, Utah, but I am not sure whether or not we took any scow loads of ore up to town. (R. 5345, Vol. 30.) I made several round trips to Moab and to the head of Cataract Canyon after installing the 14 horse power engine in the Wilmont, all of which trips were for compensation. In 1905 or 1906 the copper company built another power boat called the Colorado, in which we used my old 7½ horse power engine. I recall making a number of trips in the Colorado, generally to the head of Stillwater Canyon, but that boat was not a success. In 1906 the copper company quit operating. During the years 1905, 1906 and 1907 I made other trips than those I have mentioned here for compensation. I took one party of hunters in the Colorado

40 miles down the Green River and made a number of trips with tourists and hunters on the Wilmont. All of these trips were for compensation. I frequently took a scow loaded with supplies down to Townsite Bottoms. We would leave the scow there as a sort of supply base and continue with the party to the head of the cataracts with my power boat, returning to the scow and getting more supplies as they were needed. In handling the scows that I have mentioned in my testimony we would always push them with the power boat. (R. 5346-9, Vol. 30.) After the winter of 1907-8 or 1908-9, when the ice ran out in the spring, the Wilmont was caught and its hull so damaged that I removed the machinery and built a 22-foot boat with a 5-foot beam and a draft empty of 18 inches, and with loads a draft up to 3 feet. In this boat I installed my old 7½ horsepower engine. This was a propeller boat and was named the Navajo. Between 1908 and 1912 we used the Navajo for carrying hunting parties and tourist parties to the cataracts and to points on the Colorado River above the junction. At one time I took the City Engineer of Salt Lake City and some other men from Green River, Utah, to Moab and return in the Navajo. I took several other trips with the Navajo from Green River, Utah, to points near Moab, not going clear into Moab because these were hunting parties and our objective was hunting ground. On these trips we took all of our supplies along with us in the boat and all of these trips were for compensation. During those years I took supplies for compensation to persons at Townsite Bottoms. I frequently towed row boats loaded with supplies. I kept the Navajo in operation during those years for the profit there was in navigating the river and couldn't afford to take pleasure trips. I lived at my ranch all the year round and brought most of my supplies down the river from town in my boat, each year making many round trips. (R. 5349-53, Vol. 30.) After I took the four-horse power engine out of the Wilmont I had no trouble in negotiating any portion of the Green or Colorado river with that boat. At times during the first few years we touched sand bars but were off and on again without any serious difficulty; I don't think we were ever on a sand bar with the Wilmont more than three minutes. The only difficulty I ever encountered in operating the Navajo was when there was a sand roll in the stream and the waves would cause water containing sand to get in the water jacket. Aside from

that engine trouble, I recall no other difficulty of any character that we encountered during the years I was navigating with the Navajo. I have never been capsized by one of these waves and never knew of any one else being capsized, and I run those waves head on. When there is a flood driftwood appears on the river, but not at other times. Driftwood damaged my paddles when I was operating with a side wheel. Driftwood usually follows the main channel and you can dodge to one side of it. It never kept me off the river. (R. 5353-6, Vol. 30.) I have never found any great change in the channel of the Green or Colorado river between Green River, Utah, and Moab, except that when a flood came in from a side wash it would be hard to find a channel for a few hours. There was always a channel if you knew where to find it. Where there is a fall of 2.8 feet per mile the current is sufficient to wash away material brought in through side canyons within a few hours; at other points it may take a day or two for the channel to be cleaned again and back in its former condition. What I have just said holds true in Stillwater and in Labyrinth Canyon. After you have made your first trip through a place where material has been washed in from a side canyon you have no difficulty in finding the channel there on later trips, but you have to keep a sharp lookout. Usually the channel is well-defined and there are surface indications of its location. (R. 5356-9, Vol. 30.) Knowledge of the Green and Colorado rivers and boating experience upon them are very valuable aids in navigating those streams. (R. 5363, Vol. 30.) Eleven photographs marked "Defendant's Exhibits Nos. 32 to 32-J," both inclusive, are pictures along the stretches of water concerning which I have testified and of various boats and points of interest. One of them—Exhibit 32-C—is a picture of the Wilmont pushing a scow loaded with several tons of copper ore. (R. 5367-72, Vol. 30.) It is my conclusion that the Cliff Dwellers certainly made use of the river because their store houses are often placed in a canyon where there is no other method of approach and at points absolutely inaccessible except to boats on the river. At those points there are marks, or foot holds, up and down the canyon walls from their houses to the river. (R. 5374, Vol. 30.) I ceased carrying freight and passengers late in 1912 because I couldn't make it pay; by that I mean that we did not receive money that we considered compensation for our investment

and the effort involved; with the boats that we had and could afford to build we couldn't compete commercially with the short haul, for instance, from Green River to Moab. We spent no money for advertising or otherwise to attract tourists and had no capital for any such purpose. (R. 5387-9, Vol. 31.) I once came down the Green River in the Navajo with quite a heavy load on the occasion when the Valley City reservoir had gone out and the water in the stream had backed up fully 12 miles. When I returned two days later there was no sign of any debris in the river, which had cleaned itself out in the meantime. On another occasion when a flood came down Indian Creek the water backed up for five or six miles; however, there was a good channel on the west side and we went right through without any trouble. The two instances I have mentioned are the only instances I know of when either of the rivers were backed up. (R. 5391-3, Vol. 31.) In 1910 I saw a fall of many thousands of tons of rock at a point 10 or 12 miles below Green River, Utah, and I also saw a large fall of rock just below the junction; the occasion I first mentioned is the only occasion I know of when rock fell into the river; I don't think rock fell into the river on the other occasion, just below the junction. (R. 5418, Vol. 31.)

*George H. Dern, Governor of Utah*, testified: In April, 1926, I made a boat trip with Dave Rust and party from the mouth of Crescent Wash to Lees Ferry. I do not recall our encountering any sand bars or being delayed by sand bars on that trip and I observed no other difficulties or impediments to navigation on that stretch of water. A few days earlier I went from Moab to Shafer No. 1 Well on the Moab Garage Company barge and returned upstream the same afternoon on the smaller power boat. We encountered no delay or obstruction on either the down or upstream journey, everything going smoothly. (R. 5379-82, Vol. 31.) I have lived in Utah for 35 years, and for a considerable period I was a state senator, and since statehood have kept in intimate touch with the public affairs of Utah. I know of no work ever having been done by the state or by the federal government or any other agency in improving navigation on either the Green, Colorado or San Juan rivers. (R. 5384, Vol. 31.)

*Henry C. Tasker* testified: I am 35 years old, and lived at Green River, Utah, between 1911 and 1928. In

July or August, 1912, I made a motor boat trip with Mr. Wolverton to Townsite bottom for the purpose of looking over the country for use in the cattle business. My father paid Mr. Wolverton for this trip. We encountered no difficulties and got on no sand bars. (R. 5434-8, Vol. 31.) We maintained a camp at Townsite bottom for about three years, during which time I made another motor boat trip with Mr. A. I. Anderson with a boat load of supplies. Mr. Anderson was paid for the services rendered by him and his boat. During that period I borrowed a boat from Mr. Wheeler at his ranch five miles below Green River, Utah, and took supplies down to our camp in that boat and then rowed and poled the boat back upstream to the Wheeler Ranch. I recall encountering no sand bars or other difficulties on the downstream trip with Wheeler boat but going back upstream I got on a sand bar when attempting to take a short cut across a bend. On the motor boat trip with Mr. Anderson I don't remember encountering any sand bars. (R. 5438-40, Vol. 31.)

In 1921 I was with the Chenoeweth party on the survey that began at the junction of the Green and Colorado rivers. I started from Green River, Utah, with Messrs. LaRue and Page before the rest of the party. The three of us rowed in an 18-foot boat to the junction of the rivers. We left Green River about September 15th and after finishing our survey work arrived at Lees Ferry in December, 1921. (R. 5441-3, Vol. 31.) In making the topographic survey on which we were engaged I and the other rod man would take positions at designated points; sometimes one man was used on one side of the river and one on the other side; at other times we would criss-cross back and forth; most of the time each of the rod men had a boat and we would go from point to point in our boats. Sometimes when I didn't have a boat I have walked out into the river as far as I could wade and would swim the rest of the way. There were no sand bars in Cataract Canyon. From the foot of Cataract Canyon down to the Utah-Arizona line our boats were frequently stuck on sand bars and between Green River and the junction my boat would, of course, get stuck on a sand bar on the occasions when we landed. In going down the Green River, when we were traveling straight down the river with no intention of stopping, we struck no sand bars, but when landing we would hit a bar. I do not recall a single instance of striking a sand bar between Green River,

Utah, and the head of Cataract Canyon except when we had deliberately left the channel of the river. (R. 5443-7, Vol. 31.) Between the foot of Cataract Canyon and the Utah-Arizona line we were frequently stuck on sand bars, as were other boats being used by members of the survey party. If the chief would tell you to go and give him a shot from a certain point and you started to go over there you might get stuck on a bar; then he would come down to where you were and would possibly send the other rod man to the other side of the river and in going to the designated point the other man might or might not get stuck; it would all depend on where the channel was. Many times we could go right to the place we were sent without any difficulty, but at other times we would have to get out and wade. So far as I recall, my boat never got stuck on a sand bar or hit a sand bar on the entire stretch of the Colorado River, from the foot of Cataract Canyon to the Utah-Arizona line, while it was in the channel of the river, or at any time when I had not deliberately left what I knew to be the channel of the stream. I never saw any boat of any other member of our party get stuck on a sand bar while it was in the channel of the river. (R. 5447-9, Vol. 31.)

#### IMPEDIMENTS TO NAVIGATION.

In its brief Complainant refers to certain parts of the testimony of certain witnesses who told of difficulties encountered by them in traversing the rivers. There are variations in stream flow which occur each year during spring high water and later when heavy rains come. At different points on each stream there is rapid water and sand and gravel bars that may cause trouble to one unfamiliar with the channel. When a flood comes down a side canyon, carrying a substantial amount of material into the river, there may be a temporary change of channel at that point. But we contend that the overwhelming weight of the evidence is that even at such points any change of channel is only temporary.

With reference to bars encountered by members of survey parties in the course of their work on the rivers, it is obvious from the method necessarily employed by them in doing their work that they must frequently encounter bars on these or any rivers. When required to go to a certain

point they went there and would travel back and forth across the river and make frequent landings. The testimony above digested of Tasker and other witnesses for Defendant is fully corroborated by Complainant's witness Seitz, who was topographic engineer with the U. S. G. S. on the 1912 survey from Moab to the mouth of Green River. On his direct examination (R. 4022, Vol. 22), when asked to give his observations with reference to the channel of the river or with reference to sand bars, he stated that he did not make any observation with reference to them except "when we were pulling in shore and leaving shore." Mr. Chenoeweth, who was in charge of the 1921 survey from the mouth of Green River downstream, testified that he did not recall having any difficulty in getting the boats through the rapid water between Green River, Utah, and the mouth of the San Rafael, and that between the mouth of the San Rafael to the mouth of the Green River he recalled no difficulty with his boats either through Labyrinth Canyon or through Stillwater Canyon, and that he did not recall encountering any sand bars. (R. 3388, Vol. 21.) We have been unable to find any testimony on the part of Mr. Chenoeweth that he encountered any difficulty on account of sand bars or alleged unstable channel between the mouth of the Dirty Devil (Fremont River) and Hall's Crossing where his party was surveying in July and August, 1921.

The witnesses for Complainant and Defendant generally agree that, as to navigability, the Green River between its mouth and the mouth of the San Rafael and the Colorado River between Moab and the mouth of the Green and the Colorado River between the foot of Cataract Canyon and the Utah-Arizona line, are substantially the same; that is to say, one of said stretches of river is as readily navigable as either of the other stretches. There is, of course, more water in the lower Colorado, but it flows a little swifter. Complainant's witness Hoyt says that in his judgment it would be as easy to go up and down the Green River between its mouth and the San Rafael as to go up and down the Colorado between the mouth of the Green and Moab (R. 300, Vol. 2) although he says he encountered much more trouble with sand bars on the Colorado than on the Green. (R. 285, Vol. 2.) Shaw says (R. 3658, Vol. 20) that the difficulties of navigation on the Colorado between the mouth of the Green and Moab are similar "or possibly worse" than on the Green River. Richardson says (R. 3695-6, Vol. 20) that

the conditions on the two stretches of river last mentioned are essentially the same. Wimmer says (R. 4858, Vol. 27) that with his boat "Marguerite" there would be no difference in navigating up and down that stretch of the Colorado between the foot of Cataract Canyon and the Utah-Arizona line and the Green River between its mouth and the mouth of the San Rafael.

Frank Bennett and Louis M. Chaffin did more boating and rafting of freight on the lower Colorado River than any other of Complainant's witnesses. Bennett, who navigated the river throughout an aggregate period of more than twenty years, told of a very few isolated instances when he met with difficulty. Chaffin also testified concerning a few occasions when he met with some mishap or delay. The testimony of these two men concerning bars and channel on the lower Colorado is quite significant. With reference to the shifting of the bed or changing of channel in the Colorado River, Frank Bennett says: "After the river had settled down to low water or normal water, there is very little change, unless something in the way of some obstruction would come, might have a tendency to throw it on the other side." He then adds that such an obstruction would be an unusual occurrence. (R. 3235, Vol. 17.) Mr. Chaffin says that "after the river raised a foot or so, the effect on the bars didn't bother you, only to know where to go. There was room after the river raised, there was always room to get through these places if you knowed where to find them. After the spring raise commenced, always a channel." (R. 3305-6, Vol. 18.)

In recent years the channel of the San Juan River has been wide in the section between Bluff and the mouth of Chinle Creek; also at Piute Farms and in a lesser degree this is also true for a short stretch at Clay Hill Crossing and Zahn's Camp. Several of Complainant's witnesses (principally members of survey parties) have testified as to shallow depths and bars at those points where the river has spread out and its channel become braided. We recall no substantial evidence rebutting the testimony of witnesses for Defendant with reference to absence of sand bars and ample channel depths at points within the canyons even at low water. In considering the testimony of those witnesses for Complainant who say that they passed some point where, as the water flowed over a bar, there was a very shallow depth along the channel selected by them, it must be kept in mind

that the incident occurred when the stage of water was low. We recall no evidence that any such alleged depths or difficulties were or would have been encountered at any normal stage of the river. We have referred to the testimony of many witnesses for Defendant who have had occasion, either in boating or in fording, to observe stream depths during the low water season between Bluff and the mouth of the San Juan. None of them has ever observed such shallow depths as those described by some of Complainant's witnesses. K. D. Williams, who was chain man with the government survey party in charge of Mr. Moore in 1924-5, saw no section of the San Juan River where it was less than waist-deep in the channel, and he saw no difficulty in the boating operations. (R. 4332, Vol. 25.) Complainant's witness Raymond M. Priest, who was with the government survey party engaged in surveying the Bluff damsite and who had occasion to cross the river back and forth in the course of his work below Bluff and for a distance of some thirty or forty miles upstream from Bluff to the end of the reservoir site about September, 1914, says that where he crossed the stream its average depth was from twenty-four to thirty-six inches; that this was its depth at Bluff and that said depth "seemed uniform throughout the whole stretch of river we worked on;" that at said time "it was probably low water period, or nearly so." (R. 1836-8, Vol. 10). We recall no evidence being introduced tending to rebut the testimony of Defendant's witnesses that the shallowest place on the San Juan River is in the immediate vicinity of Bluff.

At page 85 of Complainant's Exhibit No. 63, being Water-Supply Paper 380, it is stated:

"The San Juan is a perennial stream. Along its upper course it receives the waters of vigorous tributaries which have their sources in the San Juan and La Plata mountains. Within the 90-mile stretch of winding channel from Bluff to Colorado River it receives no continuous supply of importance, but maintains a depth of 3 to 5 feet *even in the dry season.*"

In this connection we invite attention to certain *uncontradicted* evidence coming in part from the lips of Complainant's witnesses Kumen Jones, John Adams, Frank H. Hyde and Jens Nielsen, whose testimony on this subject is hereinbefore abstracted.

They say that when they arrived at Bluff in the '80s the San Juan River flowed in a confined, permanent channel between well-defined banks along which grew cottonwood trees, willows, etc.; that over a period of years two or three floods came and finally the present widening of the channel outside the canyon was accomplished. Mr. Hyde testified that he had personal knowledge of the cutting of timber on the water-shed of the San Juan and its tributaries and that this cutting, coupled with the destruction of underbrush, permitted a quick run-off and was the cause of the floods which destroyed the old channel outside the canyon. This testimony is also corroborated by the witness Loper who, as indicated in the abstract of his testimony hereinbefore given, says that when he was at Piute Farms in 1895, the river channel was only three or four hundred feet wide; whereas when he again saw the river at that place in 1921, its channel was thirty-three hundred feet wide. (R. 2323, Vol. 12.)

#### STREAM FLOW OF THE RIVERS.

As appears from the testimony of witnesses and as shown in Complainant's Exhibit No. 88, the following gauging stations have been maintained within the State of Utah on the three rivers here under consideration, to wit: near Bluff on the San Juan River during the period from November, 1914, to September, 1917, and during the period from March, 1927, to September, 1928; near Cisco on the Colorado River during the period from 1914 to 1917 and from 1923 to 1928; at Green River, Utah, on the Green River during the period from 1895 to 1897 and from 1905 to 1928. Gauge records at other gauging stations outside Utah, including the station at Green River, Wyoming, and the stations at Shiprock and Farmington, New Mexico, were received in evidence, but, we submit, throw no very great light upon the question of stream flow at the sections of the river here in controversy. Below Green River, Wyoming, many streams flow into the Green River; and below Farmington and Shiprock, New Mexico, many streams, including the Mancos River and McElmo Creek, flow into the San Juan. As early as 1913, 20,000 acres of land were irrigated from McElmo Creek and 10,000 acres from the Mancos River (Complainant's Exhibit No. 58, at page 121). In Water Supply Paper 249 (Complainant's Exhibit 66) after mentioning the Mancos



River and other tributaries of the San Juan, the following statement appears at page 153:

"The other tributaries of the San Juan need not here be described. Those mentioned are perennial streams, but much of their water is diverted for irrigation and never reaches the main river."

Especially during seasons of the year when the water of tributaries of the San Juan entering below Shiprock are not diverted for irrigation purposes, the gauge records at that point would seem to be of little value in determining stream flow at Bluff. We shall later refer to depletion of these rivers resulting from diversions for irrigation purposes.

There is no evidence indicating that the years during which the gauging stations have been maintained at Bluff, Cisco and Green River, Utah, respectively, were not fairly representative years and we shall therefore confine our references to the records at the Utah stations in discussing gaugings of stream flow.

#### *San Juan River.*

The statement appearing on page 68 of Complainant's brief that there was at one time a minimum daily discharge of only 199 second-feet at the Bluff station is supported by data appearing in said Exhibit 96 and also on page 43 of Complainant's Exhibit 56. It there appears that on one day, to wit, December 10, 1916, the gauging records at Bluff show a stream flow of 199 second-feet, the maximum flow for that month being 1130 second-feet, and the mean flow 669 second-feet. There were two days in September, 1915, when the daily stream flow was 380 second-feet and nine days when the daily stream flow ranged from 420 to 480 second-feet; there was one day in December, 1915, when the daily stream flow was 388 second-feet and seven days during that month when it ranged from 416 to 485 second-feet; during December, 1916, when the stream flow of 199 second-feet was recorded, there were two days when the stream flow was 204 second-feet and one day when it was 291 second-feet, two days when the flow was 350 second-feet and three days when the flow ranged from 410 to 471 second-feet; in January, 1917, there was one day when the stream flow was 350 second-feet, one day when it was 410 second-feet and two days when it was 471 second-feet; in August, 1928, there was one day when the stream flow was

320 second-feet and five days when the stream flow ranged from 428 to 499 second-feet; in September, 1928, there was one day when the stream flow was 395 second-feet and nine days when the stream flow ranged from 400 to 472 second-feet. On all other days throughout the aggregate period of four and a half years during which the gauging station has been maintained the minimum daily stream flow was in excess of 500 second-feet. Aside from the 48 days to which we have referred, *supra*, there have been only 97 days throughout the entire period when the minimum daily stream flow of the San Juan River at Bluff was not in excess of 700 second-feet. During more than two-thirds of that entire period the mean monthly flow of the San Juan River was in excess of 1400 second-feet. (Complainant's Exhibit No. 96.)

We note the statement appearing at the bottom of page 83 of Complainant's brief that the mean depth at the gauging station near Bluff "varies from less than one foot when the discharge is about 300 second-feet or less to between 10 and 11 feet with flood flows of 20,000 second-feet." In view of the fact that there have been only four days during all of the years that the Bluff gauging station has been maintained when the discharge of the stream was not in excess of 300 second-feet and only eight other days when its discharge was not in excess of 400 second-feet, it does not seem to us that the above quoted statement can be of any real aid to the Court in arriving at the actual facts.

On page 65 of the brief, Complainant states: "As shown on Plate 4, Exhibit 82-A, the velocity in the thread of the current" is 2 miles an hour at the "low-water stage" at the gauging station near Bluff. In view of the fact that there were only 142 days out of the entire four and one-half years during which gauging records have been taken at that station when the minimum daily stream flow did not exceed 700 second-feet, we may safely assume that 700 second-feet is a "low-water stage." If a stream flowing 700 second-feet of water were 700 feet wide and one foot deep from shore to shore, its rate of speed would, of course, be one foot per second. If such a stream were 233 $\frac{1}{4}$  feet wide and traveled at a rate of speed slightly in excess of 2 miles per hour it would be one foot deep from shore to shore. Obviously a stream could not have such uniform depth unless it were flowing in a flume or other artificial channel. Traversing the country in its natural state, one would reasonably expect

a channel depth as great as that given on page 85 of Complainant's Exhibit 63 (3 to 5 feet), even were its width from shore to shore twice or even three times 233 $\frac{1}{2}$  feet.

We submit that Complainant's own gauging records conclusively corroborate the testimony of Defendant's witnesses. They are further corroborated by the testimony of Raplec, Priest, Mendenhall and other of Complainant's witnesses, as well as by the statement of dry season depths appearing on page 85 of Complainant's Exhibit 63. We respectfully submit that if the testimony of certain witnesses who were with the 1921 survey party concerning shallow water at some points during a few days of extreme low water be given full credence, it is established by the overwhelming weight of the evidence that such depths and difficulties were very exceptional—even at extreme low water.

#### *Green River.*

It is true, as stated on page 66 of Complainant's brief, that at one time there was a minimum daily discharge at Green River, Utah, of 510 second-feet. This occurred on December 1, 1920. As appears from Complainant's Exhibit No. 88 there was one day in 1926, when the gauge record indicates a minimum flow of 600 second-feet; in 1909 there was one day when the Green River gage indicated a minimum flow of 750 second-feet; and one day in 1911 when that gauge indicated a stream flow of 770 second-feet. There was one day in 1910 when the gage record shows a minimum stream flow of 800 second-feet. Aside from the years just mentioned, there was not another day during all of the twenty-five years while the Green River, Utah, gaging station has been maintained when the minimum daily stream flow did not exceed 800 second-feet. Time and space do not permit us to here present a detailed statement of the comparatively few days on the Green River when its minimum daily stream flow was under 800 second-feet.

#### *Colorado River.*

As stated on page 67 of Complainant's brief, there was one occasion, to-wit, on September 4, 1924, when the minimum daily stream flow of the Colorado River at Cisco was 866 second-feet. As appears from Complainant's Exhibit No. 88 and other exhibits, there was no other year in the entire period during which the Cisco gaging station has been main-

tained when the minimum daily stream flow was less than 1460 second-feet.

As appears from the last mentioned exhibit, the gage at Lees Ferry showed a discharge of 1000 second-feet on December 27, 1924; on December 26, 1924, the flow was 1500 second-feet; and after December 27, gradually rose until it reached 1500 second-feet, the next day 2400 second-feet, and thereafter continued a steady rise. We recall no evidence which explains this extraordinary drop of the river during those few days of December, 1924. The minimum daily stream flow at Lees Ferry during any other year while that station has been maintained was 2290 second-feet.

#### STREAM DEPLETIONS CAUSED BY IRRIGATION.

The fact that the waters of these streams have been greatly depleted as a result of diversions for irrigation purposes is set forth in many of the official documents introduced in evidence by Complainant.

#### *San Juan River.*

A. L. Kroeger, a civil engineer, produced a map that was received in evidence and marked "Defendant's Exhibit No. 28." The heavy red line, including the areas colored brown, green and yellow, respectively, indicates the exterior boundaries of the water-shed of the San Juan and its tributaries. The area colored brown represents that section where the timber has been cut, the locations and dates of installation of the larger saw mills being there shown. The area colored green represents farm land irrigated by water from the San Juan and its tributaries. (R. 5156, Vol. 29.) There are approximately 782,000 acres of cut timber land in the areas colored brown and 160,000 acres of irrigated land in the areas colored green. (R. 5158-9, Vol. 29.) The location of said irrigated lands is shown with approximate accuracy on said map, the information as to acreage and location having been obtained by the witness from official records of the states of New Mexico and Colorado, copies of which records he had in his possession. (R. 5154-5, Vol. 29.) The amount of water required for each acre of said irrigated lands is approximately 3 acre-feet per year. (R. 5166, Vol. 29.) Expressed in terms of second-feet, one second-foot of water running for twenty-four hours equals approximately 2 acre-feet. (R. 5168, Vol.

29.) Accepting 3 acre-feet as the duty of water, the 160,000 acres require 480,000 acre-feet of water per year. Expressed in terms of second-feet, this would be the equivalent of 657 second-feet of water flowing continuously through a period of 365 days.

As appears in the two next succeeding sub-titles, the government engineers fix the duty of water on lands irrigated by the water of the Green and Colorado rivers above their confluence as 3.5 acre-feet and assume that twenty-five per cent of water diverted for irrigation purposes again finds its way back into the river. Assuming the duty of water on lands irrigated by the San Juan and its tributaries to be 3.5 acre-feet and making no allowance for return flow, the amount of water required each year to irrigate the 160,000 acres would be the equivalent of a daily stream containing 767 second-feet of water flowing continuously for three hundred sixty-five days; assuming a twenty-five per cent return flow, said land would require a continuous flow for three hundred sixty-five days of a stream containing 573 second-feet. If we assume the duty of water to be only 3 acre-feet on the San Juan lands and allow for a twenty-five per cent return flow, the amount of water required to irrigate the 160,000 acres of San Juan land would be the equivalent of a daily stream containing 493 second-feet of water flowing continuously for three hundred sixty-five days each year.

#### *Colorado River.*

As appears on pages 126-7 of Complainant's Exhibit No. 58 (Water-Supply Paper 395) 302,000 acres of Colorado land were, as early as 1913, irrigated with water from the Colorado River and its tributaries. We have not access to information concerning additional acreage thus irrigated since 1913, nor as to the acreage of Utah lands above Moab thus irrigated. On said last mentioned pages of said exhibit, in estimating depletions on account of irrigation, 3.5 acre-feet is given as the duty of water and it is estimated that there is a twenty-five per cent return flow. Accepting 3.5 acre-feet as the duty of water and allowing for a twenty-five per cent return flow, the flow of the Colorado River is each year depleted by reason of water diverted for irrigating said 302,000 acres of land in an amount equal to the continuous stream flow throughout three hundred sixty-five days of a stream at all times carrying 760 second-feet of water.

#### *Green River.*

On pages 134-5 of said Exhibit No. 58, it is stated that in 1913, there were 500,000 acres of land irrigated with water diverted from the Green River and its tributaries, above Green River, Utah. This, of course, includes acreage in Utah and Wyoming. We have not access to any data showing the amount of increase in irrigated lands and diversions of water since 1913. Again accepting the report's assumption of 3.5 acre-feet as the duty of water and allowing for a twenty-five per cent return flow, the flow of the Green River is each year depleted by reason of water diverted for irrigating said 500,000 acres of land in an amount equal to the continuous stream flow throughout three hundred sixty-five days of a stream at all times carrying 1258 second-feet of water.

At page 137 of said Exhibit No. 58, it is stated:

"In Utah, Colorado, and Wyoming, in the upper basin, water is diverted for irrigation during a more or less definite period commonly called 'the irrigation season,' which usually extends from April 1 to October 1; on the lower Colorado, though the rate of demand varies from month to month, there is no definite irrigation season, water being diverted for irrigation throughout the year."

#### DOCUMENTARY EVIDENCE AS TO NAVIGABILITY.

It is unfortunate that some man of the character and mental capacity of Mr. Dellenbaugh or Major Powell did not make boat journeys on the San Juan River similar to their expeditions on the Green and Colorado rivers and record their observations with reference to navigability. Statements recorded by such men, long before any controversy has arisen, would seem to be entitled to great weight. Although in the course of their journeys they proceeded in a leisurely manner, studying the adjacent country and making frequent landings, they were not, like the government survey parties of recent years, making surveys of the rivers and along the sides of the rivers which compelled them to continually cross back and forth and proceed to certain points regardless of difficulties and regardless of the location of the river channel. They were not, like Major Stanton, making a railroad survey or examin-

ing and locating bars in the stream or monumenting and fixing the corners of such mining locations. Generally speaking, they probably did their boating along portions of the river where obvious impediments to progress would be avoided.

In the report of Major Powell (Complainant's Exhibit No. 51) he describes, at pages 52-6, his journey from the mouth of the San Rafael to the mouth of the Green River. His party was on that stretch of river between July 14 and July 17, 1869. On pages 67-73 he describes his journey from the foot of Cataract Canyon to the mouth of the Paria below Lees Ferry, Arizona. He was on the last mentioned stretch of the river, making side trips, etc., between July 28 and August 4, 1869. Not a single mishap, danger, difficulty or navigation impediment is recorded on his journey from the mouth of the San Rafael to Lees Ferry except in Cataract Canyon. On the pages above indicated he frequently comments on the quiet water and pleasant nature of the journey. Speaking of the ride through Labyrinth Canyon he says, at page 54 of said exhibit:

"There is an exquisite charm in our ride today down this beautiful canyon."

Speaking of his journey through Stillwater Canyon on July 17 he says, at page 55:

"The stream is still quiet, and we glide along, through a strange, weird, grand region."

On July 31st (page 70) he speaks of the "cool, pleasant ride today" and of his arrival at the mouth of the San Juan. Through these pages he graphically describes the wonderful scenery and speaking of his journey after passing the mouth of the San Juan and as he continues down Glen Canyon, he says, at page 72:

"Past these towering monuments, past these mounded billows of orange sandstone, past these oak-studded glens, past these fern-decked alcoves, past these mural curves, we glide hour after hour, \* \* \*"

We have already referred to the testimony of Mr. Nims, who was with the Stanton party, and to excerpts written by him many years ago. With reference to the journey from Green River, Utah, to the mouth of the Green he said, in 1890:

"We had a pleasant sail down the Green of one hundred twenty miles, to its junction with the Grand, forming the Colorado."

(Complainant's Exhibit No. 177, at page 258 of Mr. Nims' article in "The Commonwealth," August, 1890, entitled "Through the Colorado River.")

On the same page of said article Mr. Nims records:

"In the beginning of Cataract Canon, we encountered our first real rapid \* \* \*"

"Here (at the head of Cataract Canyon) ended the 'picnic' part of our trip."

(Complainant's Exhibit No. 177, at page 74 of Mr. Nims' article "Profile Negatives Canned.")

"We now pushed out (from Tickaboo) and owing to the long stretches of smooth water, with very few rapids we arrived at Lees Ferry, one hundred fifty miles below \* \* \*"

(Complainant's Exhibit No. 177, at page 259 of Mr. Nims' article "Through Mysterious Canons of the Colorado.")

"From this point (mouth of Dirty Devil) to Lees Ferry, Arizona, one hundred fifty miles, the trip was uneventful."

(Complainant's Exhibit No. 177, at page 75 of Mr. Nims' article "Profile Negatives Canned.")

At pages 175-9 of Complainant's Exhibit No. 13 (The Romance of the Colorado River, by Frederick S. Dellenbaugh) appears a very entertaining recital of what is there denominated "White's Fiction." The author there refers to "yarns" told by Mr. White concerning the inaccessible depths of the canyon, White's alleged terrifying experiences as he and other members of his party "clung to the raft as it dashed against half-concealed rocks, or whirled about like a plaything in some eddy," White's tales of "foaming waters," etc. After reviewing in delightful fashion these wild stories of Mr. White, the author denominates them as "nonsense," and at page 179 of said Exhibit No. 13 adds:

"They were not yet, even taking their own, or rather his own, calculations, near the Grand Canyon, and the whole one hundred and fifty-nine miles of Glen

*Canyon are simply charming; altogether delightful. One can paddle along in any sort of craft, can leave the river in many places, and in general enjoy himself. I have been over the stretch twice, once at low water and again at high, so I speak from abundant experience."*

In view of the fact that the river through Glen Canyon is not wider than the Colorado River between Moab and the junction and, as we recall the evidence, not quite as wide as the Green River, and in view of the further fact that, although a little swifter through Glen Canyon, no great difference in gradient exists between that stretch and the stretch above the junction of the Green and Colorado, there can be little doubt that throughout Glen Canyon the river is as readily navigable as either the Green or the Colorado above Cataract Canyon. The history of navigation appearing in the record, as well as the testimony of witnesses, establishes this fact.

The report of the War Department (Defendant's Exhibit No. 18.) sets forth the careful investigation made by the Army engineers relative to the navigability of Green River from Green River, Utah, to its mouth and of the Colorado River from Moab to the mouth of the Green. The report is brief and the facts upon which the Army engineers base their conclusion are therein fully set forth. We readily concede that said conclusion is not as matter of law controlling in this case but submit that it is entitled to great weight. The sole purpose of that survey was to determine the question of navigability, and we know of no other government report or survey for such purpose except such as have been made for purposes of this litigation. Although the expressed conclusion of the Army engineers may not be deemed controlling, we contend that the indisputable facts appearing in their report establish as matter of law the soundness of their conclusion that those sections of the river covered by their report are navigable waters of the State of Utah.

#### CHARACTERISTICS OF THE COUNTRY TRAVERSED BY THE RIVERS.

During the course of the trial we stated our contention that it is wholly immaterial, so far as the question of navigability is concerned, whether the country traversed by a

river is new, undeveloped and sparsely populated or thickly populated. It is equally immaterial whether the adjacent country is capable of supporting a large or a small population. The nature and extent of public rights are not determined by the "size" of the public. Utah was admitted into the Union on an equality with the original States, and Utah rivers of navigable capacity are no less navigable in law, than are New York rivers of navigable capacity.

The eastern and southeastern portions of Utah are more undeveloped and sparsely settled than most other sections of the State, although the 1920 census shows that only 449,396 people then lived on its 84,990 square miles. It is reasonable to assume that there will be future growth in wealth, industry, commerce and population.

It is probably a generally accepted fact that today more acres are under cultivation by the farmers of America than are necessary to produce sufficient crops to supply existing demands. Just how long this condition will continue can, of course, not be foretold, but we are not entering the realm of speculation when we say that at some future time vast areas of land now used only for grazing in eastern and southeastern Utah will be farmed. Evidence of silver, copper, gold, vanadium, uranium, manganese and other mineralization in sections adjacent to these rivers is in the record. The evidence discloses the existence of coal veins in certain sections near areas in dispute. Extensive forests are found on Elk Ridge and in the LaSal, Blue and Henry Mountains. From testimony hereinbefore abstracted it appears that great quantities of "flour" gold are in the bars of the Colorado and San Juan Rivers. No process has yet been discovered for obtaining satisfactory results in extracting and saving gold in this form. In the Bill of Complaint herein it is alleged in subdivision numbered VI. that deposits of oil and gas have been discovered within portions of the riparian lands and extending to and under the river beds here in controversy.

Among the witnesses testifying concerning the potentialities of this section of Utah in agriculture, mining and other respects are Albert R. Lyman (R. 4365-71, Vol. 25); A. S. Woods (R. 4411-22, Vol. 25); E. T. Wolverton (R. 5328-30, 5342-4, 5363-4, Vol. 30; R. 5395-7, Vol. 31); Horace W. Sheley (R. 5451-66, Vol. 31); F. W. Keller (R. 5467-75, Vol. 31); T. G. Wimmer (R. 4807-8, Vol. 27); and Governor George H. Dern (R. 5385-6, Vol. 31).

Governor George H. Dern testified (R. 5385-G, Vol. 31) that he has visited many of the scenic sections of the West to which tourists go in great numbers, including Zion National Park, Bryce's Canyon National Park, Grand Canyon, Rocky Mountain National Park, Yellowstone National Park, and says that the section of the Colorado River below Moab and also the stretch of river between Crescent Wash and Lees Ferry is "an outstanding piece of natural scenery, and if it were developed so it would be easy and convenient for people to make the trip it would be a very popular and attractive trip;" that he makes this statement having in mind the other scenic sections of the West to which he refers. This testimony of Governor Dern is fully corroborated by Mr. Dellenbaugh in his books that were received in evidence and by other witnesses in the case. Other evidence confirms the fact that the Green River along the stretch in controversy is quite as wonderful in scenery as is the Colorado River. There is no reasonable doubt that in the not far distant future tourists in great numbers from all sections of the country will visit these rivers and, except in Cataract Canyon, will travel in boats up and down the entire stretches of river in dispute. We contend that such use of the rivers, even if their use in carrying supplies and other freight between different points which would necessarily be incident to the handling of tourists were excluded, will constitute commerce, and a "useful" commerce, within the meaning of the decisions of the United States Supreme Court.

The very nature of a large portion of the country immediately adjacent to the stretches of river here involved makes their navigation not only convenient and desirable but absolutely necessary. Miners and oil men have always used them in the past and will always use them in the future. The rivers are the only highways available to man or left by nature along practically all of the stretches in dispute.

#### CASES CITED BY COMPLAINANT AND OTHER CASES DEALING WITH "NAVIGABILITY."

Although in its brief Complainant does not cite every decision of the United States Supreme Court in which the question of navigability was considered and many decisions of other federal courts involving that subject are omitted, the Supreme Court cases which are of most aid and which

will doubtless be deemed controlling in the case at bar are there referred to.

We see no ambiguity in or conflict between the Supreme Court decisions, and as we read the cases cited by Complainant we find no support for its contentions here.

In *Cohens v. Virginia*, 6 Wheaton 264, Mr. Chief Justice John Marshall says at pages 399-400:

"It is a maxim not to be disregarded that general expressions, in every opinion, are to be taken in connection with the case in which those expressions are used. If they go beyond the case, they may be respected, but ought not to control the judgment in a subsequent suit when the very point is presented for decision. The reason of this maxim is obvious. The question actually before the court is investigated with care, and considered in its full extent. Other principles which may serve to illustrate it, are considered in their relation to the case decided, but their possible bearing on all other cases is seldom completely investigated."

As we shall endeavor to show, the above quoted injunction has been ignored by Complainant in its analysis of the cases.

Before proceeding to discuss Complainant's cases we will refer to one other matter. Although the digest of the testimony of certain witnesses appearing in the Appendix to Complainant's brief does not greatly concern us, we cannot conceive upon what principle of law or procedure such Appendix is presented.

In *Utah Consol. Mining Co. v. Utah Apex Mining Co.*, 285 Fed. 249 (8th C. C. A.), where appellant sought to bring to the attention of the Court facts that had been detailed by witnesses in the so-called Lawson case, in which the nature of the same limestone bed in controversy had been adjudicated, the Court said at page 256:

"Every opinion must be read in connection with all that is said in it, and the controlling principles of law which it announces are applied to the facts found within its four corners. In no other way is it an authority than on facts analogous to those found in it. As said in *Carroll v. Lessee of Carroll*, 16 How.

275, 287 (14 L. Ed. 936): 'Its weight of reason must depend on what it contains.' *Moriarty v. City of New York*, 132 App. Div. 10, 116 N. Y. Supp. 323; *Yoders v. Township*, 172 Pa. St. 447, 33 At. 1019, 51 Am. St. Rep. 750. We must accept the facts recited in the opinion in the Lawson Case—they were accepted by the Supreme Court, 207 U. S. 1, 28 Sup. Ct. 15, 52 L. Ed. 65, as the premise from which the conclusion there reached was drawn."

In his opening statement the able counsel for Complainant briefly mentioned the case of *Oklahoma v. Texas*, 258 U. S. 574, but the only decision from which he quoted was *Harrison v. Fite*, 148 Fed. 781. From the beginning it has appeared that Complainant's case is built around certain general language employed by Judge Hook in that case. We shall therefore begin with that case and endeavor to analyze its real meaning.

In *Harrison et al., v. Fite, et al.*, 148 Fed. 781, Complainants as officers and trustees of a voluntary association known as the "Big Lake Shooting Club," asked for an injunction restraining defendants, most of whom were averred to be market hunters and fishermen, from trespassing upon what was alleged to be the property of the Club. It was admitted that complainants as trustees for their Club held title to the riparian lands abutting on the meander line of what was known as "Big Lake." Their deeds also purported to convey to them as accretions the lands lying within the lines to the thread of Little River. Defendants claimed that Big Lake was a part of Little River and contained various navigable channels, and that Little River was a navigable stream. In the very first paragraph of the opinion, as a premise of the decision that follows, Judge Hook announces (page 783) that whether waters are navigable or unnavigable "the question whether the title to the soil under the waters passes to the grantee of the shore land is determined by the law of the state where the land lies." It has not been our understanding that Complainant desires to have the foregoing statement of the law applied in the case at bar.

In the second paragraph of the opinion he states that in Arkansas, where Big Lake was located, "a riparian owner takes all accretions, whether the water course be navigable

or not." He then cites Arkansas cases in support of the proposition that although title to the bed of a navigable stream in Arkansas is in the state, the bed "does not extend to or include that upon which *grasses, shrubs, and trees* grow, though covered by the great annual rises."

At page 785, after referring to the conflicting evidence relative to alleged former navigation of Big Lake, Judge Hook says:

"Whatever may have once been the capacity and utility of the body of water known as 'Big Lake' as a highway of commerce or in the floatage of the products of the fields and forests along its banks, *the conditions that are to be considered are those of recent years and the present.*"

The law of Arkansas as announced in the last quoted language is, of course, in irreconcilable conflict with the decisions of the United States Supreme Court in the *Economy Light and Power Company* and *Holt State Bank* cases.

At page 786, after stating that "During the greater part of the year the bed of the lake appears to view, excepting where the deeper depressions allow the waters to stand in scattered pools;" that extensive *fields of grass* are present upon which livestock run for several months of the year; that vehicles are driven over the dry bed and roads over the bed are worked on by citizens; that *dead trees and stumps* still show the effects of a fire that ravaged the lake basin more than thirty years ago, the Court (obviously having in mind the law of Arkansas as to what constitutes the bed of a body of water and the law of that state with reference to accretions) says:

"The evidence fully justifies the finding that that part of the area indicated upon the maps and exhibits as being the bed of Big Lake, which extends from the eastern meandered line westward to the east line of Little river, has *by process of accretion and the reliction of the waters, become a part of the patented lands* along the eastern margin."

From the facts assumed by Judge Hook in arriving at his conclusion, it is apparent that if Big Lake was navigable during any period of the year its *susceptibility* to such navigation was only *occasional*.



It is true that this case has been cited once, and so far as we have been able to discover once only, by the Supreme Court of the United States. In *Oklahoma v. Texas*, 258 U. S. 574, it is cited in a footnote at the bottom of page 591 for the proposition that to be navigable a stream must be either used or susceptible of being used as a highway for commerce and that if such use or susceptibility for such use is "exceptional, and confined to the irregular and short periods of temporary high water" it is not navigable in law.

In *Harrison v. Fite*, supra, as in two or three other cases relied upon by Complainant, the fact that there was no "public" terminus within the area in controversy was doubtless considered to be an additional reason for denying navigability. We find great conflict in state court decisions as to whether or not the existence of such public terminus is essential. We do not believe the Supreme Court of the United States has ever passed on that question and, so far as we have been able to find, Complainant has cited all federal court decisions, except one, in which the existence or non-existence of a public terminus, as a factor in arriving at navigability in law, has been considered. In *Harrison v. Fite* complainant owned the riparian land. Judge Hook there says, "To be navigable a water course must have a useful capacity as a public highway of transportation," and that in order to subject water to a "public" servitude mere depth of water or the fact that there might be pleasure boating thereon or that hunters or fishermen might float their skiffs or canoes thereon is not sufficient.

In *North American Dredging Co. v. Mintzer*, 245 Fed. 297, plaintiffs sought to restrain the Dredging Company from operating a dredge and removing dirt through their land. It appears that about 500 acres of salt marsh or tideland had been acquired by plaintiffs' grandfather by grant from those holding title under the state Tideland Act. When title to this marsh land was acquired and for years thereafter, it was used largely for farming and grazing. Years before, plaintiffs' grandfather had built a dike to keep out the tide and render the land more available for pasturage. After 1901 this dike was permitted to become out of repair and sea water flooded the land at high tide. However, there was a channel "varying with the tide from 2 feet or less at low tide in its shallowest parts" to 7 or 8 feet at flood. The Standard Oil Company acquired by grant a part of this

500 acres and in order to reach their premises wished to deepen this channel so that it could be navigated. At page 300 the Court says:

"The court found that it was only after the Oil Company had established its works that any effort was made to navigate the channel by craft or burden; that occasionally power boats and scows of light draft have been taken up through San Pablo creek into the channel involved, on the flood tide, but that it was impracticable to put the channel to such use without deepening it for the purpose."

It thus appears that the public had no interest or concern whatsoever in this small channel which the Oil Company desired to improve and make navigable for its own purposes, and no terminus there existed to which the public would have the right to go or where they would have a right to land without being guilty of trespass. In the lower court (242 Fed. 553) District Judge Van Fleet called attention to the fact that the legal title to the land in question "including the soil under the channel itself," which the Oil Company demanded the right to remove, was in plaintiffs and that defendant had not challenged such title; that title had come to plaintiffs grandfather in the early 70's by grant from former owners under state patent. At page 559 Judge Van Fleet says:

"This is largely a question of fact, to be determined from the character of the stream, its situation and availability as a highway of commerce, and the other surrounding circumstances affecting the question."

In *Toledo Liberal Shooting Co. et al. v. Erie Shooting Club*, 90 Fed. 680, it appeared that appellee had leased from the owners between 3000 and 4000 acres of land for the purpose of using it as hunting ground. This area included a marshy body of water called Maumee Bay and a considerable part of its shore land. Appellant leased from the owners a comparatively small acreage completely surrounded by the lands leased to appellee. In the court below appellee had obtained an injunction restraining appellant from trespassing upon land covered by appellee's lease. Appellant contended that Maumee Bay was navigable, and among other witnesses doubtless produced the witnesses

whose testimony is abstracted on page 220 of the Appendix to Complainant's brief. Here, as in the Mintzer case, the Court gave consideration to the fact that this land had been conveyed to the state of Michigan as swamp land and the state in turn had conveyed it to individuals. At page 682 of the opinion it appears that in places there was a depth of 3 feet but there were large areas where the depth was only 12 inches deep except on unusual occasions. It was a natural feeding ground for duck and other water fowl and was not a "highway, never has been, and can never be." Particular stress is placed upon the fact that it could not be used by the public. Here again we find a situation where there is no terminus to which the public have the right to go. At page 682 the court says:

"It is nothing more or less than a marsh opening into the lake. To be navigable in law, it must be navigable in fact; that is, capable of being used by the public as a highway for the transportation of commerce."

In *Manigault v. S. M. Ward & Co. et al.*, 123 Fed. 707, which case is not cited by Complainant, the Court says at page 713:

"In order to make a stream navigable by the public, it is not enough that it is floatable—that is, capable of floating vessels or other craft. It must be a public highway. To be a public highway, it must have a terminus, a quo the public can enter it, and a terminus ad quem they can leave it."

In calling attention to the last cited case we do not wish to be understood as contending for the doctrine there announced. As already stated, there is a conflict in the authorities with respect to that doctrine and it is immaterial in the case at bar. We merely refer to it as an apt statement of a doctrine which obviously influenced the Court in each of the above cases relied upon by Complainant.

In *Gulf & I. Ry. Co. of Texas et al. v. Davis et al.*, 26 Fed (2d) 930, it appeared that a bridge across Mud Bayou had been constructed and maintained by the plaintiff railroad companies since 1896. It was a part of the plan of construction of the Intercoastal Waterway that the proposed

canal would cross Mud Bayou at the point where this railroad bridge was located. The railroad companies refused to comply with the order of the Secretary of War and sought an injunction against the frequent prosecutions that would follow such disobedience. The question involved was not whether Mud Bayou was navigable but whether it was "navigable water of the United States." At page 932 the court says:

"The whole country from Mud Lake to the mouth of the bayou is nothing but a marsh, entirely uninhabited, providing no article of commerce, and fit for nothing but the pasturage of cattle. Mud Bayou from its source down to its mouth is nothing but a mere drain for the marsh. The entire course of Mud Bayou lies wholly within the state of Texas. It is not in any way or manner, nor has it ever been, nor in all probability will it ever be, an avenue of interstate or foreign commerce, because there has never been any interstate or foreign commerce carried on or to be carried over it, and in the absence of some changes in its condition, or in the condition of the surrounding country, it will never be."

It was admitted by plaintiffs that it would be possible for light draft boats to navigate Mud Bayou, but from all of the facts and circumstances appearing in the case it was obvious that there was no reasonable probability of such navigation. Under the evidence in the case at bar the question whether, in order to meet the criterion of intrastate navigability, there must be either a history of former or present navigation or evidence of probable future navigation seems to us to be purely an academic question. However, Chief Justice Marshall's admonition should be kept in mind when reading the opinion of the Court in *Gulf & I. Ry. Co. v. Davis*. As already stated, the question, before the Court was whether Mud Bayou was "navigable water of the United States." Immediately following the excerpt from the opinion quoted on pages 148-9 of Complainant's brief, attention is directed to the fact that the power of Congress arises under the commerce clause of the Constitution; "it springs as an incident to the general power to regulate commerce, and being incidental springs, and only springs, in aid of commerce past, present, or actively potential." (p. 933.) We will later advert to this question in

discussing other cases where the Supreme Court of the United States points out that in determining what constitutes "navigable water of the United States" a line must be drawn at some point; that merely because a small boat might be able to travel from a creek or marsh through a shallow channel into a great river such creek or marsh does not have the status of "navigable water of the United States."

*Davis et al. v. Gulf & I. Ry. Co. of Texas et al.*, 31 Fed. (2d) 109, merely affirms the decision of the court below and refers to no fact or principle not mentioned above in our discussion of the trial court's opinion.

In *Leovy v. United States*, 177 U. S. 621, it appears that appellant was convicted in the trial court of unlawfully building a dam across a stream known as Red Pass without the consent of the Secretary of War. Here again the question before the Court was not whether Red Pass was navigable in intrastate commerce but whether it was "navigable water of the United States." Under the Act of March 2, 1849, Congress granted to Louisiana all swamp and overflowed lands found to be unfit for cultivation, the purpose of this grant being to aid that state in constructing necessary levees and drains to reclaim such lands. The Court (p. 626) arrives at the conclusion that the dam in question was "constructed under the police power of the State and within the terms and purpose of the grant by Congress." The Court says at page 627:

"It is conceded that Red Pass is not a natural stream, but is in the nature of a crevasse, caused by the overflow of water from the Mississippi River. This crevasse seems to have been formed some time before the grant by the United States to Louisiana, and the fact that by this and similar breaks through the banks of the river large tracts of land were rendered worthless, was, it may be assumed, well known to Congress, and was, indeed, the actuating cause of the grant.

"As respects navigation through Red Pass, there was some evidence, on the part of the government, that small luggers or yawls, chiefly used by fishermen to carry oysters to and from their beds, sometimes went through this pass; but it was not shown that passengers were ever carried through it, or that

freight destined to any other State than Louisiana, or, indeed, destined for any market in Louisiana, was ever, much less habitually, carried through it."

At page 632 the Court says:

"While, therefore, it may not be easy for a court to define the size and character of a stream which would place it within the category of 'navigable waters of the United States,' or to define what traffic shall constitute 'commerce among the States,' so as to make such questions sheer matters of law, yet, in construing the legislation involved in the case before us, we may be permitted to see that it was not the intention of Congress to interfere with or prevent the exercise by the State of Louisiana of its power to reclaim swamp and overflowed lands by regulating and controlling the current of small streams not used habitually as arteries of interstate commerce."

After quoting from instructions wherein the trial court charged the jury that if Red Pass was navigable and connected with waters that permitted a journey to another State it was "navigable waters of the United States," the Court says at page 633:

"If these instructions were correct, then there is scarcely a creek or stream in the entire country which is not a *navigable water of the United States*. Nearly all the streams on which a skiff or small lugger can float discharge themselves into other streams or waters flowing into a river which traverses more than one State, and the mere capacity to pass in a boat of any size, however small, from one stream or rivulet to another, the jury is informed, is sufficient to constitute a navigable water of the United States."

At page 634 the Court says:

"A few fishermen testified that they occasionally went through this pass with small vessels, carrying oysters for planting, and one or two cargoes of willows and timber were spoken of. *None of these witnesses pretended to have carried produce or oysters out of the State.*"

In *Leovy v. United States*, supra, the Court does not hold that Red Pass was not navigable water of the State of Louisiana.

In *Brewer-Elliott Oil & Gas Co. et al. v. United States et al.*, 260 U. S. 77, the Court, after stating at page 86 its well settled rule that a river is navigable when used or susceptible of being used in its ordinary condition as a highway for commerce over which trade and travel are or may be conducted in the customary modes of trade and travel on water and that the mode or craft employed in conducting that commerce is immaterial, disposes of the question of the navigability of that stretch of the Arkansas River in controversy by saying that it will not disturb the finding of the two lower courts with reference to that fact. It then calls attention to the express grant made to the Osage Indians long before Oklahoma became a state, in which grant that portion of the bed of the river in controversy was clearly and unambiguously conveyed to said grantee, and announces its conclusion that a title thus vested cannot be destroyed by later action on the part of Oklahoma. The facts with reference to navigability are set forth in the opinion of the trial court and will be referred to in the next succeeding paragraph.

In *United States v. Brewer-Elliott Oil & Gas Co. et al.*, 249 Fed. 609, various excerpts from testimony and evidence are recited at pages 617-623. The area in dispute was above Grand River in Oklahoma. Gen. Sibert testified (p. 621.) *that he found no record "of commerce above Grand River,"* although he said *"there was an account of one or two boats going above it."* It appeared from a report received in evidence and dated February, 1879, that from Wichita to Ft. Smith the river had a navigable depth for the first 70 miles of 6 inches and for the remainder of the distance a depth of 12 inches "with a channel much obstructed by snags." Another report dated 1881 described "difficulties indicative of non-navigable conditions." In 1884 a survey of the river was made from Wichita to Grand River and the report stated that "no portion was or had been considered navigable, and that the mouth of the Grand River was considered the head of navigation, commerce for 40 miles below being practically nil, adding that a small boat of light draft had made the trip from Little Rock to Arkansas City on the crest of a short rise carrying no freight of consequence, and of no

practical benefit in demonstrating navigability." In this report the opinion was expressed that the river could be made navigable by dams, dikes and confined channels, ranging from 200 to 500 feet in different sections. In March, 1888, a permanent Board of Engineers on improvement of the river from Wichita to the mouth of the Canadian River reported that the commerce over that section is and always has been practically nothing, estimated the cost by contraction works of a navigable depth of two feet at low water as exceeding their value, expressed grave doubts as to maintaining it, and designated movable dams or a canal as a proper means of obtaining steady navigation, if justifying the expense. In 1891 another report was made, stating that a dependable two foot channel could not be obtained except in April or probably May or June.

In its opinion the trial court says at page 623: "The use of that portion of the river for transportation boats has been *exceptional and necessarily on high water*, was found impracticable, and was abandoned. The rafting of logs or freight has been attended with difficulties precluding utility. There was no practical susceptibility to use as a highway of trade or travel."

In *Brewer-Elliott Oil & Gas Co. et al. v. United States et al.*, 270 Fed. 100, the Eighth Circuit Court of Appeals makes only a meager statement of facts but refers to the opinion of the trial court (reviewed in the next preceding paragraphs of this brief) for such statement.

In *United States v. Rio Grande Dam and Irrigation Co.*, 174 U. S. 690, the government sought to restrain defendant from constructing a dam across the Rio Grande River. The U. S. Supreme Court decision does not contain a very full statement of the facts with reference to navigability but those facts are quite fully recited at pages 675-676 of the opinion of the Supreme Court of New Mexico found in 51 Pac. 674. From the opinion of that Court it appears that as the Rio Grande traverses New Mexico, it spreads out over a wide area, over fine, light, sandy soil of great depth; that it is shallow; that bars continually form, pass away and reform, and that the quicksands in the bed of the stream and along its margin are perilous to life; that through that territory the fall of the river is from 4 to 52 feet to the mile, and that the changes in its course are rapid, continual and often radical; that "in all the period of time only two in-

stances were shown when the river was actually utilized for the conveyance of merchandise, and each of those instances were of timbers," one such occasion being in 1858 or 1859, when a raft was sent down from Canutillo to El Paso, a distance of 12 miles, and the other more recently when some telegraph poles were floated from LaJoya, a "short distance." The government reports of exploration of the river for the special purpose of considering its navigability disclose that "The stream is not now navigable, and it cannot be made so by open channel improvement." Another report to the Secretary of War held "the construction, not only of an open river channel, but of any navigable channel, to be impracticable." Upon the facts presented the Supreme Court of New Mexico arrived at the conclusion that the portion of the stream in controversy was not navigable and dismissed the bill.

On appeal the U. S. Supreme Court agreed with the conclusion of the Supreme Court of New Mexico with reference to navigability of the portion of the Rio Grande involved in the action, but reversed and remanded the case, with instructions to make inquiry into the question whether the intended acts of defendants would substantially diminish the navigability of the stream within the limits of present navigation, and if so, to enter a decree restraining those acts to the extent that they would so diminish navigability. The U. S. Supreme Court held (p. 698) that the "Rio Grande, speaking generally, is a navigable river;" that its navigability is a matter of common knowledge of which the courts may take judicial notice but that the courts are not presumed to know how far upstream its navigability extends. The Court observes that the mere fact that logs, poles and rafts might "occasionally" be floated down the stream in times of high water does not make it a navigable river. At page 699 the Court further says:

"Obviously, the Rio Grande within the limits of New Mexico is not a stream over which in its ordinary condition trade and travel can be conducted in the customary modes of trade and travel on water. Its use for any purposes of transportation has been and is exceptional, and only in times of temporary high water. The ordinary flow of water is insufficient."

In *Oklahoma v. Texas*, 258 U. S. 574, Oklahoma claimed

title to the entire bed of Red River; Texas claimed the southerly half; and the United States, which intervened in the action, disputed the claims of both States, asserting full proprietorship of the southerly half and, in behalf of certain Indian allottees, claiming an interest in portions of the northerly half. We will confine our examination of the case to those facts and statements of law which bear on the question of navigability.

Apparently there was considerable evidence as to navigability which the Court did not feel inclined to accept at its face value. Speaking of the evidence on that question the Court says at pages 586-7:

"The evidence bearing on this question is voluminous and in some respects conflicting. A large part of it deals directly with the physical characteristics of the river, comes from informed sources and is well in point. A small part consists of statements found in early publications, and repeated in some later ones, to the effect that the river is navigable for great distances—some of them exceeding its entire length. These statements originated at a time when there were no reliable data on the subject, and were subsequently accepted and repeated without much concern for their accuracy. Of course, they and their repetition must yield to the actual situation as learned in recent years. The evidence also discloses an occasional tendency to emphasize the exceptional conditions in times of temporary high water and to disregard the ordinary conditions prevailing throughout the greater part of the year. With this explanatory comment, we turn to the facts which we think the evidence establishes when it is all duly considered."

With reference to the characteristics of the river in the western half of the State the Court concludes from the evidence that "only for short intervals, when the rainfall is running off" was there sufficient depth of water for "even very small boats," such rises as would permit of the operation of very small boats usually lasting only "from one to seven days" and in the aggregate seldom cover as much as forty days in a year." (p. 587.) At page 588 the Court concludes its observations with reference to the river in the western half of the State with the following comment:

"We regard it as obvious that in the western half of the State the river is not susceptible of being used in its natural and ordinary condition as a highway for commerce; *and there is no evidence that in fact it ever was so used. That section embraces the receivership area.*"

Directing its attention to that portion of the river in the eastern half of Oklahoma, the Court says (p. 589) that, although light draft boats during one period carried merchandise upstream to the mouth of the Kiamitia and other points in that vicinity and took out cotton and other products on the return trip, such boat trips "*occurred only in periods of high water, and was accomplished under difficulties.*" It then adds that in "very exceptional instances boats went to the mouth of the Washita, where some had to await the highwater of the next season before they could return."

At page 590 the Court refers to appropriations made by Congress in 1886, looking toward the making of a navigable channel, and to the fact that the officer in charge of the work "several times recommended that it be discontinued, because not likely to result in any commercial navigation; and in 1916 that officer, the division engineer, the Board of Engineers and the Chief of Engineers concurred in recommending that the project be entirely abandoned, their reasons being that the small (high-water) commerce of an earlier period had disappeared; that the characteristics of the river rendered it impracticable to secure a useful channel except by canalization, the cost of which would be prohibitive; that the expenditures already made were practically useless, and that there was no reason to believe conditions would change in such way as to bring better results in the future."

At page 591, the Court concludes its observations with reference to the navigability of the river in the eastern half of the State as follows:

"While the evidence relating to the part of the river in the eastern half of the State is not so conclusive against navigability as that relating to the western section, we think it establishes that trade and travel neither do nor can move over that part of the river, in its natural and ordinary condition, according to the modes of trade and travel customary on

water; in other words, *that it is neither used, nor susceptible of being used, in its natural and ordinary condition as a highway for commerce. Its characteristics are such that its use for transportation has been and must be exceptional, and confined to the irregular and short periods of temporary high water. A greater capacity for practical and beneficial use in commerce is essential to establish navigability.*"

In *The Daniel Ball*, 10 Wall. 557, no contention was made that the river there involved, to wit, Grand River, was not navigable in fact. The steamboat Daniel Ball had a draft of two feet and it was stipulated between the parties that it was actually employed in navigating Grand River between Grand Rapids and Grand Haven, Michigan. The boat had not been inspected or licensed, and the United States filed a libel to recover the penalty fixed in the federal statute. The owners of the boat urged in defense that Grand River was not navigable water of the United States, that the boat was not engaged in trade or commerce between two or more states and hence was not subject to the federal navigation laws. Because Grand River was susceptible of being navigated in interstate commerce, the decree of the lower Court imposing the penalty demanded for non-compliance with the federal Act was affirmed.

In *The Montello*, 20 Wall. 430, the government libeled the Montello for non-compliance with certain provisions of the federal statute. In that case it was contended by defendants that Fox River was not a navigable stream, and also that it was not navigable in interstate commerce.

As appears from the report of this case, the Wisconsin River flowed through Portage City at a point something less than two miles from Fox River. Merchandise coming from the headwaters of the Mississippi would be portaged over this two-mile stretch from the Wisconsin to the Fox River and thence to Lake Michigan. In its natural state, there were falls and rapids at various points in the Fox River; below certain rapids known as the De Pere, the navigation was especially difficult. There were many other similar though less difficult places. Notwithstanding these difficulties, the stream had from early times been used as a channel of commerce. In the early days long, narrow boats had been used, drawing two to two and one-half feet of water,

"which men would push with poles or propel by oars, or have dragged by horses and mules; sometimes, in very shallow water, wading alongside and pushing the boats onward themselves. At places where progress on the stream was impracticable the vessel would be unloaded and a 'portage' made, till the navigator had got beyond the difficult place, and then a reshipment would be made of the merchandise into some other boat beyond, or into the same boat, which unloaded, and drawing less water than before, could be got across the place that in a loaded state had stopped it."

After referring to the fact that the impediments to navigation, which existed when the river was in its natural state, had been "removed by artificial navigation," so that freight and passengers are now easily transported in boats over the river, the court says, at page 440:

"It is said, however, that although the Fox River may now be considered a highway for commerce, over which trade and travel are, or may be, conducted in the ordinary modes of trade and travel on water, it was not so in its natural state, and, therefore, is not a navigable water of the United States within the purview of the decisions referred to."

The Court then refers to the fact that, notwithstanding the difficulties encountered in navigating the river in its natural state, it had actually been used for commerce, and says that "capability of use by the public for purposes of transportation and commerce affords the true criterion of the navigability of a river, rather than the *extent* and *manner* of that use." A more complete excerpt from the opinion of the Court in this case has already been quoted.

At page 442 of the opinion in *The Montello*, the Court quotes the language of Chief Justice Shaw in *Rowe et al. v. The Granite Bridge Corporation*, 21 Pickering 344, wherein Chief Justice Shaw said that it is not "every small creek in which a fishing skiff or gunning canoe can be made to float at high water which is deemed navigable, but, in order to give it the character of a navigable stream, it must be generally and commonly useful to some purpose of trade or agriculture." In a later Massachusetts case, to wit, *Attorney General v. Woods*, 108 Mass. 436, the defendant sought to construe this language of Chief Justice Shaw very much as Complainant seeks to construe it in the case at bar. After

quoting this language of Chief Justice Shaw, the Court says, at page 439-40 of the Woods case:

"But this language is applied to the capacity of the stream, and is not intended to be a strict enumeration of the uses to which it must be actually applied in order to give it this character. Navigable streams are highways; and a traveller for pleasure is as fully entitled to protection in using a public way, whether by land or by water, as a traveller for business. Certainly fishing and fowling are as really regarded, on navigable waters, as trade and agriculture, though not mentioned in the case cited above; and in *West Roxbury v. Stoddard*, 7 Allen, 158, 171, it is said that the use of great ponds, which are public property, may as well be for bathing, boating, skating, fishing and fowling, as for business, and is entitled to equal consideration. If water is navigable for pleasure boating, it must be regarded as navigable water, though no craft has ever been upon it for the purposes of trade or agriculture. *The purpose of the navigation is not the subject of inquiry, but the fact of the capacity of the water for use in navigation.*"

We have read no decision of the Supreme Court of the United States that is not in complete harmony with the last quoted language of the Massachusetts Court. We also contend that none of the decisions of lesser federal courts cited and relied upon by Complainant, when read in the light of the facts there before those courts, can properly be construed to be in conflict with said statement of the Massachusetts Court in the Woods case. If the language of Chief Justice Marshall, in *Cohens v. Virginia*, is kept in mind, little difficulty will be encountered in interpreting any of the federal decisions that are pertinent in the case at bar.

In *Economy Light & Power Co. v. United States*, 256 Fed. 792 (7th C. C. A.), a more complete statement of the facts is found than in the Supreme Court decision. In its bill of complaint the United States alleged that defendant had, without the consent of Congress and without authority of the Illinois Legislature, commenced the construction of a dam in the Desplaines River at a point in Grundy County, Illinois; that said river at said point was navigable water of the United States; an injunction restraining further ob-



struction of the river by defendant was prayed for. At pages 793-7 the following facts, among others, are recited: The river rises in Wisconsin and runs in a southerly direction through Lake and Cook Counties, Illinois, until it reaches Riverside, some eleven miles from the mouth of the Chicago River; thence it takes a southerly direction through Cook and Will Counties to its confluence with the Kankakee River near the east line of Grundy County. Originally the river had a considerable quantity of swamp, marsh and bog at headquarters and in Lake County and in portions of Cook County and there were a number of lakes developed in Lake County which are responsible for the name of that county. Beginning near Riverside there were a great number of water expanses and connecting straits or channels 150 feet to a quarter of a mile in width at places and with varying depths up to 10 or 15 feet. These were formerly used as ice fields. Below the region just described, which extended for approximately 12 miles, there were a succession of ponds and shallow connections in the rock. This whole stretch was described in the original land survey as a "succession of swamps, ponds, lakes, and marshes connected by currents." Farther down there was a declivity at the rate of 7 feet per mile from a certain highway to the head of Lake Joliet, and still lower down there were some 10 miles occupied by pools, or Lake Joliet. Still farther down there came Lake Du Page, "some 13 miles in length, with a width of about 350 feet on the average, and with a depth of 10 feet and upwards, these pools being connected by intermediate rapids" like certain other rapids in the river referred to in the Court's description of physical conditions. "The proportion of the Desplaines river itself from the end of the portage road to its mouth, or confluence with the Kankakee, that would consist of pools, would be about 60 per cent." In its original state there was "at the higher stages" sufficient water for a boat to go partially loaded from Romeo down to the head of Lake Joliet, "and at the lower stages to go down light, but at the lower stages the cargo itself would require a transfer over the 11 miles from Isle la Cache to Mount Juliet. All the river below Lake Joliet would be navigated by discharging the cargo in part or wholly at Treat's Island, and near the mouth of the river." Notwithstanding the difficulty of navigation and the necessary portages and small connecting currents during low water, there was no time when the Desplaines River ran absolutely dry.

At pages 797-8 appears a statement of the navigation history of the river. The Court says that from the latter part of the seventeenth century to the first part of the nineteenth century, men engaged in the fur trade passed up and down the Chicago and Desplaines rivers in canoes and flat boats "very regularly." However, the Court immediately adds that "fourteen specific instances of the use of the Desplaines down to the year 1830, are shown in the evidence," and proceeds to enumerate those fourteen instances. Then follows a statement that there were very many other trips made during that time that are "not so well authenticated." The Court then says: "The trial judge found, as the record shows, that there is no evidence of actual navigation within the memory of living men \* \* \*". Then follows a statement of the type of craft used, the largest being Durham boats sixty feet long, eight feet wide, two feet deep, with a capacity of fifteen tons and drawing 20 inches of water. All commerce on the river ceased in 1825, and as early as 1889 several dams had been constructed across the river.

In *Economy Light & Power Co. v. United States*, 256 U. S. 113, the Court does not attempt a full statement of the facts, stating that the "details are given in the opinion of the Circuit Court of Appeals and need not be repeated." At pages 121-2, it is said:

"The Circuit Court of Appeals, in passing upon the question of navigability, correctly applied the test laid down by this court in the *Daniel Ball*, 10 Wall. 557, 563; and *The Montello*, 20 Wall. 430, 440-443; that is, the test whether the river, in its natural state is used, or capable of being used as a highway for commerce, over which trade and travel is or may be conducted in the customary modes of trade and travel on water. Navigability, in the sense of the law, is not destroyed because the watercourse is interrupted by occasional natural obstructions or portages; nor need the navigation be open at all seasons of the year, or at all stages of the water."

In *United States v. Holt State Bank et al.*, 270 U. S. 49, title to the bed of Mud Lake in Marshall County, Minnesota, was in controversy. Before suit was commenced the lake had been drained so that its former bed was dry land. At pages 56-7 the facts upon which the Court's decision rests

are set forth. It there appears that in its natural and ordinary condition the lake was from three to six feet deep. Mud River traversed it in such a way that the lake might well be characterized as an enlarged section of the river. Early visitors and settlers used the river and lake as a route of travel, "employing the small boats of the period for the purpose. The country about had been part of the bed of the glacial Lake Agassiz and was still swampy, so that waterways were the only dependable routes for trade and travel." Mud River, after passing through the lake, connected with a navigable water route. The river and lake had been used by merchants in two settlements in sending out for and bringing in supplies. The Court says, at page 57:

"True, the navigation was limited, but this was because trade and travel in that vicinity were limited."

Continuing its statement of the facts, the Court says, at page 57:

"In seasons of great drought there was difficulty in getting boats up the river and through the lake; but this was exceptional, the usual conditions being as just stated. Sand bars in some parts of the lake prevented boats from moving readily all over it, but the bars could be avoided by keeping the boats in the deeper parts or channels. Some years after the lake was meandered, vegetation such as grows in water got a footing in the lake, and gradually came to impede the movement of boats at the end of each growing season, but offered little interference at other times. Gasoline motor boats were used in surveying and marking the line of the intended ditch through the lake and the ditch was excavated with floating dredges.

"Our conclusion is that the evidence requires a finding that the lake was navigable within the approved rule before stated."

At page 56 the well-settled law is thus reiterated:

"The rule long since approved by this court in applying the Constitution and laws of the United States is that streams or lakes which are navigable in fact must be regarded as navigable in law; that they are navigable in fact when they are used, or are

susceptible of being used, in their natural and ordinary condition, as highways for commerce, over which trade and travel are or may be conducted in the customary modes of trade and travel on water; and further that navigability does not depend on the particular mode in which such use is or may be had—whether by steamboats, sailing vessels or flatboats—nor on an absence of occasional difficulties in navigation, but on the fact, if it be a fact, that the stream in its natural and ordinary condition *affords* a channel for useful commerce."

In *Alabama Power Co. v. Gulf Power Co. et al.*, 283 Fed. 606, the Court says, at page 613:

"The *capability* of use by the public for purposes of transportation and commerce is the true criterion of the navigability of a river, rather than the *extent* and *manner* of its use. *U. S. v. The Montello*, 20 Wall. 430."

Under the law announced in the foregoing decisions, we earnestly contend that the evidence in the case at bar conclusively establishes the navigability in fact and in law of all stretches of river flowing over the beds here in controversy outside Cataract Canyon, which section will be discussed under another title. The witnesses have testified without contradiction that they navigated these streams at all seasons of the year, at flood and at normal stage, at high and at low water. Some describe difficulties encountered, but they reached their destination. Women and children have successfully and without mishap piloted boats at low water along stretches of the rivers where some of Complainant's witnesses say they encountered most trouble in navigating. Complainant's witness Mendenhall says that in all the years during which he navigated these rivers he never lost a boat or suffered any mishap of any character. Upon the record in this case we cannot believe that Complainant can seriously contend that one familiar with these rivers will encounter any serious difficulty in navigating them at any normal stage of water, or even at extreme low stage, except for short distances in certain very limited areas. We submit that if the most extreme testimony given by members of government survey parties on the San Juan, Green and Colorado river stretches were to be accepted

without question, these streams should not be held unnavigable unless the language of the Supreme Court of the United States in *Economy Light & Power Co. v. United States* be modified so as to declare the law to be that "navigability, in the sense of the law, is destroyed if the water course is interrupted by occasional natural obstructions or portages, or if the navigation is not open at all seasons of the year and at all stages of the water;" and the language of that court in *The Montello* should also be modified so as to declare that a river "is not navigable if its navigation is encompassed with difficulties by reason of natural barriers such as rapids and sand bars."

### CATARACT CANYON

Defendant has made no survey of Cataract Canyon and produced no evidence relative to the length or location of the different rapids in that stretch. From the testimony it appears that there is quiet water between the rapids and that there is ample shore land at every rapid except one at the lower end of the canyon, so that portages of boats and cargo can be made if it is not desirable to run the rapids. It appears from Complainant's Exhibit No. 10 that the aggregate length of all rapids in Cataract Canyon is 11.2 miles. We do not contend that these rapids can be safely run in an open boat, and, with the most approved type of boat, it would doubtless be a dangerous process for one not skilled in handling a boat. *The Montello* and *Economy Light & Power Company* cases are more likely to be of aid in deciding the status of the river through Cataract Canyon than any other cases we have found. In view of the undeniable navigability of the stretches above and below Cataract Canyon, it would create a somewhat anomalous situation if the comparatively short stretch between those portions should not be given a like status.

### QUESTIONS SUGGESTED BY THE SPECIAL MASTER.

The Special Master (R. 5532, Vol. 32) suggested that in their briefs counsel for the parties to the action give some consideration to the four questions indicated below.

(1) Under the rule applied by the Court to what extent, if any, must the river be navigable in both directions, up as well as down?

We have observed no intimation in any federal decision that upstream navigation is at all necessary to meet the criterion of navigability. We cannot see how or in what respect a downstream trip with freight or passengers could be any more or any less "useful commerce" than an upstream trip with the same cargo or passengers. As stated in *The Montello*, 20 Wall. 430, the test is not the extent or manner of the use of a stream but its capability of use in its natural state "for purposes of commerce, no matter in what mode the commerce may be conducted." At page 441 of the opinion in that case, immediately following a statement that the mode by which the commerce is or may be conducted or the difficulties attending navigation is not the true test of navigability, the Court says:

"If this were so, the public would be deprived of the use of many of the large rivers of the country over which rafts of lumber of great value are constantly taken to market."

It is doubtless a matter of common knowledge that no part of these rafts of lumber are again returned upstream.

In *United States v. Mississippi & Rum River Boom Co. et al.*, 3 Fed. 548, it was held that the running of logs downstream is a public right "common to all."

In *Heerman v. Beef Slough Manuf'g Co. et al.*, 1 Fed. 145, the same statement is made.

(2) To what extent, if any, will navigability from one bank to another affect the status of the river?

We find no federal case giving a concrete answer to this question. We have found one State Court case containing the statement that the ferrying of a river from one side to the other establishes its navigability at that section only and does not establish its navigability in other sections. It would seem to us that this statement of the State Court is correct.

(3) In a case not involving interstate commerce what is the definition of commerce in its relation to navigability, and what constitutes useful commerce under the rule laid down in the latest case of the *Holt State Bank*, 1926?

In *Railroad Co. v. Fuller*, 17 Wall. 560, the Court defines commerce at page 568:

"Commerce is traffic, but it is much more. It embraces also transportation by land and water, and all the means and appliances necessarily employed in carrying it on."

In *The Montello*, 20 Wall., at 442, the Court quotes with approval the statement of Chief Justice Shaw that a navigable stream must be commonly useful "to some of the purposes of trade or agriculture." Of course neither Chief Justice Shaw nor the Supreme Court of the United States intended to limit useful commerce to trade and agriculture any more than the Court in *The Montello* when it spoke of a navigable river as one capable of being used in trade and "travel" intended to limit valuable navigation of a river to those purposes.

When the decision in the case of *Holt State Bank* was rendered such a vast number of acts had been held to be "commerce" that it would be idle to attempt to enumerate them.

We cannot conceive of any "lawful" commerce that is not "useful" commerce. We also are unable to see any difference between useful interstate commerce and useful intrastate commerce, except that the former is carried on between two or more States or so directly affects commerce thus carried on as to be a part of it, whereas intrastate commerce is confined within the boundaries of a single State. We can suggest no act of useful interstate commerce that would not be useful intrastate commerce if done within the boundaries of a single state without affecting interstate commerce.

(4) There has not yet been any stipulation between counsel as to the date when power boats came into general and customary use.

#### ANCIENT AND EARLY NAVIGATION.

Complainant stresses the fact that travel to California in the early days was not via the Colorado River. Major Powell made his expeditions between 1869 and 1872. Until that time there was no accurate information as to the course of the stream. Early travelers coming upon the rivers in Utah would be able to observe that the rivers ran southerly and, if their destination was California, would have no

reason to abandon their horses and wagons and set out on a boat journey even if they had had materials with which to build a boat. Since the question of interstate navigability is not in issue here, we have little evidence as to the rapids and other navigation difficulties in Grand Canyon except such as is contained in Major Powell's reports and other documents. A glance at the map of Utah and Arizona clearly shows why the Mormons did not use the rivers in traveling between their settlements. In going from Salt Lake City to the settlements in central and southern Utah the line of travel was necessarily far distant from either of these streams and in going thence to their settlements in Arizona or to Bluff, they would be compelled to travel with their teams and wagons and had no occasion to navigate the rivers.

#### RIGHTS INCIDENT TO COMPLAINANT'S RIPARIAN OWNERSHIP.

In its statement in support of its motion for leave to file the bill of complaint herein, Complainant says:

"The United States is a riparian owner, and its claim to the river beds is based on that."

On page 2 of its brief Complainant again reiterates its riparian ownership and says that "its claim to the river beds is based upon that ownership."

If, as Complainant says, its claim of title is based on its riparian ownership, it has no title.

This is true whether these rivers are navigable or unnavigable. Complainant's mere status as riparian owner gives it no more title to the bed of unnavigable water located upon or adjacent to its land than that possessed by any other riparian owner. It is well settled that the rights of a riparian owner are measured and determined by the law of the State and not by federal law. In making this statement we do not contend that where a grant of the bed of a stream or other body of water has been made before statehood the State may by later action nullify such grant. In such cases the grantee retains title not because he is a riparian owner but because he is a grantee.

In *Hardin v. Jordan*, 140 U. S. 371, where title to the bed of an unnavigable lake (mistakenly denominated as

navigable on a map there reproduced) was in dispute, members of the Court were unanimous in their opinion that the law of Illinois with reference to the rights of riparian owners was controlling but disagreed as to whether that State had or had not adopted the common law. Mr. Justice Gray, although dissenting from the majority view that the common law was in force in Illinois, expressed his agreement with the prevailing opinion as to the controlling effect of the local law as follows:

"Beyond all dispute the settled law of this court, established by repeated decisions, is that the question how far the title of a riparian owner extends is one of local law. For a determination of that question the statutes of the State and the decisions of its highest court furnished the best and final authority."

Also see:

*St. Anthony Falls Water Power Co. v. St. Paul Water Commissioners*, 168 U. S. 349 at 358;  
*Packer v. Bird*, 137 U. S. 661.

At stated many years ago in Vol. 1 of *Kinney on Irrigation and Water Rights*, at pages 545-6, in Utah as well as in other western states there referred to, "the common law of riparian rights is rejected *in toto*." Also see:

*State of Utah v. Sylvester Rolio*, 262 Pac. 987.

#### EFFECT OF UTAH STATUTES.

Chapter 9 of the Session Laws of Utah, 1927, reads as follows (we omit the title and enacting clause):

"SECTION 1. COLORADO RIVER IN UTAH AND GREEN RIVER IN UTAH DECLARED TO BE NAVIGABLE STREAMS. That the State of Utah does hereby declare that the Colorado River in Utah and the Green River in Utah from time immemorial and at the time of the admission of Utah into the Union as one of the States of the United States of America were and ever since have been and now are navigable streams.

"SEC. 2. TITLE TO BED OF ALL NAVIGABLE RIVERS VESTED IN STATE OF UTAH, WHEN—EXCEPTIONS. That the title to the beds

of said rivers and of each of them, as well as the title to the beds of all other streams and lakes which at the time of said admission of Utah into the Union were navigable in fact, vested in the State of Utah at the time of its said admission into the Union and said title has at all times thereafter been and now is vested in the State of Utah, except such portion or portions thereof as may have been heretofore disposed of by the State of Utah pursuant to law, by express grant.

"SEC. 3. INTENT WITH RESPECT TO PARAGRAPH (a) OF ARTICLE IV. OF THE COLORADO RIVER COMPACT—COLORADO RIVER NAVIGABLE FOR INTRA-STATE COMMERCE. That the State of Utah does hereby declare that its adherence to paragraph (a) of Article IV. of the Colorado River compact as set forth in Chapter 5, Laws of Utah, 1923, which paragraph reads as follows:

'(a) Inasmuch as the Colorado River has ceased to be navigable for commerce and the reservation of its waters for navigation would seriously limit the development of its Basin, the use of its waters for purposes of navigation shall be subservient to the uses of such waters for domestic, agricultural and power purposes. If the Congress shall not consent to this paragraph, the other provisions of this compact shall nevertheless remain binding,'

was not and is not intended as and shall not be construed to be a declaration or admission that the Colorado River in Utah has ceased to be navigable for intra-state commerce; nor was said paragraph or any language therein contained intended as, nor shall it be construed to be, a relinquishment or waiver of any right, title or interest of the State of Utah in or to the bed of the Colorado River in Utah.

"Approved February 26, 1927."

In *United States v. Holt State Bank*, 270 U. S. 49, it is clearly announced that navigability, when asserted as the basis of a right arising under the federal constitution, "is necessarily a question of federal law to be determined ac-

ording to the general rule recognized and applied in the federal courts" and that the lower courts erred in applying the Minnesota rule. In view of the great divergence of opinion between state courts as to what constitutes "navigability," it is quite natural that the federal courts should seek uniformity and follow their own rule in determining the proper criterion. It does not follow from this that a state is without power to fix the status of important rivers within its boundaries and declare them navigable streams.

Notwithstanding the fact that the Court later arrived at the conclusion that it was not necessary to pass on the question of the navigability of the Klamath River and withdrew that portion of its opinion dealing with that question, we believe the decision in *Donnelly v. United States*, 228 U. S. 343; 708, to be pertinent.

Also see:

*Wear v. Kansas*, 245 U. S. 154;

*Hardin v. Jordan*, 140 U. S. 371.

In *Brewer-Elliott Oil & Gas Co. et al. v. United States et al.*, 260 U. S. 77, the Court distinguishes *Donnelly v. U. S.* and also *Wear v. Kansas*, 245 U. S. 154, and holds that a state by its courts or legislature may not "adopt" a retroactive rule for determining navigability which would destroy a title already accrued under federal law and grant or would enlarge what actually passed to the state at the time of her admission under the constitutional rule of equality here invoked. At page 89 the Court says:

"Some States have sought to retain title to the beds of streams by recognizing them as navigable when they are not actually so. It seems to be a convenient method of preserving their control. No one can object to it unless it is sought thereby to conclude one whose right to the bed of the river, granted and vesting before statehood, depends for its validity on non-navigability of the stream in fact."

The fact that Sec. 5575 of Chap. 118, Laws of Utah, 1921, contains the language quoted on page 196 of Complainant's brief, to wit: "Nothing herein contained shall be construed as a legislative declaration of ownership by the State of Utah of the beds of non-navigable rivers or streams,"

in no manner prevented the Legislature from making its declaration of State ownership of the beds of the Green and Colorado rivers in 1927. The language of Sec. 5575 above quoted does not purport to convey the beds of non-navigable waters to riparian owners and was employed merely to define the scope of the provisions of the 1921 statute.

#### UTAH HAS NOT TREATED THE RIVERS AS BEING NON-NAVIGABLE.

On pages 189-194 of its brief, Complainant argues that, because placer miners have, from 1885 until the present time, located mining claims along and extending into the beds of these rivers, purporting to make such locations under the mining laws of the United States, and have, both before and since statehood, filed notices of such locations with the recording officers of certain Utah counties, Defendant is placed in the position of admitting that these rivers are not navigable. Under the recording laws of that state, as under the recording laws existing before statehood, a county recorder rests under the duty of receiving and recording any instrument purporting to affect the title to real property upon receipt of the prescribed fee. It is a matter of common knowledge that mining locations are made and notices thereof filed by prospectors and miners on property of all kinds and descriptions and regardless of the situs of the title at the time such locations are made. Usually this is done innocently and the recording of such notices of location in no manner tends to destroy the title of the real owner. No one ever knows or cares anything about such records except when some controversy as to priority arises between different locators. We cannot believe that Complainant intends to seriously urge that the State of Utah failed to bring suit against these prospectors because it felt that the rivers in question did not have sufficient navigable capacity.

With reference to the language appearing in State leases requiring the lessee to defend suits that might be brought by the United States or those claiming under it, we invite attention to the fact that the anticipated litigation came. In this connection we will volunteer the information that had Defendant known that the present suit would be as expensive as it has proved to be the lessees would not have been relieved of their obligation in the premises for the compara-

tively trivial sum accepted by Defendant. What we have just said may be outside the record as it now stands, but, if Complainant is permitted to contend that these State leases are evidence that Defendant is not the real party in interest in this case, or that Texas Production Company, or any other company or individual, is conducting or taking any part whatsoever in this litigation, we shall ask leave to reopen the case for the purpose of refuting any such inference. The State leases were not received for any such purpose and evidence of any such fact would obviously be irrelevant.

With reference to the alleged absurdity of the Utah statute declaring the Green and Colorado rivers to be navigable streams throughout that state, we submit that the proper time to urge such alleged absurdity will be when that question is before the Court. Although, in order to permit Complainant to fully disclose and develop its theory, the Special Master permitted some of its witnesses to describe remote sections of the rivers, he then indicated his opinion and later definitely ruled that no evidence relative to other sections of the rivers than those in dispute would be considered except as such evidence had a direct bearing on the question of navigability in the areas involved. At the outset Defendant stated that it had made no survey and was not prepared to introduce any evidence concerning any sections of the rivers except those at and in the immediate vicinity of the controverted areas. If and when both sides are heard with reference to other sections of the rivers, the Court will be better able to arrive at a conclusion as to their navigability.

With reference to our failure to put in issue the question of interstate navigability we have no apologies to offer. It was not only our right, but our duty, to limit the controversy to those matters in which we had an interest and with respect to which we would be able to present evidence. By thus properly narrowing the issues we did not estop ourselves from proving that the river through Glen Canyon to the Utah-Arizona line is navigable. We appreciate that within certain limits the navigable capacity and characteristics of the rivers above controverted areas may throw light upon the question of navigability within those areas. But we do not see how any evidence received as to navigable capacity at any point between the Utah-Arizona line and the mouth of the Colorado River has any bearing upon the question of intra-state navigability within the controverted areas.

## EXECUTIVE ORDER WITHDRAWING LANDS FOR INDIAN PURPOSES.

Complainant's Exhibit 71, containing a copy of an order withdrawing for Indian purposes certain land bounded on the west by the middle of the channel of the Colorado River and on the north by the middle of the channel of the San Juan River and a later Executive Order made in 1892, restoring all land theretofore withdrawn, except that portion lying east of the 110th meridian, was received in evidence subject to defendant's objection that the exhibit was irrelevant. We are not quite sure from a reading of Complainant's brief just what its contentions are with reference to this order. In view of the evidence in this case the significance, if any, that such an order might have as bearing on the question of navigability does not greatly concern us. The probabilities are that when in 1884, the President signed the order of withdrawal he had not the slightest knowledge concerning the navigable capacity of either of these rivers and the question of their navigability probably never entered his mind.

Complainant does not purport to be suing in behalf of any Indians. In its statement in support of its motion for leave to file its Bill of Complaint herein, it says:

"The United States is a riparian owner, and its claim to the river beds is based on that."

At page 2 of Complainant's brief this same statement is again made. The order does not purport to be a grant, nor does it purport to withdraw any land for the Navajos or any other Indians. It is silent as to the nature of the "Indian purposes" contemplated.

At page 190 of its brief, Complainant states that "scores of placer miners have operated in the beds of these rivers, claiming rights under location notices posted and filed under the laws of the United States." It also appears from the evidence that oil permits were granted by the Department of the Interior along the San Juan River. This affirmative action on the part of the Department of the Interior does not indicate any purpose to hold any portion of the bed of the San Juan River "for Indian purposes."

*Shively v. Bowlby*, 152 U. S. 1, overruled the doctrine announced in *Hardin v. Jordan*, 140 U. S. 371, and other



earlier cases, that the United States is without power to either retain or alienate title to the shore or beds of navigable waters. However, it is still the well settled law, as announced in *United States v. Holt State Bank*, supra, and other cases, that "disposals by the United States during the territorial period are not lightly to be inferred, and should not be regarded as intended unless the intention was definitely declared or otherwise made very plain."

In view of the oft repeated statement of the Supreme Court that the title and dominion over navigable waters and their beds located outside the boundaries of existing States are held "in trust for the future States" and that every presumption will be indulged against any intent to deprive the new States of title and dominion over them, we believe it very clear that a mere presidential proclamation could not effect such alienation, however clear its terms might be. But the proclamation here in question is so vague and uncertain that it seems obvious that it could in no manner affect the matter in issue between the parties. That such was the view of Complainant and its Solicitor General when this suit was instituted is placed beyond controversy by the following language appearing in the statement in support of the motion for leave to file the Bill of Complaint herein:

"Whether it (the United States) is the owner of the beds of these streams depends on whether they are navigable, and that, in turn, presents a question as to what test of navigability is to be applied."

The allegations of the Bill of Complaint are directly responsive to the above quoted statement and Complainant's Exhibit No. 71 is irrelevant unless it is held to have some bearing on the question of navigability.

#### DISCLAIMER IN UTAH CONSTITUTION.

We have already discussed the question of the effect of Utah statutes, which is adverted to under Subdivision XII, on pages 194-6, of Complainant's brief. Complainant there refers to Section 2 of Article 3 of the Utah Constitution and to the Utah Enabling Act (28 Stat. 107). The section of the Enabling Act referred to, wherein the people of Utah are required to disclaim and pursuant to which in

their Constitution they did disclaim "all right and title to the unappropriated public lands lying within the boundaries thereof," and also Section 12 of that Act, are found in the Enabling Acts of the states of Washington, North Dakota, South Dakota and Montana.

In *Mann v. Tacoma Land Co.*, 153 U. S. 273, where the question of title of the State of Washington to the beds of its navigable waters was involved, the Court held that these provisions of the Enabling Act of that state in no manner constituted a waiver of the state's title to the beds of its navigable waters.

In *Oklahoma v. Texas*, 258 U. S. 574 at 583, the Court fully recognizes the title of Oklahoma to the beds of its navigable waters although the third section of the Oklahoma Enabling Act is identical in language with Section 3 of the Utah Enabling Act.

In *Newhall v. Sanger*, 92 U. S. 761, the Court said:

"The words 'public lands' are habitually used in our legislation to describe such as are subject to sale or other disposal *under general laws*."

Also see:

*State of Utah v. Sylvester Rolio*, 262 Pac. 987.

Many other cases might be cited holding that the disclaimers contained in the various Enabling Acts have reference only to public lands subject to sale or disposal "under general laws," and have no reference to beds of navigable streams.

We respectfully submit that it should be adjudged and decreed that Defendant is the owner of all of those portions of the beds of the Colorado, Green and San Juan rivers here in controversy.

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