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**Documents**

*Relating to*

THE PURCHASE & EXPLORATION

OF

LOUISIANA



DOCUMENTS  
RELATING TO  
*THE PURCHASE*  
&  
EXPLORATION OF  
*Louisiana.*

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- I. The Limits and Bounds of *Louisiana*. By THOMAS JEFFERSON.  
II. The Exploration of the *Red*,  
the *Black*, and the *Washita* Rivers. By WILLIAM DUNBAR.
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Printed from the original Manuscripts in the Library  
of the *American Philosophical Society* and by direc-  
tion of the Society's Committee on Historical  
Documents.

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BOSTON and NEW YORK: Published by  
HOUGHTON, MIFFLIN & COMPANY. 1904.

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*Published June 1904*

FIVE HUNDRED AND FIFTY COPIES PRINTED

NUMBER 440

AMERICAN PHILOSOPHICAL SOCIETY



## PUBLISHERS' NOTE.

**T**HE two documents now first printed in this volume have been for nearly a century in the custody of the American Philosophical Society. The first is a paper written by Thomas Jefferson while President of the United States, which gives a summary of the various claims of France, Spain, and England to territory in the Mississippi Valley, and lays down the boundaries of the Louisiana Purchase. The original of this paper, in Mr. Jefferson's own hand, was deposited by him in the archives of the Society in Philadelphia, where it still remains. The second is the manuscript known to historians as the Dunbar Journal, the importance of which has been generally recognized, though but few have had access to it. The Journal was kept by William Dunbar of Natchez, on a voyage of exploration which, in company with Dr. George Hunter, he undertook by direction of the President in 1804, as a part of Mr. Jefferson's statesmanlike plan to survey the vast new territory just coming into the possession of the United States. This manuscript was presented to the Society by Daniel Parker, Adjutant and Inspector-General, U. S. A., on the 18th of July, 1817.

The Journal of William Dunbar is comparable to the more famous Lewis and Clark Journals, which were likewise placed in the keeping of the American Philosophical Society at the instance of Mr. Jefferson, and like them is a contribution of the first

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order to the history of the earliest exploration of the country west of the Mississippi. Dunbar himself was a man of note, and has already been honored in his native state as "the first scientist of Mississippi." Born at Thunderton near Elgin, Scotland, a younger son of Sir Archibald Dunbar, he united, as so many eminent men among his countrymen have done, practical and scientific abilities of a high order. He settled in America in 1771, and became a successful planter. Later he held important trusts under the Federal government, was a correspondent of Thomas Jefferson, Sir William Herschel, David Rittenhouse, and other famous men, and made many contributions of importance to the scientific interests of the country, then in their infancy.

In addition to the Journal and the paper already mentioned on the boundaries of Louisiana, the volume includes the letter from Mr. Jefferson transmitting his manuscript to the American Philosophical Society, with some mention of the circumstances under which it was written, and an extract from Mr. Jefferson's message to Congress, transmitting a summary of the Dunbar Journal. The portrait of Mr. Jefferson is from the original by Thomas Sully, which now hangs in the rooms of the American Philosophical Society in Philadelphia. That of Mr. Dunbar is from the portrait at "The Forest," Dunbar's estate in Mississippi. The map is a photo-lithograph from the copper-plate engraving of Nicholas King's great map in the War Department at Washington.

In printing these rare documents, care has been taken to preserve the peculiarities of spelling and the quaint abbreviations which were characteristic of the writing of the time.

The acknowledgments of the publishers are due to the American Philosophical Society for its courtesy in permitting the use of the manuscripts here printed, and also of the portrait of Jefferson by Sully; to the Secretary of the Society, Dr. I. Minis Hays, for his assiduous care in the difficult task of comparing proof, verifying names, etc.; and to Mr. William Dunbar Jenkins for the copy which he has kindly furnished of the portrait of Dunbar.

*Boston, May 9, 1904.*







*Th Jefferson*



*The*  
**LIMITS**  
and  
*BOUNDS*  
OF  
**Louisiana**

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*By* THOMAS JEFFERSON









TO *PETER S. DU PONCEAU,*

Corresponding Secretary of the Literary and  
Historical Committee of the American  
Philosophical Society.

*Monticello, Dec. 30, '17.*

DEAR SIR



**I** *NOW* send you the remains of my Indian vocabularies, some of which are perfect. I send with them the fragments of my digest of them, which were gathered up on the banks of the river where they had been strewed by the plunderers of the trunk in which they were. These will merely shew the arrangement I had given the vocabularies, according to their affinities & degrees of resemblance or dissimilitude. If you can recover Cap<sup>t</sup> Lewis's collection, they will make an important addition, for there was no part of his instructions which he executed more fully or carefully, never meeting with a single Indian of a new tribe, without making his vocabulary the 1<sup>st</sup> object. What Professor Adelung mentions of the Empress Catherine's having procured many vo-

*cabularies of our Indians, is correct. She applied to M. de la Fayette, who, thro' the aid of Genl Washington, obtained several: but I never learnt of what particular tribes. The great works of Pallas being rare I will mention that there are two editions of it the one in 2. vols, the other in 4. vols 4<sup>o</sup> in the library I ceded to Congress, which may be consulted. But the Professor's acc<sup>t</sup>. of the supposed Mexican MS. is quite erroneous, nor can I conceive thro' whom he can have recieved his information. It has probably been founded on an imperfect knolege of the following fact. Soon after the acquisition of Louisiana, Govl Claiborne found, in a private family there, a MS. journal kept (I forget by whom) but by a confidential officer of the French government, proving exactly by what connivance between the agents of the Compagnie d'Occident, & the Spaniards, these last smuggled settlements into Louisiana, as far as Assinais, Adaïs etc. for the purpose of covering the contraband trade of the company. Claiborne being afraid to trust the original by mail, without keeping a copy, sent it on after being copied. It arrived safe and was deposited by me in the office of state. He then sent me the copy. On the destruction of the office at Washington by the British, apprehending the original might be involved in that destruction, I sent the copy to Col<sup>o</sup> Monroe, then Secretary of State, with a request to return it, if the original was safe, & to keep it, if not. I have heard no more of it. My intention was, & is, if it is returned to me, to deposit it with your Committee, for*

*safe keeping or publication. While on the subject of Louisiana, I have thought I had better commit to you also an historical Memoir of my own respecting the important question of it's limits. When we first made the purchase, we knew little of it's extent, having never before been interested to enquire into it. Possessing then in my library every thing respecting America which I had been able to collect by unremitting researches, during my residence in Europe particularly, and generally thro' my life, I availed myself of the leisure of my succeeding autumnal recess from Washington, to bring together every thing which my collection furnished on the subject of it's boundary. The result was the Memoire I now send you, copies of which were furnished to our Ministers at Paris and Madrid, for their information as to the extent of territory claimed under our purchase. The New Orleans MS. afterwards discovered, furnished some valuable supplementary proofs of title.*

*I defer writing to the Secretary at war respecting the observations of Longitude & Latitude by Cap<sup>t</sup>. Lewis, until I learn from you whether they are recovered, and whether they are so compleat as to be susceptible of satisfactory calculation. I salute you with great esteem and respect.*

TH: JEFFERSON





## A Chronological Series of facts relative to **Louisiana.**

1673. **S**PAIN declares war against France.  
4. Russel's Mod. Eur. 68.

Joliet, an inhabitant of Quebec, & the  
Jesuit Marquette descended from Can-  
ada down the Missisipi to the Arkan-  
sas in 33°. & returned to Canada. 8.  
Rayn. 158. Hennepin N. D. 293.

1675. LaSalle goes to France to sollicit au-  
thority to explore the Mišipi. Joutel  
xvii.

1678. The peace of Nimezuen. 4. Russ. 92.  
LaSalle returned from France to Canada  
with Tonti to undertake to explore  
the Mišipi. Joutel xviii.

1679. He builds a fort at the mouth of the  
Miami of the lake. Hennepin Nouv.  
Decouvertes. 171.

1680. Jan. He builds a fort on the river Illi-  
nois. Hennep. N. D. 223. Called it  
Crevecoeur.

Feb. 29. Hennepin with 2. men leave  
the Illinois to descend the Mišipi in a

bark canoe. Hennep. N.D. 228. 241. Visits the Arcansas 258. The Taensas 263. Reaches the sea. 272. Returns to the Illinois 294. 349. Nouv. voyage 96. 1. Du Pratz. 4.

1681. La Salle visits fort Crevecoeur & leaves a garrison there of 15. or 16. men. Tonti. 147.

1682. La Salle & Tonti went down the Mišipi & named the country Louisiana. He went to the mouths of the Mišipi, observed their latitude, & returned to Canada. Joutel xvii. xx. Tonti 153. 1. Du Pratz 5. 2. Dumont 258. says in 1679.

They build a fort, called Prudhomme, in the Chickasaw country 60. leagues below Ohio.

1683. Tonti 155. Reach the ocean Apr. 7. 1683. Ib. 191. They have 60. persons in their company. Set out on their return Apr. 11. 1683. Ib. 196.

Soon after this some Canadians, enticed by the flattering accounts of the country, went & settled near the mouth of the Mišipi, & on the coast. 2. Dum. 260.

1684. Spain declares war against France, but concludes at Ratisbon a truce of 20. years. 4. Rus. 141.

Jul. 24. La Salle sails from Rochelle with 4. vessels to seek the mouth of the Mišipi by sea. Joutel 2. Tonti 140. He had with him 100. souldiers & officers, in all 280. persons. Hennepin Nouveau Voyage. 12.

1685. Feb. 18. La Sale landed in the bay of S<sup>t</sup> Bernard, or S<sup>t</sup> Louis. Joutel 32. 1. Dupratz 6. Tonti 245. 2. Dum. 259 Builds a fort there. Tonti 245. 276. Left 100. men there Hen. N.V. 23. 130. persons. Joutel 45.

Apr. 22. He sets out with 20. men to seek a new place. Tonti. 249.

June. He makes a 2<sup>d</sup> settlement further up the river. 70. persons go to it. Joutel 49.

July. They abandon the first fort & go to the 2<sup>d</sup>. Joutel. 51. Called it and the neighboring bay S<sup>t</sup> Louis. Joutel 54.

Tonti descends the Mišipi with 40. men to meet LaSale. Tonti 220. reconnoitres the coast 20. leagues East and West of the mouth. On the jour de Paques (Easter) they set out on their return. 222.

Tonti builds a house on the river Arkansa & leaves 10. Frenchmen there. Tonti 225. Joutel says 6. men, 4 of whom

- afterwards returned to Canada. Joutel 151. This becomes permanent. 226. 1. Dupr. 6. and is afterwards included in Law's grant, who settled it with Germans in 1719. 2 Dum. 68.
1686. Apr. 22. LaSale sets out for Illinois by land. Hennepin N.V. 39. but returns to Fort Louis. Ib. 63.
1687. Jan. 7. He sets out again with 20 men. Henn. N.V. 67. Is murdered. Joutel 99. Henn. N.V. 77.
- LaSale's 2<sup>d</sup> fort at St<sup>e</sup> Louis is afterwards abandoned. Tonti 329. Coxe. 39.
- After the death of LaSale, Cavalier his brother, with 7. men, set out for Canada. Joutel 132.
- July. They find the house on the Arkansa built by Tonti with only 2. men remaining in it. Jout. 151. They leave one of their company there. 157. They strike the Mišipi. Joutel 158.
- Dec. 3. Tonti sets out from the Illinois, & descends the Mišipi a 2<sup>d</sup> time. Tonti. 317. Finds LaSale's 2<sup>d</sup> settlement broke up. 329. Finds at the Coroas 2. of the 7. French men who had separated from Cavalier after the death of LaSale. 331. Returns to Illinois. 331.



1689. War commenced by Spain against France.  
4. Russel. 228.
1696. Spain established a post at Pensacola. 9.  
Reynal. 128.
1697. Sep. 20. Treaty of Ryswick 4. Russell  
248.
1698. D'Hiberville discovers the mouth of the  
Mišipi. by sea. 2. Dum. 260.  
He is made Governor. 2. Dum. 260.  
He establishes a colony at Mobile, &  
Isle Dauphine. 260.
1701. The war of the Spanish succession begins,  
France & Spain being allies. 4. Rus.  
317.
1712. Sep. 14. Louis XIV. grants the exclusive  
commerce of Louisiana to Crozat.  
Possession & extent described Joutel  
196. 2. Dum. 260.
1713. Mar. 31. Treaty of Utrecht establishing  
the 49<sup>th</sup> degree of lat. as the division  
between Louisiana & the British  
Northern possessions.
1714. Mar. 6. Treaty of Rastadt.
1715. The French establish Natchitoches on  
Red river & build a fort 35. leagues  
above it's mouth. 2. Dum. 65.
1715. The Spaniards make settlements at the  
Assinai & Adais on one side & at Pen-

- sacola on the other. 1. Dupratz 9. 13.  
 14. (this was 7. or 10. leagues from  
 Natchitoches) to restrict the French  
 limits. 1. Dupratz. 14. 278.
1716. Crozat cedes his charter to the West  
 India company. 2. Dumont. 6. 260.
1717. The company sent inhabitants to Isle  
 Dauphine, where were some settlers  
 before. 2. Dum. 7.  
 Hubert and Page settle at the Natchez.  
 2. Dum. 60.  
 Fort Rosalie is built. 2. Dum. 60.
1718. Two other vessels are sent there. 2.  
 Dum. 8.  
 France and England declare war against  
 Spain. Quadruple alliance. 5. Rus. 6.
1719. The French take Pensacola. 1. DuPratz  
 189. 2. Dumont 9. The Spaniards re-  
 take it. 191. 12. The French take it  
 again. ib. 195. 18.  
 France and Spain make peace. 5. Rus. 7.  
 France sends 800. settlers to Louisiana.  
 DuPratz. xlviiii.  
 Old Biloxi is settled. 2. Dumont 34.  
 Isle Dauphine is evacuated & every body  
 removed to Old Biloxi, except a Ser-  
 jeant & guard of 10. men. 2. Dum.  
 36. 37.

New Biloxi is settled. 2. Dum. 42. 43.  
A cargo of Negroes arrives at Old Biloxi.  
ib.

The grantees now settle, every one on his own grant, to wit, at Old Biloxi, Bayagoulas, Point Coupée, Natchez, Yazous, Arkansas, Black river. 2. Dum. 44.

New Orleans is laid off, 30 leagues above the mouth of Mišipi, where some settlers from Canada had already settled, & the seat of government is fixed there. 2. Dum. 47.

1720. A fort on the Missouri is built & garrisoned. 2. Dum. 74. Called Fort Orleans. Jeffry. 139.

DelaHarpe & Dumont, with 22. men, go 300. leagues up the Arkansa. A fine country. Salt springs, marble, plaister, slate & gold. 2. Dum. 70.

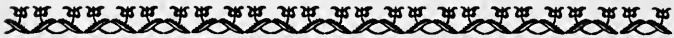
1722. The Balise is established, & a fort built on piles. 2. Dum. 57.

The Spaniards attempt a settlement among the Missouris, but are all massacred to the number of 1500. 2. Dum. 282.

1733. France, Spain & Sardinia commence war against the Emperor. 5. Rus. 27.

1735. Peace is made 5. Rus. 29.

1736. The French build a fort at Tombicbee.  
1. DuPratz. 85.
1743. The Family compact made.
1748. The Treaty of Aix la Chapelle. 5. Rus.  
187.
1762. Spain enters as an ally with France into  
the war against England.  
Nov. 3. France cedes Louisiana West of  
Iberville to Spain by a secret treaty,  
and East of Iberville to England. Pre-  
liminary treaty. The King of France's  
order to L'Abbadie.
1763. The Treaty of Paris is made.
1783. Great Britain cedes the two Floridas to  
Spain.



### *Limits.*

**I**N 1680. the nearest settlements of Spain were  
on the river Panuco, 100. leagues West of  
the Misipi. Hennep. N.D. 274. Coxe 115.  
Coxe's Carolana. 4.

In 1715. they make the settlements at Assinais  
& Adais, & Pensacola. 1. DuPratz. 9. 13.  
14. 278.

In 1722. they attempt one on the Missouri

which is prevented by the Indians. 2. DuPratz 157. 2. Dumont 282. Jeffry's hist. of the French Dominions in America. 139.

DuPratz sais 'the coast is bounded to the West by St: Bernard's bay, where M. de la Salle landed.' and again 'on the East the coast is bounded by Rio Perdido etc. a little to the East of Mobile etc. 1. DuPratz. 216. and 'the Red river bounds the country to the North.' 1. DuPratz. 272.

2. DuPratz 301. says 'Canada lies to the North of Ohio, & inclines more to the East than the source of Ohio.' [Consequently the Ohio was not in Canada, and must therefore have been in Louisiana, as these two provinces were co-terminous.] And again 'the lands of the Illinois are reputed to be a part of Louisiana.' Ib. His book was published in 1758. and the translation in 1763.

The Translator of DuPratz, in his preface, says 'the mountains of New Mexico run in a chain of continued ridges from North to South, and are reckoned to divide that country from Louisiana, about 900. miles West from the Mišipi. Pa. xi.'

1712. The great document establishing with precision the boundaries of Louisiana, is Louis XIV's grant of this date to Crozat. to be found in the translation of Joutel. 196.

1763. Treaty of Paris Art. VI. France cedes to England the river & port of Mobile & every thing on the left side of the Miſipi, which she possesses or ought to possess except the island of N. Orleans: and Art. XIX. Spain cedes to England all she possesses East or S. E. of the Miſipi. Thus all Louisiana E. of the Miſipi. is acknowledged to England, and all English claims West of the Miſipi acknowledged to Spain.

England divides the country South of Georgia, & East of the Iberville into two provinces, East & West Florida, by the Apalachicola.

1783. England, by Art. V. of the treaty cedes to Spain la Floride Orientale ainsi que la Floride Occidentale.

Spain re-establishes the government of Louisiana as before, & the government of Florida; that part of what the English had called West Florida being under the Governor of N. Orleans, & the rest under the Governor of Florida. See the Baltimore American Patriot. Vol. 1. N<sup>o</sup> 97. This is confirmed by M. D'Azara, Spanish Ambassador at Paris who told m<sup>r</sup> Livingston that Mobile made a part of Louisiana. See Liv's letter to Monroe. Paris. May 23. 1803.

Spain retrocedes to France by the treaty of St Ildefonso.

1803. Apr. 30. France cedes to the US. Louisiana with the same extent that it now has, & that it had when France possessed it, and such as it ought to be after treaties passed subsequently between Spain & other powers.

‘Objections des Commissaires Anglois sur l’incertitude des limites de l’Acadie etc. ‘Les limites propres et anciennes de l’Acadie s’étendent depuis l’extrémité de la baye Françoisise jusq’au cap Canseau. L’objection d’incertitude sur ces limites ne peut donc tomber que sur celles de l’intérieur des terres. Dans de pareils cas, la regle la plus usitée et la plus convenable est d’étendre les limites dans l’intérieur des terres jusque à la source des rivieres qui se dechargent à la cote, c’est à dire que chaque nation a de son coté les eaux pendantes. C’est ainsi qu’on en a usé à la paix des Pyrenées pour fixer les limites entre la France et l’Espagne’ etc.  
1. Memoires de l’Amerique. 116.







AN

# Examination

INTO

The boundaries of *Louisiana*.

**T**HE French having for a century and a half been in possession of Canada, and it's inhabitants penetrating to the remote waters communicating with the S<sup>t</sup> Laurence, they learned of the Indians that, in the neighborhood of those waters, arose a great river, called the Missisipi, running due South to the sea, and through a fine country unpossessed by any white nation. In 1673. the Sieurs Joliet and Marquette, two Canadians, undertook to explore it, descended the Missisipi as far as the river Arkansa, in 33° & returned to Canada. Their account of it inflamed the enterprize of M. de la Salle, who in 1675, went to France to sollicit authority to explore the Missisipi. He obtained it, returned to Canada, and in 1680. went as far as the river Illinois, on the

lower part of which he built & garrisoned a fort called Crevecoeur, and sent the father Hennepin with 2. men to push his discoveries down the Miſipi as far as he could; &, as preparatory to a more formal essay, going himself Northwardly. Hennepin descended the Miſipi to the ocean, & returned with the information collected, to the Illinois. In 1682. La Sale & Tonti undertook their expedition; went down the river with 60. men, named the country Louisiana, built a fort in the Chickasaw country, 60 leagues below the Ohio, which they called Prudhomme, reached the ocean, and returned to Canada the ensuing year 1683.

La Sale then went to France, to obtain the means of going thence to the Miſipi directly by sea. In the mean time some Canadians descend the river, & settle near it's mouth, & along the coast Eastwardly, to the island of Massacre, opposite Mobile. The government of France, entering at once into the view of extending an united possession along the S<sup>t</sup> Laurence & Miſipi, from sea to sea equips la Sale with 4. vessels, on board of which were 280. persons, of whom 100. were officers and soldiers furnished with all necessaries. He sailed in July 1684. from Rochelle, and missing the mouth of the Missisipi, landed Feb. 18. 1685. in the Bay of S<sup>t</sup> Bernard to the West of it. Here he takes possession, makes two successive establishments, building and garrisoning

forts at each, the second of which was called St. Louis.

The Chevalier Tonti, about this time, sets out from Canada in quest of La Sale, whom he supposed to be then on the Misipi, descends with 40. men to the mouth of the river, reconnoitres the coast 20. leagues East & West; finding nothing of La Sale, he ascends the river, builds a house on the river Arkansa, and leaves 10. men in it, which becomes a permanent settlement, and he returns to Canada.

In 1686 La Sale attempts to penetrate from fort St. Louis to the Illinois by land, but is obliged to return. In 1687 he makes another attempt with 17. men, and is murdered on the way by some of his own people. Cavelier, brother of La Sale, undertakes the same enterprize with 7. men; they find the house on the Arkansa built by Tonti, with only two men remaining in it; they leave a third, strike the Misipi, and reach Canada. Tonti descends the river a second time, finds two Frenchmen who had separated from Cavelier settled at the Coroas, and returns to the Illinois.

In 1689. a war commenced between France and Spain, which continuing till the treaty of Ryswick in 1697. suspended the aids of France to her colony: but in 1698. D'Iberville was sent as it's governor with recruits. He discovers the mouths of the Misipi, and settles his new recruits

at Isle Massacre, which he calls Isle Dauphine, and at Mobile, where they find the Canadians who had settled there in 1683. Spain had, during the war, to wit, in 1696. taken a counterpost at Pensacola.

The result from these facts is that France had formal & actual possession of the coast from Mobile to the bay of St Bernard, & from the mouth of the Miſipi up into the country as far as the river Illinois. The nearest Spanish settlements at this time were on the River Panuco, to the West, 100. leagues from the Miſipi, and at Pensacola, to the East . . leagues distant. There does not appear as yet indeed to have been any formal declaration of the limits of Louisiana: but the practice of nations, on making discoveries in America, has sanctioned a principle that ‘when a nation takes possession of any extent of sea-coast, that possession is understood as extending into the interior country to the sources of the rivers emptying within that coast, to all their branches, & the country they cover.’ 1. Mem. de l’Amerique 116. It was in support of this principle of virtual and declared possession, that France entered into the war of 1755 against Great Britain, whose settlements began now to reach the Eastern waters of the Misipi, and who opposed the claim of France, not on a denial of this principle, but on a prior possession taken & declared by repeated charters, thro’ the space

of an hundred years preceding, as extending from sea to sea. France then had possession of the Miſiſipi, and all the waters running into it, and of the sea coast and all it's rivers & territories on them from Mobile to the bay of S<sup>t</sup> Bernard. The river Perdido, midway between the adversary possessions of Mobile & Pensacola, became afterwards the settled boundary between Spain & France, in the East, and the Rio Norte, or Bravo, midway between the bay of S<sup>t</sup> Bernard and the river Panuco, the then nearest settlement of Spain, was considered by France, if not by Spain, and on the same fair grounds as in the other quarter, as the boundary between them in the West. Besides being midway between the actual possessions of the two nations, that river formed a natural and well marked boundary, extending very far into the country Northwardly. And accordingly we find by several \* maps, some of them published by authority of the French government, and some Spanish maps, that France claimed to that river. This claim has not been abridged, as far as is known,

\* I possess three antient maps which mark the Rio bravo & it's Eastern branch as the dividing boundary between Louisiana & Mexico. 1. Moll's map of the West Indies & adjacent countries. 2. Moll's map of Louisiana etc. published in 1720. in which the South Western parts of Louisiana are said to be copied from a French map published in Paris in 1718. and 3. Homann's Spanish map of Louisiana of about the same date.

by any public treaty ; and those which are secret, if any such have taken place, cannot bind nations having no notice of them, & succeeding fairly to the rights of France, as publicly avowed & believed to exist.\*

But the extent of Louisiana into the interior country is not left merely on the principle of it's dependency on the coast into which it's waters disembogue : nor on the settlements extending up it's great rivers, the Mišipi, the Missouri, & the Illinois ; but on an authoritative and public document announcing it's extent, and making a temporary disposition of it. This is the Letter patent of Sep. 14. 1712. by which Louis XIV. grants to the Sieur Anthony Crozat the exclusive commerce of that country for 15. years. The following extracts from it ascertain the extent of the country.

‘ Louis by the grace of god, king of France & Navarre to all etc.

‘ The care we have always had to procure the welfare & advantage of our subjects having induced us etc. to seek for all possible opportunities of enlarging & extending the trade of our American colonies, we did, in the year 1683. give our orders to undertake a discovery of the countries & lands which are situated in the Northern part of America, between

\* To this may be added the verbal declaration of the French Comm<sup>r</sup> to those of the US. on the delivery of possession, that his positive instructions from his government were to take possession to the Rio Bravo.

New France & New Mexico : & the Sieur de la Sale, to whom we committed that enterprize, having had success enough to confirm a belief that a communication might be settled from *New France to the gulph of Mexico*, by means of large rivers ; this obliged us, immediately after the peace of Ryswick, to give orders for the establishing a colony there, & maintaining a garrison, *which has kept and preserved the possession we had taken in the very year 1683.* of the lands, coasts & islands which are situated in the gulph of Mexico, between Carolina on the East, & Old & New Mexico on the West. But a new war having broke out in Europe shortly after, there was no possibility till now, of reaping from that new colony the advantages that might have been expected from thence etc. And whereas upon the information we have received, concerning the disposition and situation of the *said countries known at present by the name of the province of Louisiana*, we are of opinion that there may be established therein a considerable commerce etc. we have resolved to grant the commerce of the country of Louisiana to the Sieur Anthony Crozat etc. For these reasons etc. we, by these presents, signed by our hand, have appointed, & do appoint the said Sieur Crozat to carry on a trade in all the lands possessed by us, and bounded by New Mexico, & by the lands of the English of Carolina, all the establishment, ports, havens, rivers, & principally the port & haven of the Isle Dauphine, heretofore called Massacre, the river of *S<sup>t</sup> Louis*, heretofore called *Missisipi*, from the edge of the sea as far as the \* Illinois ; together with the river *S<sup>t</sup> Philip*, heretofore called the *Missourys*, and

\* The French & Spaniards called by the name of the *Illinois*, or Illinois country, the whole country on both sides

of St. Jerome, heretofore called Ouabache, with all the countries, territories, lakes within land, and the rivers which fall directly or indirectly into that part of the river St. Louis.'

THE ARTICLES. I. Our pleasure is that all the aforesaid lands, countries, streams, rivers & islands be, and remain comprised under the name of the government of Louisiana, which shall be dependant upon the general government of New France, to which it is subordinate: & further that all the lands which we possess from the Illinois be united etc. to the general government of New France, & become part thereof etc.' [here follow 15. other articles relating to commerce only] 'Given at Fontainebleau the 14<sup>th</sup> day of Sep. in the year of grace 1712 and of our reign the 70<sup>th</sup> Louis. By the king Phelipeaux.'

'Here then is a solemn & public declaration sufficiently special to shew that all the waters running directly or indirectly into the Misipi, and the country embraced by them, are held and acted on by France, under the name of the province of Louisiana; and is a full & unequivocal supplement, if any supplement were necessary, to the titles derived, 1. from the actual settlements on the river and it's waters, 2. from the possession of the coast, & 3. from the principle which annexes to it all the depending of the Upper Misipi. That on the Eastern side was called East Illinois, that on the West side West Illinois.



waters. The treaties of Ryswick, in 1697, where France & Spain were adversary powers, & those of Utrecht in 1713. & Rastadt in 1714. where they were allies, by their silence, as well as by their provisions, as to these countries, must be considered as sanctioning the rights of France to this province: to which add the progress made by France, undisturbed & unquestioned, by Spain, in extending her settlements ad libitum within them, till 1763. It is true that in 1715. some Spaniards made small settlements at the Assinai, & Adais, & in 1722. attempted one on the Missouri. The last was prevented by the Indians, and the former were connived at by the Agents of France to favor a smuggling commerce with New Mexico. But these contraband encroachments cannot weigh as evidence of ownership against the possession taken by France 30. years before, & the solemn establishment of boundary by Louis XIV.

War breaking out between them in 1718. the French took Pensacola; the Spaniards retook it, but the French recovered & retained it till the peace in 1719 when it was restored to Spain; and from this epoch the river Perdido has been the acknowledged and undisturbed boundary between Louisiana and Florida.

The boundaries of Louisiana then, as held by France, were the sea-coast & islands from the river Perdido to the Rio Norte or Bravo,

then up the Rio Bravo to it's source; thence to the highlands encompassing the waters of the Mišipi, and along those highlands round the heads of the Missouri & Mišipi & their waters to where those highlands assume the name of the Alleganey or Apalachian mountains, thence along those mountains, and the highlands encompassing the waters of the Mobile, to the source of the Perdido, & down that to the ocean.

In opposition to these claims, both of France and Spain, were those of the then English colonies, now the US. whose charters extended from sea to sea, and consequently covered all Louisiana & Mexico, above the parallel of latitude which formed the Southern boundary of Georgia. These adversary claims were settled by the war of 1755-1763. and the treaty of Paris which closed it, and which made the Mišipi & Iberville the Western limit of the English possessions, and thenceforward the Eastern limit of Louisiana.

This war had begun between France & England, Spain being unconcerned in the grounds of it. In the beginning, France had sensibly the advantage, but after awhile it's successes were signally on the side of England. In 1762 Spain entered into it as a volunteer & ally of France. Great Britain immediately attacked & took the town of Havanna, & an important portion of the

island of Cuba; which imminently endangering the continental possessions of Spain within the gulf, and her communication with them, negotiations for peace were very soon set on foot. Great Britain, in exchange for her conquest in Cuba, required Florida, & that part of Louisiana from the Perdido to the Iberville. Besides the just sympathy which France felt for Spain, who had sustained this incalculable loss by friendly endeavors to aid her, she was bound by the family compact, lately renewed, Article XVIII. ‘to consider the interests of Spain as her own, & to share in it’s losses and advantages.’ A considerable change too had taken place in the minds of the government of France, against the possession of distant colonies, which could not be protected but by a great navy. France therefore, by a secret treaty, Nov. 3. 1762. (being the same day on which they publicly signed the preliminary articles with Gr. Britain) consented to cede all Louisiana to Spain, in order to enable her, by the sacrifice of such part of it as she thought proper, to ransom Cuba, and to indemnify her for the loss of Florida, required also by Great Britain to make up the equivalent. The portion of Louisiana from Iberville to Perdido therefore, ceded to Great Britain by the definitive treaty of Feb. 10. 1763. did in substance move from Spain to Gr. Britain, altho’ France, as not having publicly conveyed

it to Spain, was the formal conveyor to England. Yet she acted herein merely as the friend & agent of Spain, who was become in truth the real proprietor of all Louisiana. The importance of seeing this transaction in it's true light will hereafter appear.

England immediately laid off this portion of Louisiana, with so much of Florida as laid West of the Apalachicola, into a separate government, to which she gave the name of West Florida; and the residue of Florida into another government, to which she gave the name of East Florida. And Spain, now proprietor of Louisiana, & of course free to curtail it's future boundary to the Westward, according to her own convenience, extended the limits & jurisdiction of New Mexico to the waters of the river Mexicana inclusively. But this cannot disprove the former extent of Louisiana, as it had been held & ceded by France; but was done in virtue of the right ceded by France.

The war of 1775-1783. began between Great Britain & the US. but France and Spain at length became parties to it. By the treaty of Paris of 1783. which terminated it, Gr. Britain was constrained to restore to Spain Florida, and the territory East of the Iberville, which she had received at the close of the former war in exchange for Cuba. If the portion of Louisiana comprised in it had really moved from

France, then the restitution of the portion between Iberville & Perdido should have been to France, and that of Florida only to Spain. But as the whole had moved substantially from Spain, the whole was restored to her. On re-entering into possession Aug. 18. 1769. she continued the English annexation of the Eastern portion of Louisiana with a part of Florida, under the name of West Florida; restoring however the whole to the jurisdiction of the Governor of Louisiana, residing at N. Orleans: and in public \* instruments, as well as in common parlance that portion has been spoken of under the names of Louisiana, or of West Florida indifferently.

The nation of France had seen with considerable dissatisfaction the separation of Louisiana from the mother country. That province had ever been viewed by it with great partiality. It was inhabited by their relations & fellow citizens: & they considered Spain, in the immensity of her possessions, as not entitled to such a sacrifice from France. Besides she had now got back both Florida & Cuba: and there was no justice in her continuing to retain Louisiana, which had been ceded to her only as an indemnification for the loss of one, & the means of getting back the other. As soon therefore as the successful administration of the first Consul of

\* One of these was deposited in the office of state:

France had raised her into a condition for re-demanding from other nations what she deemed her rights, Spain was required to make restitution of Louisiana, under the friendly cover indeed of an exchange, but it's inequality shews it was but a cover. The real grounds of restitution required that it should not be mutilated, but full and entire as she received it. For what had she ever given for it? She was compleatly replaced in her antient possessions. On what just ground then could she propose to retain any portion of the equivalent ceded only as an indemnity for them? Accordingly a compleat retro-cession was provided for by the treaty of S<sup>t</sup> Ildefonso of Oct. 1. 1800. by definitions studiously formed to reach every thing which had been ceded to or for her by France. By that instrument she re-cedes to France the colony or province of Louisiana, with the same extent 1. that it now has in the hands of Spain. 2. that it had when France possessed it, and 3. such as it ought to be after the treaties passed subsequently between Spain and other powers. That is 1. she is to recede the antient country of Louisiana, as it is now recovered back into the hands of Spain & held by her under the name of Louisiana, or West Florida, or Mexico, or by whatever other names she or other powers may since have chosen to designate certain parts of it, or to sever it by overlapping Mexico on it's West, and West

Florida on it's Eastern quarter: she is to recede the *thing*, as it is in her hands, unaffected by new names. To make it still plainer, she is to retrocede it 2<sup>dly</sup> with the same extent that it had when France possessed it. Now France never possessed it one day with any less extent than from the Perdido to the Rio Norte, & inland to the sources of all it's rivers. The whole of this extent she transferred on the same day by two treaties of equal date, to wit, all Westward of the Miſipi & Iberville to Spain, & all Eastward to Great Britain. But, of the Eastern portion, Spain having since recovered back all below 31°. of latitude, that, with the Western side, composes Louisiana, as now in the hands of Spain, and as it had been possessed by France. But, not to disturb the right of the US. to the portion North of 31°. and to shew that it was only so much of the Louisiana held by France, as *was now in the hands of Spain*, it is expressly limited 3<sup>dly</sup> to be such as it ought to be after the treaties passed *subsequently* between Spain & other powers. *Subsequently* to what? To the cession of the country by France. When was that session? Nov. 3. 1762. and Feb. 10. 1763. What are the treaties subsequent to this? Those affecting the limits of Louisiana are the treaty of Sep. 3. 1783. with Great Britain, & that of Oct. 27. 1795. with the US. The former was a restitution, by Gr. Britain to Spain, of Florida,

& the portion of Louisiana from the Perdido to the Iberville : and consequently, *after this treaty*, the extent of Louisiana *ought to be*, as again consolidated to the Perdido. But inasmuch as by the latter of these two treaties, Spain had confirmed to the US. a degree of latitude [from 32°. to 31°.] which she had long contended to be an unceded part of Louisiana, & consequently not within the limits of the US., therefore by this provision, that right is saved to the US. & the extent of Eastern Louisiana, *after this treaty, ought to be* only to the latitude of 31°.

Should it be alledged that this confirmation of the diminutions of Louisiana by treaties subsequent to it's alienation by France, goes to the treaty of 1763. with Gr. Britain also ; the answer is that this treaty was *simultaneous* with the alienation, & not subsequent to it, and therefore could not be within the scope of this definition. The confirmation too is in favor of treaties made *by Spain*, with other nations. That with Great Britain is by *France and Spain*. But it might also be justly observed that Louisiana was not lessened in it's dimensions by that treaty ; it was only divided, the Eastern portion thereof transferred to Great Britain, the Western to Spain ; who might new-name a part of it West Florida, & a part Mexico, for their internal purposes, as they pleased ; but when the portion newly called



West Florida came back to *the hands of Spain*, it was still a part of antient Louisiana, *as possessed by France, as now in the hands of Spain*, & unalienated by subsequent treaties of Spain with other powers.

On the whole, the intention of the treaty of S<sup>t</sup> Ildefonso is clearly this. France had in 1763. generously ceded all Louisiana to, or for Spain. Spain consented that the Eastern portion of it, below Georgia, together with her Florida, should go to recover Cuba. Afterwards however, in another war, by the arms of France and of the US. (for Spain came in late, & then did little more than waste her resources on the rock of Gibraltar) she recovers back, and has secured to her, her antient Florida, & the Eastern portion of Louisiana, below Georgia. The treaty of S<sup>t</sup> Ildefonso therefore meant to review this whole transaction, & to restore France & Spain to the *Status quo* prior to the war of 1755.—63. Spain being now in possession of her original colonies of Florida and Cuba, it was just, & was meant, that France should also be reinstated in Louisiana, so far as Spain, while it was in her hands, had not transferred portions of it by permanent alienations to other powers. She confined her reclamation therefore to the part of her antient possession which was in the hands of Spain, not touching the portions which had been validly transferred to the US.

If Spain then were not to deliver the country from the Iberville & Misſipi to the Perdido, this would not be delivering Louisiana with the extent it had when France possessed it, & before it had ever been dismembered: nor with the extent it *now* has in the hands of Spain, since it has been restored to it's antient & integral form: nor such as it ought to be after the treaty subsequently passed with England in 1783. And we trust that these definitions are too exact & unequivocal, & Spain too just, to admit any doubt of what we are entitled to demand, & she bound to deliver.

Whatever Louisiana was, as retroceded by Spain to France, such exactly it is, as ceded by France to the US. by the treaty of Paris of April 30. 1803.

Sept. 7, 1803

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*P. S.* The Northern boundary of *Louisiana*, Coterminous with the possessions of *England*.

THE limits of Louisiana have been spoken of in the preceding statement, as if those established to the West & North, by the charter of Louis XIV. remained still unaltered. In the West they are so, as already explained. But, in

the North, a material change has taken place. With this however it was unnecessary to complicate our subject, while considering the interests of Spain alone: because the possessions of Great Britain, & not of Spain, are coterminous with Louisiana on it's Northern boundary. We will now therefore proceed to examine the state of that boundary, as between Gr. Britain & the US.

Disputes having arisen between Gr. Britain & France as to the limits between Canada & Louisiana on the one side, & the countries of the Hudson's bay, & North Western companies on the other, it was agreed by the treaty of Utrecht (1713) Art. X. that 'Commissaries should be forthwith named by each party to determine the limits between the bay of Hudson and the places appertaining to the French, & to describe & settle the boundaries between the other British and French colonies in those parts' these Commissaries accordingly fixed the Northern boundaries of Canada & Louisiana, by a line beginning on the Atlantic, at a Cape or Promontory in  $58^{\circ}-30'$  N. Lat. thence South Westwardly to the lake Misgosink, or Mistassin, thence farther S. W. to the lat. of  $49^{\circ}$  North from the Equator, and along that line indefinitely. [Hutchins's topographical description of Louisiana. pa. 7.] Thus the Northern boundary of Canada and Louisiana became fixed, & the

latter particularly became changed to the parallel of  $49^{\circ}$  from the Equator, instead of the highlands inclosing the Northern waters running directly or indirectly into the Misipi, as settled by Louis XIV. Canada being, by the peace of 1763. transferred to England, it's Southern boundary was settled by the treaty of 1783. with the US. along the S<sup>t</sup> Croix & highlands bounding the Southern waters of the S<sup>t</sup> Laurence, the  $45^{\text{th}}$  degree of latitude to the water communication between the lakes, and along that communication to the lake of the woods; whence the line of the US. was to run due West, till it should strike the Missisipi. Now, according to the maps of that time, and particularly Mitchell's on \* which the boundary of 1783. was predicated, the line of  $49^{\circ}$  passes through the Southern part of the lake of the Woods: and the North Western point of the lake of the Woods, as observed by Thompson, Astronomer to the North West company, is in Lat.  $49^{\circ}-37'$ . [McKenzie's 2. voyage chapt. 13.] At that lake therefore the English negotiators ceased to pursue the water communication, because, South of the latitude of that lake, they owned nothing: and to have followed the water line further Northwardly, would have broken in upon the continuity of their Southern boundary. Canada

\* The identical map used by the negociators, with their MS. marks on it, is deposited in the office of state.

was thus closed to the West, by it's Northern & Southern limits meeting in a point in the lake of the Woods. It was at that time believed that the Missisipi, heading North of  $49^{\circ}$  would have been intersected by that line of latitude, and our possessions consequently closed. But subsequent information rendered it probable that that river did not extend so far North; (it is now said only to  $47^{\circ} 38'$ ) and consequently that there was an unclosed space between it's source & the lake of the woods. Without undertaking to decide what were the limits dividing Great Britain & Spain in that quarter, we concluded it would be safest to settle, as occasions should offer, our boundary there with both nations, on the principle of 'valeat quantum valere potest' with each. Having to form a convention with England for ascertaining our limits in the North Eastern quarter, we took that occasion for closing, as far as depended on her right, the vacancy in our North Western angle; & therefore proposed it to her. While negotiations were going on at London for this purpose, an opportunity occurred of our acquiring Louisiana: and the stipulations being promptly concluded, a treaty for that acquisition was actually signed at Paris twelve days before that of London was concluded. But this treaty was not known to the negociators of either party at London; nor could the rights acquired by it, be affected by arrange-

ments instituted & completed there merely for the purpose of explaining and supplying the provisions in the treaty of 1783. In result, this acquisition rendered these explanations unnecessary, and the V<sup>th</sup> article respecting them merely nugatory. For England holding nothing in that quarter Southward of 49°. the line proposed in the V<sup>th</sup> article, from the North Western point of the lake of the Woods Southwardly to the nearest source of the Miſipi, is through a country, not belonging to her, but now to the US. Consequently the consent of no other nation can now be necessary to authorize it. It may be run, or not, and in any direction which suits ourselves. It has become a merely municipal object respecting the line of division which we may chuse to establish between two of our territories. It follows then that the V<sup>th</sup> Article of the Convention of London of May 12. 1803. should be expunged, as nugatory; and that instead of it, should be substituted one declaring that the dividing line between Louisiana & the British possessions adjacent to it, shall be from the North Western point of the Lake of the Woods, along the water edge Westwardly to it's intersection with the parallel of 49° North from the Equator, then along that parallel (as established by the treaty of Utretcht between Gr. Britain & France) until it shall meet the limits of the Spanish province next adjacent. And it

would be desirable to agree further that, if that parallel shall, in any part, intersect any waters of the Missouri, then the dividing line shall pass round all those waters to the North until it shall again fall into the same parallel, or meet the limits of the Spanish province next adjacent. Or, unapprised that Spain has any right as far North as that, & Westward of Louisiana, it may be as well to leave the extent of the boundary of  $49^{\circ}$  indefinite, as was done on the former occasion.

Jan. 15. 1804.





THE EXPLORATION OF THE  
*RED*, THE *BLACK*, AND THE  
*WASHITA* RIVERS.

This Manuscript presented to the  
American Philosophical Society  
by D. Parker

Phil: 18 July 1817

Rec<sup>d</sup> thro' Dr Cutbush

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Extract from the *Message* from  
the *President* of the UNITED  
STATES, read in Congress,  
February 19, 1806.

“H AVING been disappointed, after considerable preparation, in the purpose of sending an exploring party up that river, in the summer of one thousand eight hundred and four, it was thought best to employ the autumn of that year in procuring a knowledge of an interesting branch of the [Red] river called the Washita. This was undertaken under the direction of Mr. Dunbar, of Natchez, a citizen of distinguished science, who had aided, and continues to aid us, with his disinterested and valuable services in the prosecution of these enterprises. He ascended the river to the remarkable hot springs near it, in latitude  $34^{\circ} 31' 4''.16$ , longitude  $92^{\circ} 50' 45''$  west from Greenwich, taking its courses and distances, and correcting them by frequent celestial observations. Extracts from his observations, and copies of his map of the river, from its mouth to the hot springs, make part of the present communications. The examination of the Red river itself, is but now commencing.

TH: JEFFERSON.

February 19, 1806.







*Guill'° Dunbar*



# JOURNAL

OF A

## Voyage

Commencing at *S<sup>t</sup>. Catherines* landing, on the East bank of the *Mississippi*, proceeding downwards to the mouth of the *Red* river, and from thence ascending that river, the *Black* river and the *Washta* river as high as the *Hot-Springs* in the proximity of the last mentioned river.



This voyage was undertaken by  
the late *William Dunbar Esq* of Natchez 1804  
in Company with George Hunter.—

This Journal  
was kept by M<sup>r</sup> Dunbar — & is 200 pages

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The Geometrical Survey of the  
Rout will be found at the End consist'g of 64  
Pages in his hand writing.

Philad. 18 July 1817

*Jn. Vaughan*

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# JOURNAL

OF A

## VOYAGE

SET out from St. Catherine's landing in the afternoon. The Latitude of this place is  $31^{\circ} 26' 30''$  North; and Longitude  $6^{\text{h}} 5' 56''$  — west of Greenwich. } 1804  
October 16<sup>th</sup>  
Tuesday

A little below are the white cliffs 5 leagues below the Natchez the face of the cliffs is chiefly white sand surmounted by pine; the cliffs are from 100 to 200 feet high; when the waters are low the basis of the cliffs are uncovered consisting of clay of different colours and some beds of ochre covered here and there by a thin lamina of iron ore; small springs possessing a petrifying property flow over the clay and ochre; numberless logs and pieces of timber converted into stone are strewed about the beach. Fine pure argil of various colours chiefly white and red is found here. Encamped at night upon an Island 7 miles below the place of departure.

Set

1804  
October  
Wednesday  
17<sup>th</sup>

} Set off; passed Fort Adams, and six miles farther the line of demarcation, and arrived at the mouth of red river about nine miles below the line of demarcation; encamped just within its mouth; the waters of this river have a red appearance from a rich fat earth or marl of that colour born down by the floods from which it derives its name; the mouth of the river is about five hundred and fifty yards wide: here we commenced taking the meanders of the river by course and time depending upon the log to inform us of our rate of going as well as the velocity of the Current; there is however no sensible Current at the mouth: the banks on both sides are here clothed with willows, the land is low and subject to inundation to the height of 30 or more feet above the present level of the waters, the mouth of the red river is accounted to be 75 leagues from New-orleans and 3 miles above the exit of the Chafalaya or Opelousa river which was probably the continuation of the red river, when perhaps its waters did not unite with those of the Mississippi excepting during the inundation. M de Ferrer has settled the Latitude and Longitude of this place; the first at  $31^{\circ} 1' 15''$  N. and the last at  $6^h 7' 11''$  west of Greenwich.

Thursday 18<sup>th</sup> Set off up the river, remarked vegetation to be surprisingly luxuriant along the banks owing

no doubt to the rich red marle yearly deposited by the floods of the river — willows grow to a good size, but other forest trees are much smaller than those seen upon the banks of the Mississippi, which may be owing to the newly formed soil or its excessive richness. The river narrows gradually as we advance: at noon it was about 200 yards wide. Got out the instruments, which requiring a good deal of adjustment we were unable to make perfect observations. The Latitude  $31^{\circ}.8'.54''.6$ , perhaps accurate enough to correct the traverse of the river.\* The banks of the river are luxuriantly clothed with peavine and several kinds of grasses yielding seed, of which geese and ducks are very greedy: got our log line prepared and divided into perches — hove the log and found we went at the rate of 4 perches in half a minute. i. e.  $1\frac{1}{2}$  mile per hour — very slow — Soldiers do not exert themselves at the oar; came to, for the night having made nearly 13 miles — hove the lead in the middle of the river and found 11 fathoms. There are generally willows growing on one side of the river, and on the other the same small growth of forest trees continues, consisting chiefly of black oak, packawn, hickory, elm &c. The Trees are so exceedingly grand & lofty upon the banks of the Mississippi, that by

\* The place of observation was at the extremity of the Course N  $32^{\circ}$  E  $17'$  to a p! on the left.

comparison

1804 } comparison those bordering on this river seem  
 October } dwarfish, and appear to bear a kind of proportion to the magnitude of their own river. The extremes of temperature were from  $46^{\circ}$  to  $48^{\circ}$  of Farhenheits thermometer. Made this day  $12\frac{55}{100}$  miles.

Friday 19<sup>th</sup> Continued our rout up the river ; having given the Soldiers this morning a few words of advice and encouragement, they improved considerably in activity and cheerfulness, hove the log and found we went 7 perches per half minute, the Current yet continues so moderate as to offer no impediment to our rowing along shore therefore not worth estimating : landed before 12 to observe and for dinner. Latitude  $31^{\circ} 14' 50''$ .1. After dinner caught a runaway negro ; proceeded on to the confluence of red and black river in Latitude  $31^{\circ} 15' 48''$  which by our reckoning appears to be  $26\frac{1}{3}$  miles from the Mississippi, the Contrast of the two rivers is great, the red river being charged with red marly earth and the other a clear river gives it by comparison a dark appearance, hence the name of black river — Each river is about 150 yards and when united about 200 yards wide. Sounded in the black river and found 20 feet black sand, little or no current. Took specimens of the red marl of red river bank. The water of the black river is rather clearer than that of the Ohio and of a warm

warm temperature, probably owing to the waters which flow into it from the valley of the Mississippi particularly from the Catahoola. Made 15 miles 102 perches. } 1804  
} October

Continue ascending the river ; Thermometer Saturday 20  
 47° Temperature of the water 73° a spring issuing from the river bank 66° Forest trees on the banks chiefly red and black oak interspersed with ash, paccawn, hickory, some elms, pirsimon &c ; several kinds of grass and many humble plants in flower, so that even at this season our country affords employment for the Botanist. Great luxuriance of vegetation along the shore, grass very rank, and a thick curtain of shruberry of a deep green ; the soil black marl mixed with a moderate proportion of sand, resembling much the soil on the Mississippi banks, yet the forest trees are not lofty like to those on the margin of the great river, but resembling the growth on the red river. I omitted mentioning in its proper place, that the last single inundation of the red river appears to have deposited on the high bank a stratum of red marl above  $\frac{1}{2}$  inch thick now dry ; some specimens were taken. Took a meridian altitude of the Sun, from which the Latitude deduced was  $31^{\circ} 22' 46'' .6$ —observed Canes growing on several parts of the right bank, a proof that the land is not deeply overflowed, perhaps from 1 to 3 feet : the banks have the appearance

1804 } appearance of stability, very little willow or other  
 October } productions of a newly formed soil being seen on  
 either side: the solid high bank being deeply  
 shaded by vegetation from the humble creep-  
 ing plant to the spreading oak. Encamped at  
 sun-set. Sounded; 5 fathoms—black sand—  
 Extremes of the Thermometer  $47^{\circ}$ – $80^{\circ}$ . Made  
 this day 13 miles 40 perches.

Sunday 21<sup>st</sup>: Thermometer before sun-rise  $60^{\circ}$ . Continue  
 ascending; no current to impeded us, for altho'  
 there be a feeble current along the principal  
 thread of the stream, yet as this is deflected  
 from bend to bend, we easily avoid its influence  
 by directing our course from point to point or  
 rather passing a little under the points, and in  
 fact where there is any current, a compensation  
 is found by the counter current or eddy under  
 the points. The river is now only 80 yards wide;  
 the timber becomes larger, the banks in some  
 places 40 feet high, yet liable to inundation, not  
 from the floods of this small river, but from the  
 intrusion of its more powerful neighbour the  
 Mississippi: The lands decline rapidly (as in all  
 alluvial countries) from the margin to the Cy-  
 press swamps, where more or less water stag-  
 nates all the year round. The current of the  
 river is still so insensible even in the thread of  
 stream, that we take no account of it: at 8<sup>h</sup> a.m.  
 we arrived at an Island, small but elevated, said  
 to

to be the only one in this river for more than 100 leagues ascending. On the left bank near the Island is a small settlement commenced by a man and his wife : a covered frame of rough poles without walls serves for a house, and a Couple of acres of indian corn had been cultivated, which suffices to stock their little magazine with bread for the year ; the forest supplies Venison, Bear, turkey &c, the river fowl and fish ; the skins of the wild animals and an abundance of the finest honey being carried to market enables the new settler to supply himself largely with all other necessary articles ; in a year or two he arrives at a state of independence, he purchases horses, cows & other domestic animals, perhaps a slave also who shares with him the labours and the productions of his fields & of the adjoining forests. How happy the contrast, when we compare the fortune of the new settler in the U. S. with the misery of the half starving, oppressed and degraded Peasant of Europe!! — The banks here are not less than 40 feet above the present level of the river water and but rarely *overflowed* ; the nearest road to the high lands at the Rapid-settlement on the red river, nearly west is said to be 40 miles thro' an inundated alluvial country ; it is probable the direct distance does not much exceed one half, the numerous lakes in the overflowed lands rendering the road very circuitous : both banks are clothed with

{ 1804  
October

1804 } with rich Cane-brake, pierced by many creeks  
 October } fit to carry boats during the inundation: saw many Cormorants and the stately Hooping Crane: Geese and Ducks not yet abundant; they arrive in myriads with the rains & winter cold: Landed before noon to observe: we had been disappointed at the hour of breakfast by clouds in making observations for the magnetic variation and for regulating the time & rate of going of the watch, preparatory to the lunar observation, & now apprehended the same disappointment, the heavens being loaded with flying clouds: just before the Sun was expected on the meridian, a dense cloud concealed him from view, when he reappeared he was already dipped a little; the latitude deduced is undoubtedly too far North  $31^{\circ} 37' 52''.5$  the sun had therefore not attained his meridian altitude.

This afternoon found the shore favorable for tracking, (i. e.) running along shore & towing the boat; rate of going by log a little improved 5 perches p<sup>r</sup>  $\frac{1}{2}$  minute. At 3<sup>h</sup> p. m. therm<sup>r</sup>  $83^{\circ}$ . — The banks have a regular shelving slope from the top to the water's edge & are totally covered with the most luxuriant herbage consisting chiefly of 5 or 6 kinds of strong grass yielding vast crops of seed nearly mature, upon which Geese and Ducks get surprisingly fat: we shot some water fowl of the Duck kind, whose web-foot was partially divided, the body covered



covered with a bluish or lead coloured plumage; they were extremely fat and excellent, resembling in taste the Canvass-back. The teal of these rivers is also very fat and fine. Wind S.S.E. and cloudy. Encamped. Extremes of the thermometer  $60^{\circ}$ – $83^{\circ}$ . Made this day 14 miles 59 perches. } 1804  
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Thermometer before sun-rise  $65^{\circ}$  Wind S.S.E. Monday 22<sup>d</sup> cloudy. A few drops of rain before day : set off as soon as we could get the men ready & on board. — Soldiers slow in their movements — continues cloudy & threatens rain. Green matter floating on the river, supposed to come from the Catahoola and other lakes and bayoos of stagnant water, which when raised a little by rain flow into the black river. Saw also many patches of an aquatic plant resembling little Islands, some floating on the surface of the river, and others adhering to or resting on the shore and logs ; examined the plant & found it to be a hollow jointed stem with roots of the same form ; extremely light with very narrow willow shaped leaves projecting from the joint, embracing however the whole of the tube extending to the next inferior joint or knot ; the extremity of each branch is terminated by a spike of very slender and narrow seminal leaves from one to two inches in length and  $\frac{1}{10}$  or less in breadth, producing its seed on the under side of

1804 } of the leaf in a double row, almost in contact,  
 October } the grains alternately placed in perfect regularity: I have not been able to detect the flower, so as to be able to determine the class and order to which the plant belongs, it is not probably new; I at first supposed it might be the same which is described by M<sup>r</sup>. Bartram as occupying large portions of the surfaces of rivers in East Florida, but upon examination I found it to be entirely different.

The day continued cloudy; at noon it rained, we had consequently no observation for the Latitude. At 3<sup>h</sup> p. m. therm<sup>r</sup>. at 79° — the afternoon continued cloudy. The current is yet insensible as to any opposition made to our progress. Sounded in the evening, found 3½ fathoms, the river being now considered very low. Extremes of the therm<sup>r</sup>. 65°—79° Wind S.S.E. Cloudy — made 13 miles 76 perches.

Tuesday 23<sup>d</sup> Thermometer 68° — the river for several nights past has fallen about 3 inches perpendicular each night: observed a great number of muscles and periwinkles along shore: the muscle is of the kind commonly called pearl-muscle, & by means of its long tongue makes considerable progress along the bottom & upon the beaches of the river when under water: our people had a quantity of them dressed and found them to be agreeable food: to me they were tough and unpalatable.

unpalatable. The wind altho' a head but not strong, we got along pretty well; but towards 11<sup>h</sup> a. m. it became much stronger, and we made little way. Notwithstanding the cloudy state of the atmosphere we were fortunate in getting a good meridian observation, by which it appears we were in Lat:  $30^{\circ} 36' 29''$  nearly 3 miles higher than the town of Natchez: after dinner proceeded to the mouth of the Catahoola on the left and landed to get information from a french man settled here: he has a grant of land from the Spanish government, has made a small settlement and keeps a ferry-boat for crossing men & horses traveling to or from Natchez and the settlements on red river and on the Washita river: the Country here is all alluvial; in process of time the rivers shutting up ancient passages & elevating the banks over which their waters pass, no longer communicate with the same facility as formerly; the consequence of which naturally is that many large tracts formerly subject to annual inundation are now entirely exempt from that inconvenience: such is the situation of a most valuable tract upon which this french man is settled: his house is placed upon an Indian mount with several others in view: there is also a species of rampart surrounding this place & one very elevated mount; all of which I propose to view and describe on my return, our situation not now admitting

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1804 } admitting delay: the soil here is equal to the  
 October } best Mississippi bottoms; the proprietor says the  
 high mount is not less than 80 feet perpendicular, of this we shall form some estimate at our return. We obtained from him the following list of distances from the mouth of the red river to the Post on the Washita called Fort Miro.

|   |     |         |
|---|-----|---------|
| From the mouth of Red river to the mouth<br>of black river . . . . .      | 10  | Leagues |
| To the mouths of Catahoola, Washita &<br>Tenza . . . . .                  | 22  |         |
| To the River Ha-ha on the right . . . . .                                 | 1   |         |
| To the Prairie de Villemont on the same . . . . .                         | 5   |         |
| To Bayoo Louis on the same — rapids here . . . . .                        | 1   |         |
| To Bayoo Boeufs on the same . . . . .                                     | 4   |         |
| To the Prairie Noyée (drowned Savannah) . . . . .                         | 3   |         |
| To Pine point on the left . . . . .                                       | 4½  |         |
| To the Bayoo Calumet . . . . .  | 3½  |         |
| To the Coal mine on the right & Gypsum on<br>the opposite shore . . . . . | 3   |         |
| To the 1 <sup>st</sup> Settlement . . . . .                               | 12  |         |
| To Fort Miro . . . . .  | 22  |         |
|   | 91. | Leagues |

The accounts of the low state of the river we receive here are rather discouraging, as it appears, that on the first rapids, seven leagues distant there are only 22 inches of water, and we now draw at the stern 30 inches or more. — Went on and encamped within the mouth of the river Washita. This river derives its appellation from the name of an indian tribe formerly

merly resident on its banks, but now no more to be found; it is said that the remnant of the nation went into the great planes to the westward & either compose a small tribe themselves, or are incorporated into another nation. The Junction of the Washita with the Tenza and the Catahoola a little below, all together form the black river, which last here, loses its name, altho' our maps represent it as taking place of the Washita: the Tenza and Catahoola are also names of ancient tribes now extinct: the latter is now the name of a Creek or bayoo 12 leagues long, which is the issue of a lake of the same name 8 leagues in length & 2 leagues generally in breadth, it lies west of this place & communicates with the Red river during the time of the great annual inundation; it receives at the West or N.W. angle a Creek called little river, which preserves a channel with running water at all seasons, meandering along the bed of the lake; but all other parts of its superficies during the dry season from July to november & often latter, are completely drained & become clothed in the most luxuriant herbage: the bed of the Lake then becomes the residence of immense herds of Deer, of Turkeys, Geese, Ducks, Cranes &c &c feeding upon the grass and grain; the Duck species being generally found on or near the little river. The Bayoo Tenza serves only to drain off a part of the waters of the  
inundation

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1804 } inundation from the Mississippi low lands which  
 October } here communicate with the black river during  
 the season of high waters. By reference to our  
 Latitude at Noon we find the mouth of the  
 Washita to be in Lat:  $31^{\circ} 37' 57''$  — Extremes  
 of the thermometer  $68^{\circ}$ — $73^{\circ}$ . Sounded — found  
 6 fathoms — muddy bottom. Made this day 9  
 miles  $77\frac{1}{2}$  perches.

Wednesday 24<sup>th</sup> Thermometer before sun-rise  $54^{\circ}$  — Wind  
 North — Cloudy — Temperature of the river  
 water  $71^{\circ}$ . No current to impede our progress  
 worth estimating. Made slow advancement as  
 usual with our oars; found the shore favorable  
 for tracking or towing, which mode we con-  
 tinued nearly all day making at the rate of five  
 perches p<sup>r</sup>  $\frac{1}{2}$  minute, which is about half a  
 perch more than by rowing: a boat properly  
 constructed for an expedition of this nature  
 ought to advance with more than double our  
 velocity. The wind was contrary all day other-  
 wise we might have gone at the rate of 6  
 perches which is equal to  $2\frac{1}{4}$  miles per hour,  
 more might be performed, but our Soldiers seem  
 at certain times to be without vigour & now  
 and then throw out hints that they can work  
 only as they are paid.

The high lands on both sides have now the  
 appearance of being above the inundation; the  
 timber is such as is generally produced upon  
 high

high lands chiefly Oaks, red, white & black; interspersed with a variety of others; the magnolio grandiflora is absent; its presence is an infallible sign of lands not subject to inundation. We observed to day along the banks the strata of solid clay or marl (not recent but apparently ancient) to lie in very oblique positions, some making an angle of nearly  $30^{\circ}$  with the horizon & generally inclined with the descent of the river, altho' in a few cases the position was contrary; timber was also seen projecting from under the solid bank, which last seems to be in some measure indurated; it is unquestionably very ancient presenting a very different appearance from the recently formed soil: the river is here about 80 yards wide. The Bayoo Ha-ha comes in unexpectedly from the right about a league above the mouth of the Washita, and is one of the many passages or issues thro' which the waters of the great inundation penetrate & pervade all the low countries, annihilating for a time the currents of the lesser rivers in the neighbourhood of the mississippi. Vegetation is extremely vigourous along the alluvial banks; the twining vines entangle the branches of the trees & expand themselves along the margin of the river, in the richest and most luxuriant festoons, and often present for a great extent a species of impenetrable Curtain varigated and spangled with all possible gradations of Color

from

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1804 } from the splendid orange to the enlivening green  
 October } down to the purple & blue and interwoven with  
 bright red and russet brown. A carpet of the  
 finest shrubbery overspreads the elevated margin,  
 composed of a variety of elegant vegetables, to  
 many of which probably no names have yet  
 been assigned by the Botanist; and in positions  
 where the shade is not too deep, the surface is  
 enameled with thousands of humbler plants in  
 full blossom at this late season.

The day has continued cloudy but begins to  
 clear away about 11<sup>h</sup> a.m. we therefore landed  
 before noon to observe & found our Latitude to  
 be  $31^{\circ} 42' 30''.5$  — The timber of the higher  
 grounds is still remarked to be inferior in size  
 and height to that on the Mississippi; but here  
 it may be accounted for by a less fertile soil, not  
 apparently (at most rarely) subject to inundation.  
 The wind still continues in the N. or N.N.W.  
 but the clouds are dissipating and tomorrow we  
 expect fair weather, for making observations.  
 Extremes of the thermometer  $54^{\circ}$ — $68^{\circ}$ . En-  
 camped after completing a poor days voyage  
 of 14 miles 48 perches. Therm! at 8<sup>h</sup> p.m.  
 $54^{\circ}$  —

Thursday 25<sup>th</sup> Therm! in air  $49^{\circ}$  — in river water  $68^{\circ}$  Wind  
 north. Cloudy. Continued & passed Villemont's  
 prairie on the right & pine point opposite: the  
 prairie obtained its name in consequence of its  
 being



being included within a grant under the french Government to a gentleman of that name; some of the family & name yet remain at New Orleans but I have not heard of any claim for this land; many other parts of the Washita are named after their early proprietors: the french people projected & began extensive settlements upon this river, but the general massacre planned & in part executed by the Indians against the french, and the consequent massacre of the Natchez tribe by the french, broke up all those undertakings & they were not re-commenced under the french government. Those prairies are planes or savannahs without timber, generally very fertile, producing an exuberance of strong thick and coarse herbage. When a piece of ground is once got into this state in an indian country, it can have no opportunity of re-producing timber; it being an invariable rule to fire the dry grass in the Fall or winter, to obtain the advantage of attracting game when the young tender grass begins to spring; & thus the young timber is destroyed, & annually the prairie gains upon the wood land; it is probable that the immense planes known to exist in America may owe their origin to this practice. The planes of the Washita lie chiefly on the East side, & being generally formed like the Mississippi lands sloping from the bank of the river towards the great river, they are more or less liable to the influence of inundation

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1804 } inundation in the rear, which has been known  
 October } to advance so far in certain great floods, as to be  
 ready to pour over the margin into the Washita  
 river ; this however has now become a very rare  
 case & it may generally be estimated that from  
 $\frac{1}{4}$  mile to a whole mile in depth will remain  
 exempt from inundation during high floods :  
 and this is pretty much the Case with those  
 lands nearly as high as the Post of the Washita,  
 with the exception of certain ridges of primi-  
 tive high land ; the rest being evidently alluvial,  
 altho' not now subject to be inundated by the  
 Washita river, (which has originally caused their  
 formation), in consequence of the great depth,  
 which the bed of the river has acquired by  
 abrasion.

We saw a good deal of high land to day on  
 either bank producing pine and other timber  
 not the growth of inundated lands. About a  
 league beyond Pine point we arrived at Bayoo  
 Louis on the right, being the commencement  
 of the rapids or rather shallows: Sent people  
 into the water to search the best channel, and  
 after being frequently aground and dragging the  
 boat we got up into a situation about a mile  
 higher, where we were in a manner embayed,  
 being shut in by a gravel-bar upon which there  
 was scarcely in the deepest part a foot of water :  
 finding the men fatigued by being so much in  
 the water at hard labor, we thought it best to

rest

rest for the remainder of the day and consult upon what was best to be done. — The bar being of inconsiderable breadth & no rock in the bottom as we had been taught to expect, it was thought best to cut a channel sufficient for the passage of the boat, which we supposed would take less time than unloading, transporting & reloading at a considerable distance from our present station. — The weather continued damp and disagreeably cold all day: we had no observation at noon. Extremes of the Therm<sup>r</sup> 49°–60° Wind at North. Clearing up — many stars to be seen in the evening: made 3 miles 120 perches.

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Thermom<sup>r</sup> in air 40° in river water 65° — Friday 26<sup>th</sup>  
Wind N.W. light clouds. The morning being very cool, it was thought best for the people to take an early breakfast before going into the water to work. After breakfast commenced digging the cannal which was required to be about an hundred feet long: this business went on heavily & slowly as usual, and it was not untill noon that it was made barely of the depth which it was supposed might pass the boat.

The day being fine made some observations for the regulation of the watch & for the magnetic variation, and at noon had a fine observation, from which the Latitude of this remarkable place was ascertained to be 31° 48'.57".5 — a little

1804 } little way up the river  $\frac{1}{4}$  of a mile there is a  
 October } high ridge of primitive earth studded with an  
 abundance of fragments of rock or stone, which  
 appears to have been thrown up to the surface  
 in a very irregular manner, the stone is of a fri-  
 able nature, & some of it has the appearance  
 of indurated clay; without it is blackish from  
 being exposed to the air, and within of a grey-  
 ish white: it is said that within the hill, the  
 strata are regular, & that good grind-stones may  
 be obtained. After dinner the boat was moved  
 into the channel, where she stuck fast. Cables,  
 ropes and pulies were got across and fixed to  
 trees: handspokes were used to raise & push  
 her along and we made some way thro' the bar,  
 but evening coming on we were obliged to de-  
 sist in hopes of being able to get over in the  
 morning. Extremes of the thermom:  $40^{\circ}$ – $70^{\circ}$ .  
 Wind N.W. Clear star light. Discovered a barge  
 coming up behind us; she also grounded & sent  
 her people out to search for the channel.

Saturday 27<sup>th</sup> Thermometer in air  $32^{\circ}$  in river water  $64^{\circ}$   
 Wind N. Clear above. A fog upon the river,  
 occasioned by the condensation of vapor arising  
 from the surface of the river: the morning be-  
 ing very cold with a hoar-frost, the people were  
 directed to get their breakfasts and prepare to  
 use their exertions in getting the boat over the  
 shoal; the day proved very fine with an agree-  
 able

able warm sunshine, but it was 1<sup>h</sup> p.m. before we got entirely over into floating water on the opposite shore, the men having upon this occasion exerted themselves to my entire satisfaction. The occupation of this day prevented us from making any astronomical observations.— After dinner we pushed on and arrived at the last of the rapids at this place; here we found a ledge of rocks across the entire bed of the river, but having previously sounded and discovered the best channel, we got over into deep water after grounding and rubbing two or three times: The river became again like a mill-pond without current, excepting a motion barely perceptible along the concave shore, the velocity was nevertheless very considerable upon the shoals where the depth of water was small. The whole of those first shoals or rapids embraced an extent of 1½ miles; that is, the obstruction was not continual, but felt at short intervals along this space: Encamped about 1½ mile above the last rapid. Extremes of the therm<sup>r</sup> 32°–73° The evening proves fine & mild. Therm<sup>r</sup> at 8<sup>h</sup> p.m. 62° Wind North. High pine land on the right — breadth of the river 100 yards.

Thermometer in air 40° — in river water 63° Sunday 28<sup>th</sup>  
 — Wind N.W. Clear — fog on the river. Continued our voyage & made some observations for the Longitude & magnetic variation at the hour  
 of

1804 } of breakfast. High lands and a large Savannah  
 October } seen on the right in the morning passed a rocky  
 hill soon after and ‘Bayou aux bœufs’ on the  
 right about 4 leagues from the rapids. At noon  
 got a good observation, Latitude deduced  $31^{\circ} 53' 35''.5$ —at 3<sup>h</sup> p.m. the thermom<sup>t</sup> was at  $78^{\circ}$  in  
 the shade; the day was warm and the sun power-  
 ful: observed some more planes to the left: the  
 river made several returning courses to day, to  
 the southward of west. Thermom<sup>t</sup> at 8<sup>h</sup> p.m.  $56^{\circ}$   
 — Extremes  $40^{\circ}$ – $73^{\circ}$  Sounded — 3 fathoms —  
 mud & sand. Made this day 12 miles 116 perches.

Monday 29<sup>th</sup> Thermom<sup>t</sup> in air  $41^{\circ}$  in river water  $62^{\circ}$  Wind  
 N.W. Fog on the river. Continued our voyage  
 — The banks of the river seem to retain very  
 little alluvial soil; on the opposite shores we see  
 frequently to the water’s edge the high land  
 earth, which is a sandy loam of a greyish light  
 color with streaks of red sand & clay; the soil  
 is not rich, bearing great numbers of pines, in-  
 terspersed with red oak, hickory and dog-wood.  
 The river is now from 60 to 100 yards wide.  
 At the hour of breakfast made three lunar ob-  
 servations, and one sun’s altitude to regulate the  
 watch, which with the observations of yester-  
 day will give the rate of going of the watch  
 proportioning for change of Latitude and de-  
 parture as we advance in the progress of our  
 voyage; I do not however think it of much  
 importance

importance to regard those observations untill { 1804  
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we arrive at the post of Washita, which I suppose to be nearly the most easterly point of the river; there and at the hot-springs (the most westerly point we shall visit) we shall take time to make correct observations; all other points of the river will be ascertained with sufficient precision from our geometrical survey so frequently corrected by the Latitude. At Noon we found our Latitude to be  $31^{\circ} 58' 2''$ . Having made some advantageous alterations in the arrangement of our benches and oars, we advanced with a little better speed; about 6 perches p<sup>r</sup>  $\frac{1}{2}$  minute which however does not exceed  $2\frac{1}{4}$  miles p<sup>r</sup> hour in water without any sensible opposition from the Current. The wind came about to S.W. in the evening; Therm<sup>r</sup> at 8<sup>h</sup> p.m.  $62^{\circ}$ . Extremes  $41^{\circ}$ — $85^{\circ}$ . Soundings—3 fathoms mud & sand—made this day 14 miles 65 perches.

Thermom<sup>r</sup> in air  $47^{\circ}$  in river water  $60^{\circ}$  Wind Tuesday 30<sup>th</sup> W.N.W. Fog on the river. Clear above.—Continued our voyage: the land on either bank seems to be from 30 to 40 feet high and does not improve in quality: pine-trees seen in most situations—nothing remarkable occurred except a rapid we passed in the afternoon, formed by a ledge of rocks which traversed the river, narrowing the water channel to about 30 yards, but the extent between the high banks was not  
less

1804 }  
 October } less than a hundred. At noon found the Latitude to be  $30^{\circ} 5' 24''$ . It would appear from the distances run by our Log and time, when compared with the estimated distances by the french inhabitants and hunters, that their league scarcely exceeds two miles. Encamped near a sand beach favorable for hauling the sene & caught a sufficiency of fish to serve all the people for supper and breakfast. Therm: at 8<sup>h</sup> p.m.  $60^{\circ}$  Extremes  $47^{\circ}$ – $83^{\circ}$ . Made this day 15 miles, 150 perches.

Wednesday 31<sup>st</sup> Thermom: in air  $44^{\circ}$  in river water  $62^{\circ}$  Wind N.N.W. Clear — fog on the river — Continued our voyage. This morning met with shallow water & strong currents, our rate of going, deducting the velocity of the stream was reduced to 2 perches : got upon shoals about 8<sup>h</sup> a.m. which detained us greatly, and impeded us more or less untill the afternoon ; at noon we had a good observation ; Lat : found  $32^{\circ} 10' 13''$  — at 2<sup>h</sup> p.m. got over the last shoal for this day & went on in good water untill the evening, the channel was very narrow, the sand bars at every point extending so far into the bend as to leave little more than the breadth of the boat of water sufficiently deep for her passage, altho' the water often covered a breadth of 70 to 80 yards upon the shoal : in the afternoon passed a little plantation or settlement on the right and at night came up with three others joining each other :  
 here



here is a plane or prairie upon which those settlements are placed; from the regular slope of the land from the river bank towards the eastward, we may be assured the soil is alluvial, yet the bed of the river is now so deep that it is no longer subject to that inconvenience, but in the rear the Mississippi advances & sometimes leaves dry but a narrow stripe along the banks, it is however now more common that the extent of the fields cultivated (from  $\frac{1}{4}$  to  $\frac{1}{2}$  mile) remain dry during the season of the inundation: the soil here is very good but not equal to mississippi bottoms; it may be esteemed second rate. At a small distance to the East are extensive Cypress swamps, over which the waters of the inundation always stand to the depth of 15, 20 & 25 feet. On the west side after passing over the Valley of the river, whose breadth is various from  $\frac{1}{4}$  to 2 miles or more, the Land assumes a considerable elevation from 100 to 300 feet and extends all along to the settlements on the Red river; those high lands from report are poor & badly watered, being chiefly what is termed a pine-barren: there is here a ferry & a road of Communication between the Post of the Washita and the Natchez & a fork of this road passes on to the Settlement called the rapids on Red river, it is distant from this place by computation 150 miles.

From the experience we have had of this  
river

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1804 } river and the information obtained, it appears  
 October } that the present is the least favorable season for ascending this river with a boat of so considerable a draught of water as ours; the spring of the year is the most advantageous, the Mississippi then flows up into the beds of the inferior rivers, raising their waters sometimes within a few feet of the top of the banks; the small current is then often in favor of the ascending boat: this objection would vanish if light boats were used drawing only 6 or 8 inches of water & if well constructed might make with ease 12 leagues or even 40 miles p<sup>r</sup> day; such ought to be the kind of boats for an expedition fitted out to explore; as little time as possible ought to be lost in moving, that more may be left for observation and research: in our actual situation our daily progress seldom equals 14 or 15 miles, which is a sad drawback upon the accomplishment of the objects of an exploring expedition. On this part of the river lies a considerable grant of Land conceded by the Spanish Government to the Marquis of Maison rouge a french emigrant, who bequeathed it with all his property to M. Bouligny son of the late Colonel of the Louisiana regiment & by him sold to Daniel Clark; it is said to extend from the post of the Washita with a breadth of two leagues including the river down to the bayou Calumet, the computed distance of which along the river is called

called 30 leagues, but said to be not more than 12 in a direct line. Extremes of the thermom<sup>t</sup> { 1804  
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44°-84°. Made this day 6 miles 165 perches.

Thermom<sup>t</sup> in air 48° in river water 62° — { November  
Thursday 1<sup>st</sup>  
Calm—clear above, a little fog on the river. Having sounded last evening a shoal upon which there is 18 inches water in the deepest place, we prepared, by unloading part of our Cargo, to cross it : we obtained the use of two Canoes, which with a good deal of trouble enabled us to get over about noon : finding a Canoe so useful & being informed of other rapids and shoals before us, we bartered away a smaller canoe with a little cash for the larger of the two we had borrowed, proposing to put two of our best hunters into the empty Canoe by which they might keep a head & procure some game, & be ready on all emergencies to assist the Barge. Dined & continued our voyage ; met with several retardments from shoals. Made only 4 miles 115 perches. Extremes of the thermom<sup>t</sup> 48°-85° at 8<sup>h</sup> p.m. 64°. Weather extremely fine & agreeable, the slow progress of our boat being the only circumstance of regret, as tending to disappoint our prospects.

Thermom<sup>t</sup> in air 48° in river water 62° light Friday 2<sup>d</sup>  
clouds—Wind S.S.E. a little fog on the river.—  
Continued our voyage with immense sand bars  
in

1804 } in view at every point : the utmost care in steer-  
 November } ing was necessary to keep clear of shoals and  
 sunken logs, which latter were frequently very  
 embarrassing : we suffered much detention this  
 day from those causes, being twice fast upon  
 a sunken log under water, and our boat being  
 so unwieldy & heavy, there was no getting her  
 off by any exertion of poles &c which could  
 be made on board, a rope was carried ashore  
 from the stern, & by that means she was hove  
 backwards & cleared of the log : we lost  $1\frac{1}{2}$   
 hour each time by two such accidents, & sev-  
 eral times got upon shoals which delayed us  
 greatly : light flat boats proper for the naviga-  
 tion of shallow waters would pass over all such  
 obstacles without touching, & when they do  
 touch, being light, they are easily pushed back ;  
 external keels are very improper for any boat  
 upon the mississippi or any river where logs are  
 to be encountered : our boat to her other in-  
 conveniencies was provided with a keel, which  
 added to her draught of water, made her much  
 more difficult to get over a log or shoal, it being  
 impossible to clear her by pushing latterally.  
 Therm<sup>r</sup> at 8<sup>h</sup> p.m. 78° Extremes 48°–84° Made  
 this day 8 miles 104 perches.

Saturday 3<sup>d</sup> Therm<sup>r</sup> in air 52° in river water 64° Some  
 light clouds. Continued our voyage with very  
 little variety, a great sameness appears as to the  
 river

river and its banks. Altho' we got several times aground we were not so unfortunate as yesterday; immense sand bars or beaches with steep banks on the opposite shore continued to be the objects of our view, very little alluvial land except at some points opposed to Cliffs, was to be seen: along the margin of the river, many humble plants are to be seen in flower at this late season, altho' the leaf falls from the trees of the forest: the great variety of tints which the foliage assumes before it separates finally from the parent stock, presents to the Eye an infinitude of beautiful landscapes, and if critically examined is perhaps not without its use: it will be found that the leaves of the same tree are all changed to the same Color, which is probably occasioned by the oxygen of the atmosphere acting upon vegetable matter deprived of the protecting power of its vital principle, & thereby calls forth its latent colorific properties: I have always remarked that the leaves of such trees whose barks and woods are known to produce a dye, are changed in autumn to the same Colour, which is extracted in the Dyer's vat from the woods more especially by the use of alumn or other mordant; whose predominant principle yields oxygen: thus the foliage of the hickory & the oak yielding the quercitron bark is changed before its fall to a beautiful yellow; other oaks assume a fawn colour, a liver or blood colour,

and

{ 1804  
November

1804 } and are also known to yield dyes of the same  
 November } complexion: I am persuaded from the few ob-  
 servations I have made that this rule will be  
 found general, and may therefore serve as an  
 excellent guide to the Naturalist who directs  
 his researches to the discovery of new objects  
 for the use of the Dyer.

At noon we found ourselves in Latitude  $32^{\circ}$   
 $17' 17''$  — nothing remarkable occurred in the  
 afternoon, except a discovery made by D<sup>r</sup> Hun-  
 ter (walking along the river side) of a substance  
 resembling mineral Coal: I suppose from its  
 appearance, that it is the Carbonated wood de-  
 scribed by Kirwan and other Chemists: some  
 specimens were preserved; it does not easily  
 burn, but on being applied to the flame of a  
 candle, it seemed to encrease it & yielded a faint  
 smell resembling, in a slight degree that of the  
 gum-lack of common sealing wax. In the even-  
 ing passed over some rapids and shoals; bottom  
 stone & gravel. Thermom<sup>t</sup> at 8<sup>h</sup> p.m.  $72^{\circ}$  Ex-  
 tremes  $52^{\circ}$ – $86^{\circ}$  Made this day 11 miles 140  
 perches.

Sunday 4<sup>th</sup> Thermom<sup>t</sup> in air  $54^{\circ}$  in river water  $64^{\circ}$  Clear.  
 This has been an unfortunate day; the morning  
 and afternoon were spent upon shoals and rapids  
 with stoney & gravelly bottoms, the Men hav-  
 ing been a great part of the time in the water.  
 Got a good observation at noon; Latitude found

32° 21' 10". Made only 4 miles 233 perches. { 1804  
Thermom! at 8<sup>h</sup> p.m. 63° Extremes 54°-83. { November

Therm! in air 52° in river water 62° heavy Monday 5<sup>th</sup>  
fog & damp air. We were obliged this morning to take out part of our loading to enable us to pass over a shoal carrying only 18 inches water, which detained us untill near 10<sup>h</sup> a.m. — In the course of the day got upon several shoals of inferior note, but upon the whole we were more fortunate than usual, the water being generally deeper and with little current. We remarked a greater appearance of fertility as we approached the Settlement; the trees are of larger dimensions, & there is a due proportion of shrub or underwood, which was absent in the poorer lands; some fields of Cane began to appear, which is a sure indication of a fertile soil: we had also leisure to admire the beautiful tints assumed by the foliage of the vegetable world: it was apparent that the external leaves most exposed to the light & to a freer circulation of air, exhibited the first changes of Color, while those of the same plant under a thick shade still retained their deep verdure. The Willow tree pendent over the water, presents a fine deep yellow along the outline of the plant, from whence may be traced a regular gradation, thro' the admired lemon color down to the soft and delicate summer's green, which last in the shade, retains

its

1804 } its full verdure: on other trees may be seen a  
 November } deep blood color inclining to black, descend-  
 ing by regular shades to the palest pink mingled  
 with green & from thence by similar gradation  
 to the usual summer verdure of the plant: Leaves  
 plucked from the tree at this season & preserved  
 in the shade will retain their beautiful colors for  
 a great length of time.

The river continues of the same general  
 breadth. i. e. from 80 to 100 yards, but the wa-  
 ter channel is often confined to 30 yards. The  
 Atmosphere had this day a smokey or misty  
 appearance; the Sun broke forth a little in the  
 afternoon, but shone with diminished lusture.  
 This smokey or misty appearance which in our  
 Country is common in the months of november  
 and december is attributed to a common practize  
 of the Indians and Hunters, of firing the woods,  
 planes or savannahs; the flames often extend-  
 ing themselves some hundred of miles, before  
 the fire is extinguished; it is observed that rain  
 always follows those conflagrations; sometimes  
 the condensation of the smoke occasions a fine  
 rain resembling a fog or thick dew, but at other  
 times the rain is impetuous accompanied by  
 thunder & lightening & immediately after it  
 clears up fine, but not always without a contin-  
 uation of the blue misty appearance of the At-  
 mosphere.

Soft friable stone is frequently seen and great  
 loads



loads of gravel and sand upon the beaches ; reddish Clay appears in strata much indurated and blackened by exposure to light and air. — The water of this river is extremely agreeable to drink and much clearer than that of the Ohio ; in this respect it is very unlike its two neighbours the arcansa and red rivers ; whose waters are extremely charged with earthy matter of a reddish brown color, giving to the water a chocolate-like appearance ; & when those rivers are low their waters are not potable, being extremely brakish, from the great number of salt springs flowing into them & very probably from the beds of rock-salt over which, (it has been reported) they flow : the inconvenience from this cause, to voyagers, is not so great as might be apprehended, as it appears that brooks & springs of fine water falling into those rivers, particularly the arcansa, are very frequent, and may be met with often in the course of a days progress. — Altho' the water of the Washita river does not exhibit any saline impregnation, yet from report there are many situations in its neighbourhood where salt may be procured by digging pits in the places called salt-licks, where water is found equally strong with sea-water ; we expect to examine some of those on our way upwards. Thermom<sup>r</sup> at 8<sup>h</sup> p.m. 58° Extremes 52°–68° Wind at N.W. Made this day 11 miles 276 perches.

1804  
November

Thermom<sup>r</sup>

1804  
November  
Tuesday  
6<sup>th</sup>

Thermom<sup>r</sup> 45° in air — in river water 64° — heavy fog Wind W. Continued our voyage with better fortune ; that is, we escaped any considerable obstructions from rapids and sand bars. No variety was to be seen in the appearance of the Country on either side the river. At noon got a fine observation about a league below the Post of Washita; Latitude deduced 32° 28' 58'' ; by the sinuosities of the river it appears we are not more than a mile to the south of it : arrived there about 3½<sup>h</sup> p.m. and were very politely received by Lieu<sup>t</sup> Bowmar, who immediately offered us the hospitality of his Dwelling with all the services in his power. The Position called Fort Miro being the property of a private person, who was formerly civil commandant here, the Lieutenant has taken post about 400 yards lower and has built himself some log-houses and enclosed them with a slight stockade: this young officer exclusive of the manners of a polite Gentleman, appears to possess talents ; he has formed a tollerably good chart of the river from its mouth to the Post, being the result of his own labors on the way up to take possession of the Post, this he has continued upwards from the best information he has been able to obtain ; the whole gives a satisfactory idea of the river & part of the Country ; we have also obtained some further information from the former Com-mandant a french man, and other persons here,  
of

of all which we have made notes & shall avail ourselves in the prosecution of our voyage. } 1804  
} November

Thermom<sup>r</sup> at 8<sup>h</sup> p.m. Extremes 45°–79° Made this day 9 miles 257 perches; amounting in the whole to 196 miles 256 perches from the mouth of the red river to the Post of the Washita; and by the old computation 90 leagues.

Thermometer in air 52° in river water 64° Wednesday 7<sup>th</sup>  
Clear. Finding from past experience that the boat in which we have come up, would be improper for the continuation of our voyage, we made enquiry this morning for other craft, but it appears there is no great choice of boats at this place; prepared also for astronomical observation: being greatly interrupted by visitants who came to offer services &c we were prevented from making any useful observation until noon & even then we were incommoded: the Sun's meridian altitude gave the Lat: 32° 29' 52''.5 but I was not perfectly satisfied with this observation; from the Causes mentioned I suspect the altitude was taken a little too late, & shall hope to correct if necessary by future observations. Therm<sup>r</sup> at 8<sup>h</sup> p.m. 67° Extremes 52°–80°

Thermom<sup>r</sup> in air 53° in river water 58° Thursday 8<sup>th</sup>  
Cloudy. This was a disagreeable, damp and cold day: made further enquiry for small boats with  
little

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} little success; found only one, which with another of the same burthen might answer our purpose: no observation made this day. Upon viewing the Country on the East of the river, it is evidently alluvial; the surface is equal with a gentle slope from the river towards the rear of the plantations; the land here is of excellent quality, being a rich black mold to the depth of a foot, under which there is a friable loam of a brownish liver color, which very probably will itself become a good soil when broken up & exposed to the influences of the elements. Therm<sup>f</sup> at 8<sup>h</sup> p.m. 56°. Extremes 53°-61°

Friday 9<sup>th</sup> Thermom<sup>f</sup> in air 42° in river water 61°. Cloudy, damp & cold. Continued our search for proper vessels and heard of a flat-bottomed barge, which we expect will be very suitable, with the reduced loading we intend to carry with us, the boat will probably draw only 12 inches water: no observation, it being dark, cloudy & disagreeable all day. Extremes of the thermometer 42°-72°

Saturday 10<sup>th</sup> Thermom<sup>f</sup> in air 40° in river water 58°. Clear—calm—this day having the appearance of being fine & serene, prepared for observation; and in the course of the day took altitudes of the Sun for the regulation of the watch and the magnetic variation: at noon found the Latitude  
by

by a fine observation to be  $32^{\circ} 29' 35''$ , this differs from that of the 7<sup>th</sup> by  $17''$ ; I give the preference to the result of this day, for reasons already mentioned; In the afternoon took distances of the moon from the Sun to the west of her and in the evening took distances of the moon from  $\alpha$  Arietis to the east of her, which may be considered as a complete series for the determination of the Longitude.

{ 1804  
November

Having hired the barge and agreed to give  $1\frac{1}{4}$  dollar p<sup>r</sup> day for the use of her, we had her brought along side: She is upwards of 50 feet long &  $8\frac{1}{2}$  feet in breadth built tollerably flat, her bottom being still a little convex & being pretty well formed for running. This boat with some improvements is probably the best form for penetrating up shallow rivers, she is undoubtedly too long, as we shall certainly meet with short turns among logs & perhaps rocks, the passage of which might be facilitated by a shorter boat: got her loaded before the evening with a view to set off early next morning. She made some water—found about bed time, that she had made a great deal of water; kept her baled all night. Thermom<sup>r</sup> at 8<sup>h</sup> p.m.  $34^{\circ}$  Extremes  $40^{\circ}$ — $72^{\circ}$ .

Thermometer in air  $24^{\circ}$  in river water  $53^{\circ}$  Sunday 11<sup>th</sup>  
Clear — calm. — Got the Barge hauled ashore  
and caulked, which detained us untill the after-  
noon;

1804 }  
 November }

noon; got another good observation at noon, which gives the latitude  $32^{\circ} 29' 30''.5$  that is  $4\frac{1}{2}''$  less than yesterday, and as those two observations were both very good, the mean of the two results may be taken for the truth, the latitude of the place of observation will therefore be  $32^{\circ} 29' 32''.75$  and as the post or Garrison lies  $4\frac{1}{2}''$  north of the place of observation, we may consider its latitude as fixed at  $32^{\circ} 29' 37''.25$ . Set out after dinner and made 3 miles, Encamped at the plantation of Baron Bastrop. It appears that this small settlement on the Washita & some of the Creeks falling into it contains only 500 persons of all ages & sexes; it is reported that there is a great deal of excellent land upon several considerable Creeks falling into the Washita & that consequently the Settlement is capable of great extension, & may be expected, with an accession of population to become very flourishing: there are three merchants settled at the post, who supply the inhabitants at very exorbitant prices with their necessaries; those with the garrison & two small planters and a tradesman or two constitute the present village: a great part of the inhabitants still continue the old practice of hunting during the winter season; their peltries go to the Merchant at a low rate in exchange for necessaries; in the summer these people content themselves with making corn barely sufficient for bread during the year;

in

in this manner they always remain extremely poor; some few who have conquered their habits of indolence (which are always a consequence of the indian mode of life) and addicted themselves to agriculture, live more comfortably & taste a little the sweets of civilized life. } 1804  
} November

Thermom<sup>t</sup> in air  $36^{\circ}$  — in river water  $54^{\circ}$  — Monday the 12<sup>th</sup>  
 Clear — Calm — Got on board some fresh beef and other provisions this morning, which detained us a little. Continued our voyage with a pilot on board hired at the rate of 30 dollars p<sup>r</sup> month. Met with several shoals, but passed over them with ease, our Barge not drawing half the water of our own boat, & being also very light both in her timbers & planks; the appearance of the lands along the river is not very inviting, much pine woods upon a thin poor soil: to the right the settlements on the Bayou Barthelmi and Siard are said to be rich lands. At noon got an observation; Latitude  $32^{\circ} 34' 47''$ . Made this day 16 miles 32 perches. Therm<sup>t</sup> at 8<sup>h</sup> p.m.  $54^{\circ}$  — This Evening a little Cloudy.

Thermom<sup>t</sup> in air  $33^{\circ}$  in river water  $55^{\circ}$  Fog Tuesday 13<sup>th</sup>  
 on the river. Calm. Continued our voyage without change in the appearance of the Country: passed an Island and strong rapid at 8<sup>h</sup> a.m. & arrived at a little settlement where we halted to breakfast a little below a chain of rocks crossing  
 ing

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November

} ing the channel between an Island & the main-land called Roquerau — great misery depicted in the Countenances of the Spaniard & his family inhabiting this little settlement, arising as it appears from extreme indolence : the wind at south indicates rain, with a dark cloudy sky : we find our situation greatly improved in our new barge, being able to go about 3 miles per hour when the Men use a little exertion : we pass without difficulty over shoals of 11 or 12 inches water. The river acquires a more spacious appearance, being in most places about 150 yards wide. Lost some time on the shoals and at half an hour past noon arrived at the last settlements. Began to rain — put ashore to dine — cleared up — set out and passed the mouth of Bayou Barthelmi on the right at 4<sup>h</sup> p.m. being 12 computed leagues from the post. Here commences Baron Bastrop's great grant of land from the Spanish Government, being a square of twelve leagues to each side ; a little exceeding one million of french acres, which I presume is more than double of what that Government granted to all persons within the Mississippi territory. — At 11<sup>h</sup> a.m. passed Otter Bayou on the left. The Banks of the river continue to be about 30 feet high, of which 18 feet from the water are a clayey loam of a pale ash colour, upon which the river has deposited an alluvion of 12 feet of light sandy soil, which appears in most places

to



to be fertile, being of a brownish dark color. { 1804  
 It seems that this species of land is here of small November  
 breadth, not exceeding half a mile on each side,  
 & may be called the valley of the river Washita,  
 beyond which there is high land clothed chiefly  
 with pines.—The Evening is cloudy & dark.  
 Made this day 16 miles 312 perches — Ther-  
 mom<sup>r</sup> at 8<sup>h</sup> p.m. 62° — Extremes 33°–66°

Thermometer in air 44° in river water 55° — Wednesday 14<sup>th</sup>  
 Clear — calm. Continued our voyage, the soil  
 seems to be thin; the growth of the timber is  
 small. We made small progress, being opposed  
 by a head wind. Passed the 'Bayou des buttes' in  
 the forenoon; this Creek derives its name from  
 a vast number of Indian mounts discovered by  
 the hunters along its course: we were detained  
 an hour extraordinary at breakfast, from the  
 necessity of repairing the rudder irons damaged  
 going over a rocky flat. The margin of the river  
 is clothed with such timber as generally grows  
 on inundated lands, particularly a species of the  
 white oak called vulgarly the overcup-oak; its  
 timber is remarkably hard, solid, ponderous and  
 durable, and it produces a large acorn in very  
 great abundance upon which the Bear feeds;  
 it is also very fattening for Hogs.

At noon got a good observation & found the  
 latitude to be 32° 50' 8".5 — after dinner passed  
 a long narrow Island. The face of the Country  
 begins

1804 } begins to change; the banks are low and steep,  
 November } and the river generally deeper and much contracted, being from 30 to 50 yards wide; this low Country is 2 or 3 leagues wide on each side of the river, liable to overflow 12 or 15 feet above the level of the land, the soil is a very sandy loam in the neighbourhood of the river, & covered by such vegetables as are found on the inundated lands of the Mississippi; in short this tract presents every appearance of a newly created soil, very different from what we passed below: it may be supposed that there existed a great Lake within the space now occupied by this alluvial tract, which may have been drained off by a natural Canal worn out by the abrasion of the waters, and that since that period, the annual inundations have been replenishing this space with the alluvion of its waters; 18 or 20 feet of soil perpendicular is yet wanting to render it a fit habitation for man; it appears never the less to be well peopled by the beasts of the forest, several of which presented themselves to view, but they must all retire to the high lands during the season of the inundation. We now begin to see quantities of water fowl which are not generally very numerous untill the cold rains and frost drive them to us from the northward. Fish is not so abundant in this river as might be expected; at the post we were informed that the river had been extremely full of fish untill the  
 year

year 1799, when the waters of the inundation of the Mississippi dammed up the Washita river some distance above the Post and produced a stagnation and consequent corruption of the waters, which destroyed all the fish within the influence of this cause. The river continues to be contracted, seldom exceeding 60 yards and generally deep; no current is felt excepting in places a little shallower than the rest. — Thermometer at 8<sup>h</sup> p.m. 44°. Extremes 44°–58°. Clear.

Thermometer in air 38° in river water 54° — Thursday 15<sup>th</sup>  
 Clouds — Calm. Continued our voyage thro' a Country of the same appearance as yesterday. Passed some rapids without difficulty — the banks still continue low; from ten to 15 feet above the present level of the river; the water marks on the trees from 15 to 20 feet. Landed to observe about 90 yards higher than the upper point of the Island of Mallet, judging that we were not far from Lat. 33° the division line between the territories of Orleans and Louisiana; we found the Latitude by a very good observation to be 32° 59' 27".5. The Island of Mallet is on the right of the main channel, and the place of observation being 90 yards N 45° E from the upper point of the Island. Making allowance for the breadth of the river (50 yards), Latitude 33° may be found from the above data when the Jurisdiction of the territories may require

1804 } require it, this Island of Mallet being very well  
 November } known to the Hunters. Should time and circumstances permit on our return, a 2<sup>d</sup> meridian altitude of the Sun may be taken and a proper mark set up in Lat: 33°.—In general the bed of the river along this alluvial country is fully covered by water from bank to bank & the navigation good, but to day at 3<sup>h</sup> p.m. we passed 3 contiguous sand-bars or beaches called ‘les trois batures’; & at three & a half hours p.m. the ‘bayou des grand Marais’ (great Marsh Creek) on the right: passed also in the evening on the same side ‘la Cypriere Chattelrau’: a point of high land approaches within half a mile of the river on the right. Thermom<sup>t</sup> at 8<sup>h</sup> p.m. 50°—Extremes 33°–60°. Made this day 16 miles 42 perches. This days voyage was shortened by an indisposition which confined me to the tent untill the hour of breakfast.

Friday 16<sup>th</sup> Thermom<sup>t</sup> in air 38° in river water 54°—Cloudy—Calm. Set out at 6<sup>h</sup> 58’ and continued our voyage, the wind rises northerly against us, nevertheless we make 7½ perches p<sup>r</sup> ½ min: whereas with our former boat we should not have exceeded 4 per: still however our improved progress is short of the velocity which a boat for our purpose ought to attain; it should not fall short of 12 per: p<sup>r</sup> ½ min: which would be about 4½ miles p<sup>r</sup> hour. No observation to day

day the weather being cloudy, damp and disagreeable. Between 11 & 12 o'clock passed on the right the 'marais de la Saline' (Salt-lick marsh) There is here a small marshy lake, but it is not intended by its name to convey any idea of a property of brackishness in the lake or marsh, but merely that it is contiguous to some of the licks, which are sometimes termed 'Saline' & sometimes 'glaise,' being generally found in compact clay which might serve for potter's ware; the bayou de la Tulipe forms a communication between the lake and the river: there is opposite to this place a point of high land forming a promontory and advancing within a mile of the river, to which boats resort when the low grounds are under water: a short league after, we came to the mouth of the grand bayou de la Saline (Salt-lick Creek) on the right; this is a creek of considerable length & tollerably good navigation for small boats, the Hunters ascend it to an extent of a hundred of their leagues in pursuing their game. They all agree that none of the springs which feed this Creek are salt; it has obtained its name from many buffalo salt licks which have been discovered near to the Creek. Altho' most of those licks by digging will furnish water holding in solution more or less marine salt, yet we have reason to believe that many of them would produce Nitre. We now begin to observe a stratum of a  
dirty

{ 1804  
November

1804 } dirty white colored clay under the alluvial soil ;  
 November } this clay is similar to what we observed before  
 we entered the alluvial tract; we have therefore  
 reason to expect, that we are gradually emerg-  
 ing from this sunken tract & shall soon ascend  
 into the high land country. Made this day 17  
 miles 185 perches. In the evening it began to  
 rain. Thermom<sup>t</sup> at 8<sup>h</sup> p.m. 42° Extremes 38°—  
 51°

Saturday 17<sup>th</sup> Thermom<sup>t</sup> in air 40° in river water 54° —  
 fog on the river — calm — river risen 2½ inches  
 during the night.

Continued our voyage; the low lands are still  
 alluvial, at least to a certain depth; an under  
 stratum of clay appears in many places, where  
 the banks have been undermined & broken  
 down: we remarked that since we entered the  
 alluvial country about 32° 52' Lat: we have  
 seen no long moss (*Tilandsia*) altho' this low  
 damp country seems in all respects well adapted  
 to favor its production; upon enquiry of our  
 Pilot, he informs us, we shall see no more of  
 it; probably its limit of vegetation northerly  
 may be fixed by nature near to 33° Lat: Saw  
 a great quantity of the long-leaf pine, which is  
 frequently found in rich & even inundated lands  
 as is the case here; the short leaf or pitch pine  
 on the contrary is always found upon arid lands  
 & generally in sandy & lofty situations; but

our

our Country furnishes it in a hard meagre clay. { 1804  
 In the forenoon saw the first swan which was { November  
 shot by one of our hunters; it was a solitary  
 one whose mate had probably been killed: this  
 is the season when the poor inhabitants of the  
 settlement of the Washita turn out to make their  
 annual hunt; they carry no provision with them  
 but a little indian corn, depending on their guns  
 and ammunition for the rest. The Deer is now  
 fat & their skins in perfection; the Bear also is  
 now in his prime with regard to the quality  
 of his fur and the quantity of fat or oil which  
 he yields, he has been feeding luxuriously for  
 some time upon the autumnal fruits of the  
 forest, such as pirsimmons, grapes, pawpaws,  
 walnuts, packawns, hickory-nuts, chinquapins,  
 beech-mast, a great variety of acorns &c &c;  
 it is however well known (notwithstanding the  
 fancies of some writers) that the Bear does not  
 confine himself to vegetable food; the planters  
 have ample experience of his carnivorous dis-  
 position. He is particularly fond of Hog's flesh,  
 but no animal escapes him that he is able to  
 conquer: Sheep & Calves are frequently his prey  
 and he often destroys the fawn when he stum-  
 bles upon it; he cannot however discover it by  
 the sense of smelling notwithstanding the ex-  
 cellence of his scent; Nature has protected the  
 helpless young by denying it the property of  
 leaving any effluvium upon its tract, which pro-  
 perty

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} perty is so powerful in the old Deer : perhaps it may not be generally known to Naturalists, that between the hoofs of Deer &c is found a sac with its mouth inclining upwards ; this sac always contains more or less musk, which by escaping over the opening in proportion as it is secreted, gives to the foot the property of leaving on the ground a scent wherever it passes : during the rutting season the musk is most abundant particularly in old males, which may often be smelt at a considerable distance by the hunters.

The Bear unlike to most other beasts of pray does not kill the animal immediately he has seized upon, but regardless of its struggles, cries and lamentations, fastens upon it and (if the expression may be allowed) devours it alive : the taste of M<sup>r</sup> Bruce & his Abyssinians may have been formed upon this excellent model. — The hunters count much of their profits from the oil drawn from the Bear's fat, which at New-Orleans is always of ready sale, and is much esteemed for its wholesomeness in cooking, being preferred to butter or hog's lard ; it is found to keep longer than any other oil of the same nature, without turning rancid : they have a method of boiling it from time to time upon sweet-bay leaves which restores it or facilitates its conservation. At noon found our Latitude to be  $33^{\circ} 13' 16''.5$ . In the afternoon saw a small Aligator, which we did not expect in so north-

ern



ern a situation ; passed a few rapids & saw cane brakes on both sides, the canes of a small size, which demonstrates that the water does not surmount the bank above a few feet: the river widens & a number of sand-beaches are seen. Therm: at 8<sup>h</sup> p.m. 44° — Extremes 40° — 41°. Made this day 15 miles 308 perches. { 1804  
November

Therm: in air 32° — in river water 52° — Sunday 18<sup>th</sup>  
 Serene — Calm — river seems rather on the rise. Set out at 7<sup>h</sup> 20' and continued our voyage; passed along a narrow passage this morning, about 70 feet wide; the whole of the water of the river runs thro' this passage; on the left the old channel of the usual breadth leaves an interval which becomes an Island when the water passes along the old bed of the river during freshes: Came up to a place at the hour of breakfast where there is an appearance of some clearing called 'Cache la Tulipe' (Tulip's hiding place) this is the name of a french hunter who concealed his property in this place. It continues to be a practize of both white and red hunters, to deposit their skins &c. often suspended to poles or laid over a pole placed upon two forked posts in sight of the river, untill their return from hunting; these deposits are considered as sacred and few examples exist of their being plundered.

The banks of the river have now the appearance of the high land soil, with a stratum of 3  
 or

1804

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} or 4 feet of alluvion deposited thereon by the river, this superstratum is greyish and very sandy with a small admixture of loam, which indicates the poverty of the mountains and uplands where the sources of the river take their rise. At noon we found our Latitude to be  $33^{\circ} 17' 13''$  — In the afternoon passed on the right, the entrance of a bay, which within must form a great lake during the inundation. We now see a considerable number of the long-leaf pine tree; the canes along the bank have a better appearance being much larger in size, this indicates a better or more elevated soil: Canes subject to be inundated, i. e. the land to be inundated 3, 4 or 5 feet, are always small and tough; they grow much finer where there is little or no inundation, provided the soil be rich & loose. Passed a high hill (300 feet) on the left clothed with lofty pine trees. Thermom<sup>t</sup> at 8<sup>h</sup> p.m.  $57^{\circ}$  cloudy weather threatens rain. Made this day 18 miles 75 perches. Having been much indisposed for some days past, the number of remarks are probably fewer than might have been made — I still remain in the same situation.

Monday 19<sup>th</sup> Therm<sup>t</sup> in air  $54^{\circ}$  — in river water  $54^{\circ}$  — Cloudy — Calm — river at a stand. Set out at 6<sup>h</sup> 56' and continued our voyage. The banks present still more the appearance of the high land soil, the under stratum being a pale yellowish clay

clay and the alluvial soil of a dirty white sur-  
 mounted by a thin covering of a brownish veg-  
 etable earth: the trees begin to have a better  
 appearance, growing to a considerable size and  
 height, tho' much inferior to those of the allu-  
 vial banks of the Mississippi: passed the 'bayou  
 de hachis' on the left this morning; points of  
 high land not subject to be overflowed frequently  
 touch the river, the valley is said to be league or  
 more in breadth on each side of the river: passed  
 some pine hills on the left called 'Cote de Cham-  
 pignole', the river has been narrow during the  
 course of this day's voyage, not exceeding on the  
 average from 50 to 60 yards. Thermometer at  
 8<sup>h</sup> p.m. 62° Extremes 54°-67°. Made this day  
 18 miles 120 perches.

Therm<sup>t</sup> in air 59° in river water 54° — Cloudy Tuesday 20<sup>th</sup>  
 — Calm. No change in the river. Set off at 6<sup>h</sup>  
 48' — The banks of the river appear to be higher  
 and the river wider, we meet with a number of  
 sand beaches and some rapids but good deep  
 water between them. At 7½<sup>h</sup> a.m. passed a  
 creek which forms a deep ravine in the high  
 lands and has been called 'Chemin Couvert' —  
 a little past 8<sup>h</sup> we ascended a rapid where the  
 water was confined to a breadth of 40 yards, a  
 little farther we had to quit the great channel on  
 account of its shallowness and rapidity, & passed  
 along a narrow channel 60 feet wide: without a  
 guide

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} guide a Stranger would have taken this passage for a Creek. Between 11 and 12<sup>h</sup> saw an alligator, which surprised us much at this late season & so far north. The Banks (exclusive of the large timber) are covered by cane or thick underbrush, frequently so interwoven with thorns and briars, as to be impenetrable, until the way is cut with an edge tool: we see also some species of timber not common below, such as Birch, Maple, holly & two kinds of timber to which no other name has yet been given but 'Bois du bord de l'eau' (water side wood). Persimmons and small black grapes are plenty in some situations; the first are often very large and excellent, the last a mixture of sweet and tart; those are also common on the Mississippi. The weather being cloudy we did not land to observe. In the afternoon observed some ferruginous earth on the right: the margin is frequently fringed with a variety of plants & vines, of the latter several species of the convolvulus, which no doubt in their season ornament this river with their elegant flowers. Thermom<sup>t</sup> at 8<sup>h</sup> p.m. 54°. Extremes 54°-62°. Made this day 18 miles 308 perches.

Wednesday 21<sup>st</sup>:

Therm<sup>t</sup> in air 43° in river water 54° — a little fog — calm. Set out & passed a hill and cliff 100 feet perpendicular crowned with lofty pines called 'Cote de Finn' (Finn's hill) a chain of high

high land continues some distance on the left ; the cliff presents the appearance of an ash colored clay ; passed a strong rapid, and a little farther a Creek on the right called Bayou d'Acassia (Locust Creek) : The river varies here from 80 to 100 yards wide ; we frequently see indications of iron along the banks and some thin strata of ore from  $\frac{1}{2}$  inch to 3 inches thick, but no other metallic appearance, nor indeed any thing uncommon in the fossil kingdom ; a little cloudy this morning, but cleared up before noon & got ashore hastily at a steep inconvenient place among trees and brush, and had a tolerably good observation notwithstanding : Latitude found  $33^{\circ} 29' 29''$ . The day proves mild, warm and agreeable, which acted as a restorative to myself and others who had been indisposed for some days past : Therm<sup>r</sup> at 3<sup>h</sup> p.m.  $72^{\circ}$ . Altho' Ducks, Geese and Turkeys are often seen, yet we cannot say they are in that abundance which from report we expected, and they are so shy, that we seldom can get a shot from our large boat ; but by sending the canoe a head some game is procured ; it is probable that higher up, we shall be more successful. Therm<sup>r</sup> at 8<sup>h</sup> p.m.  $58^{\circ}$  — Extremes  $43^{\circ}$ — $72^{\circ}$ . Made this day 18 miles 36 perches.

Therm<sup>r</sup> in air  $40^{\circ}$  in river water  $53^{\circ}$  — Light Thursday 22<sup>d</sup>  
clouds — calm. — No change this morning in  
the

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} the general appearance of the country, the timber such as has been mentioned, with an increasing proportion of holly, birch, maple and beautiful pine-trees; at 10½<sup>h</sup> a.m. came to the road of the Cadadoquis Indian Nation leading to the Arcansa Nation; a little beyond this is the Ecor à Fabri (Fabri's Cliffs) 80 to 100 feet high: it is reported that a line of demarkation run between the french and spanish provinces, when the former possessed Louisiana, crossed the river at this place; and it is said that Fabri a french-man & perhaps the supposed Engineer deposited lead near the cliff in the direction of the line: we could not however obtain any authenticated account of this matter, and it is not generally believed: a little farther is a smaller cliff called 'le petite cor à Fabri' (the little cliff of Fabri); those cliffs appear to be composed chiefly of ash-colored sand with a stratum of clay at the base, such as reigns all along under the banks of this river. The day being hazy and cloudy we made no observation for the Latitude at noon. In the afternoon we encountered a great many difficult rapids, the current of the river being frequently confined to a very small space, where the depth of water is but barely sufficient for the passage of the boat; the additional rapidity of the current indicates that we are ascending into a higher country. The water of the river now becomes extremely clear and

is

is equal to any in its very agreeable taste as a drinking water. The general breadth of the river to day has been about 80 yards, altho' in certain places not above one half of this quantity. We now find immense beaches of gravel and sand, over which the river passes, in the season of its floods with the rapidity of a torrent, carrying with it vast quantities of drift wood which are in many places piled up in prodigious masses, lying 20 feet above the present level of the water, and points out to us already the danger of ascending or descending this river in certain degrees of its floods: accidents nevertheless are rare with the canoes of the Country; ours is the first barge of so large a size that ever ascended this river: passed a very intricate rapid in the evening, which we could not get up until we had carried a rope ashore. Encamped upon an elevated gravel beach: Therm<sup>r</sup> at 8<sup>h</sup> p.m. 54° Extremes 40°-68°. Made this day 14 miles 317 perches.\*

This day an unlucky accident happened, which was very nigh being extremely serious. Doctor Hunter was employed in the cabin of the boat loading one of his pistols; he held it between his legs upon a bench with his head almost

\* It must be expected that imperfections in our reckoning must arise from the retardments and difficulties met with on the rapids and shoals; compensations for lost time and rate of going are made at the moment when the best judgement can be formed.

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} over the muzzel : while in the act of ramming down the ball, the pommel slipt from the bench & the cock of the lock came with force against it, which giving way discharged the pistol, the rammer and ball passed thro' the fingers & thumb of the right hand & also thro' the brim of the hat within little more than an inch of the Doctor's forehead ; his thumb & fingers were much torn, but no bone was broken, the concussion of the head was most severely felt: the bottom of a new powder horn (not well secured) which lay upon the table was forced outwards & the powder partly spilt upon the table, which providentially did not take fire altho' the wadding was found smoking upon the table: the circumstance of the bottom of the powder-horn being forced outwards, points out a curious effect of the elastic power of the air, viz after sustaining a considerable compression the returning vibration causes a partial rarefaction, & at the same instant the common air confined within bodies involved by the sphere of rarefaction, exerting its spring to restore the equilibrium, forces outwards all obstacles not sufficiently secured to resist its action. The Doctor's wounds were dressed ; he suffered great pain and debility, but after some repose felt better in the evening.

Friday 23<sup>d</sup> Therm! in air 48° in river water 54° — light clouds — calm. River upon the fall. Set off and continued



continued our navigation thro' difficult passages; the river is broken into a number of small streams by Islands, short turning rapids, sunken logs, shoals, bars, and every impediment to be expected in our situation, and this continued at short intervals during the whole of the day, so that our courses and distances cannot be expected to be perfect; every allowance which could be judged necessary at the moment was made: I fortunately obtained a good observation of the Sun's mer: altitude in the interval of some shifting clouds: Latitude deduced  $33^{\circ} 41' 35''$ . The banks of the river as we ascend are less elevated, being now only from 9 to 12 feet, and probably the freshes surmount them some feet; we passed a great number of high & low gravel and sand-beaches; on those were to be seen fragments of stone of all forms & of a great variety of colors; some highly polished and rounded by friction, and may have belonged to the mountains, rivers and oceans of a World, from the ruins of which the Globe we inhabit may have been formed. The banks of the river in this upper Country suffer greatly from abrasion, one side and sometimes both being broken down by every flood. We saw nothing to day worth noticing, no change being observable in the appearance of the lands and timber along the hills and banks of the river: we found on a gravel beach some fragments of the same kind of matter we found  
lower

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1804 } lower down resembling pit-coal; it burns with-  
 November } out blaze to a white ash, but will not consume  
 (in common temperature) without other fuel :  
 under the burning glass, it emits smoke & con-  
 sumes, yielding a faint smell of sealing wax ; it is  
 light and friable, & affords very little evidence of  
 being penetrated by bituminous matter. Therm<sup>t</sup>  
 at 8<sup>h</sup> p.m. 54° Extremes 48°–72°. Made 13 miles  
 28 perches.

Saturday 24<sup>th</sup> Therm<sup>t</sup> in air 48° in river water 54° — light  
 clouds — calm — river at a stand. Set off & con-  
 tinued our voyage thro' a country in all respects  
 similar to that thro' which we passed yesterday,  
 excepting that our obstacles from strong rapids  
 are considerably augmented : at a place on the  
 left called 'Auges d'Arclon' (Arclon's troughs)  
 we observed some laminated iron ore, and a stra-  
 tum of tenacious black sand shining with minute  
 chrystals. The general breadth of the river is  
 now 80 yards, tho' in many places greatly en-  
 larged by Islands & shallows, and at other places  
 contracted to 80 or 100 feet. The river is now  
 in many places rocky of a greyish color & rather  
 friable. Observed some willow very different  
 from what is found below and on the banks of  
 the Mississippi, the last is very brittle, this on the  
 contrary is extremely pliant & resembles the  
 osier, of which it is probably a species, I propose  
 on our return to take some plants along with us ;  
 its

its foliage is now of a golden yellow & falling: we also found some of the larger Whortle-berry in fruit, the berry is of a Sub-acid agreeable taste, the leaves not yet fallen of a beautiful crimson. { 1804  
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The weather being cloudy we had no observation at noon & went on to dine at the forks of the Washita and Missouri the lesser; the latter comes in from the left hand and is a considerable branch, perhaps about  $\frac{1}{4}$  of the Washita: Hunters often ascend the little missouri, but they are not inclined to penetrate far up, because this branch reaches near to the great planes or prairies upon the red river, which are often visited by the lesser Osage Tribe settled on the river Arcansa: These last frequently carry war into the Cadadoquis tribe who are settled on the red river about W.S.W. from this place, and indeed they are reported not to spare any nation or people. They do not come upon the head waters of the Washita, because they are surrounded by a number of mountains or steep hills rising behind each other, and so extremely difficult to travel over, that those savages perceiving no desireable object, do not attempt to penetrate to the river, & it is supposed to be unknown to the nation: The Cadadoquis (or Cadaux as the french who are fond of abbreviations generally pronounce the word) may be considered as Spanish Indians; They boast, I am told with truth, that they never have imbrued their hands in the blood of a white Man:

1804 }  
November } Man : it is reported (perhaps falsely) that they are excited to enmity by the Spanish officers at Nacocdoches against the Americans.

We are told there is a mine up the little Missouri, it is said that the stream runs over a bright splendid bed of mineral of a yellowish and whitish color, it is most probably martial pyrites : some 30 years ago, several of the inhabitants hunters worked upon this mine and sent a quantity of the ore to the Government at New Orleans, but they were prohibited from working any more. Therm<sup>r</sup> at 3<sup>h</sup> p.m. 59° Extremes 48°—72° Made this day by a very uncertain reckoning 11 miles 152 Perches.

Sunday 25<sup>th</sup> This morning proved very rainy, having commenced raining before day, we were therefore constrained to continue encamped : a cessation took place after breakfast, which gave us some hopes of being able to proceed, but this was not of long duration; the rain recommenced and we remained all day in our tents. We have the consolation however to expect that the river will rise a little in consequence of the rain, which will facilitate our ascent over the shoals that are to be expected above. Therm<sup>r</sup> at 8<sup>h</sup> p.m. 62° Extremes 54°—70°

Monday 26<sup>th</sup> Therm<sup>r</sup> 50°— river water 57°— clear above. Calm— river risen 3½ inches in the night. Contrary

trary to expectation the morning proved not only fine and serene, but of a mild, agreeable temperature. In general after the winter season sets in, the changes in the weather are made by extremes. A day or two of rain is commonly succeeded by a cold and blowing north wester, and the day following a frost of some severity, which has not been the course upon this last occasion, it appears also that the rain has raised the temperature of the river 3°. The water is now remarkably clear and fine, and it does not seem to have been discoloured by the last rain. There is still a great sameness in the appearance of the river banks, the Islands are skirted with osier, and immediately within on the bank grows a range of birch trees & some willows; the more elevated banks of the River are clothed by a thick growth of Cane & the timber which rises above the Cane is such as has been already mentioned Viz. oak, white, black, and red; many species of each: black Maple, white maple, Sycamore, Elm several species, Ash, hicory many species. Dog wood, Holly, Iron wood &c —

Saw a number of yellow butterflies fluttering about the banks of the River. We continue to encounter the same obstacles from the shoals & rapids; the valley of the river, in its present low state is filled with Islands, which dividing the current reduces the depth of the Channel; We find no great difficulty where the water is collected

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lected into a single channel. Our Pilot informs us that there is a body of excellent land upon the little Missouri & more especially on the Creek called the 'Bayou à terre noire,' which falls into the little Missouri; this land reaches within a few miles of the Washita, and is said to extend to the Red River being connected with the great prairies above the Cadaux nation & in the proximity of the red River: this rich tract of Country is said to be of very considerable extent perhaps a square of 30 miles & is connected with the great prairies which are the hunting grounds of the Cadaux Nation, consisting of about 200 warriors, they are warlike, but frequently unable to defend themselves against the tribe of Osages who are settled upon the Arcansa river, who passing round the mountains which give birth to the Washita, along the prairies which enclose those mountains on the West and separate them from the main Chain of mountains which furnish the waters of the red & arcansa river, pass down in the Cadaux Country & rob & plunder them of their horses and other effects, & not unfrequently take a few scalps; for it seems that this detached tribe of the Osages is a lawless gang of robbers, making war with the whole world.

Therm<sup>r</sup> at 8<sup>h</sup> p.m. 62°—Extremes 50°—68°  
Made 12 miles 21 Perches.

Tuesday 27<sup>th</sup> Therm<sup>r</sup> 54° — river water 58° — Cloudy —  
River

River risen above the mark which was 12 inches out of water: set off at 7<sup>h</sup> 1'. and continued our Voyage with the same obstacles from rapids, which were very violent at particular points from the encreased body of water descending from the higher position; but we obtained at the same time the advantage of approaching the willows & even passing thro' them, to avoid the most difficult passes. During the hour of breakfast the river rose 1½ inches perpendicular. The general height of the main banks is now from 6 to 12 feet above the level of the water, and the land is rather of a better quality, the Canes &c shewing a more luxuriant vegetation: the superficial soil subject to inundation is of brownish appearance greatly mixed with Sand; At noon arrived at 'cache à Maçon' (Masons hiding place) on the right, stopped here for dinner. Having been informed of some pit coal reported to be in the neighbourhood, we determined to explore its position. Doctor Hunter with the Pilot set out for this purpose, & at about 1½ mile N.W. of the Boat found in the bed of a Creek a substance similar to what we had formerly seen under the name of coal; some pieces of it were very black, solid, & of a homogenous appearance greatly resembling pit Coal, but it was deficient in ponderosity, & did not seem to be penetrated by bituminous matter in a sufficient degree to constitute Coal; We may perhaps therefore be permitted

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mitted to consider it as vegetable matter in a certain stage of its progress of transmutation into Coal, we were the more confirmed in this opinion by discovering other fragments, which still retained very evidently the fibrous texture of wood, one peice in particular seemed to have been a large chip taken out by the felling ax. Those last pieces were not so far advanced in the transmuting progress as the first mentioned; although black it was not so perfect, being rather a very dark brown black, retaining the exact form & shape of the wood as it had been separated from the log: as this incipient or imperfect Coal was found imbedded among clay & gravel, which appeared to have been washed down by the torrent, no clue could be found to lead to a discovery of the process by which nature effects so extraordinary a change, an ingenious enquirer placed in favorable circumstances, will probably have the good fortune to make this discovery: The time may arrive when the Planter who shall be clearing his Plantation or farm of useless timber, will be enabled from the instructions of the Chemist to place the whole in a situation to be transmuted into an usefull article capable of long preservation. This is no doubt the Carbonated wood described by Kirwan & other Chemists. We found along the banks a species of the white thorn loaded with abundance of ripe fruit, being a small oval berry of a cornelian colour



colour & agreeable sweetish taste; the whortle berry was also found in the same situation. The white maple has now a beautiful appearance, its leaves before their fall first assume a pale yellow, but this soon fades, and they change into a splendid white and present at some distance the appearance of clusters of elegant flowers. Being cloudy at noon we made no observation for the Latitude.

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We suppose the river to have risen at least 30 inches and it now flows with great rapidity, which obliges us to pass sometimes among the willows to avoid its impetuosity: this afternoon we passed some reaches of the river, which were very handsome, being of considerable length, and at least 150 yards wide, and flowing with a full current from bank to bank. We found a considerable number of unknown (to us) plants some of them very handsome, but our very limited knowledge in practical botany, did not enable us to discover what they were, particularly as they were not in flower. Made this day 13 miles 39 perches. Therm<sup>r</sup> at 8<sup>h</sup> p.m. 66° Extremes 54°-71°

Therm<sup>r</sup> 68° — river water 60° fallen 4 inches Wednesday 28<sup>th</sup> in the night — Cloudy — calm. Set off at 7<sup>h</sup> 5' and continued our voyage, meeting the same species of obstacles as yesterday — the river appears to increase in width being sometimes 170 yards

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} yards broad, flowing at this time with a full tide from shore to shore. The Current is in some places extremely rapid, that is where the depth of the Channel is diminished and the bed contracted, in such situations we are under the necessity of catching hold of the willows &c, & hauling up along shore, oars and poles being insufficient to stem the violence of the torrent; in other situations for miles together the current is inconsiderable, in fact it is nothing under the shelter of the points, this advantage is the result of the enlargement and encreased depth of the river. Being cloudy we had no observation for the Latitude. Some of our people who walked out with their guns at the hour of dinner discovered some buffalo tracts we are therefore in hopes soon of getting some fresh beef. We past some beautiful Pine Forests. The Lands in many places appeared of a pretty good quality producing trees and a variety of vegetable subjects indicating a good soil. Encamped in the evening after making by our reckoning 12 miles 255 perches. Here we found an old dutch Hunter with his party consisting in all of 5 persons. This man has resided 40 years on the Washita and before that period has been up the arcansa river, the white river and the river St Francis; the two last he informed us are small rivers of difficult navigation similar to that we are now upon, but the Arcansa river is a river of great magnitude, a large and broad channel,

channel, and when the river is low with long and great sand beaches like to the mississippi. So far as he has been up, the navigation is safe and commodious, without any impediment from rapids or shoals, upon all those rivers, the soil is of the first rate quality, the countries are of easy access, being lofty open forests, unembarrassed by canes & other under growth : the lands on the Arcansa are generally level and not subject to inundation, with here and there gently rising hills. The river is not embarrassed with rocks so far as this informant has ascended, but its bed is composed of mud and sand : the water of the river is extremely bad to drink, being of a disagreeable red colour and very brackish when low, a multitude of creeks which flow into the river furnish sweet water, which the voyager is obliged to carry in vessels on board to supply his immediate wants, hence this inconvenience is not of much moment. This man confirms the frequent reports given of silver being abundant up this river ; he has not been so high as to see it himself, but says he has received a silver pin from a hunter who assured him that he himself collected the virgin silver from the rock, out of which he made the Epinglete by hammering it out ; The tribe of Ozages live higher up than this position, but the hunters rarely go so high, being affraid of those savages who are at war with the world and destroy all strangers they can meet

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1804 } meet with. It is reported that the arcansa nation  
 November } with a part of the Chactaws, Chicasaws, Shaw-  
 nese &c. have formed a league and are actually  
 gone or going 800 strong against those depre-  
 dators, with a view to destroy or drive them en-  
 tirely off and possess themselves of their fine prai-  
 ries which are most abundant hunting grounds,  
 being plentifully stocked in Buffalo, Elk, Deer,  
 Bear and every other beast of the chase, common  
 to those Latitudes in America. Our old Dutch  
 Hunter informs us of a saline or salt spring from  
 which he has frequently supplied himself with  
 salt by evaporation, we shall visit it in the morn-  
 ing, being only half a league distant. Made 12  
 miles 255 perches. Therm: at 8. p.m. 73° Ex-  
 tremes 68°-78°

Thursday 29 Therm: 72° river water 62°—Cloudy—wind  
 South, blew strong all night—This morning  
 Doctor Hunter went with a party and the old  
 dutch hunter to visit the saline, which was found  
 in the bottom of the bed of a dry gully near a  
 Creek ; after digging a few feet found the water  
 which proved very brackish to the taste ; the  
 saline lies about 1½ mile northerly from our  
 encampment, a creek falls into the river a little  
 above our encampment, being the same which  
 communicates with the saline, a quantity of the  
 water was brought into camp whose specific grav-  
 ity was carefully ascertained by comparison with  
 the

the river water and found to be as 1.02116 + to 1. { 1804  
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Evaporated 10 quarts of the water which produced a saline mass weighing when dry 8 ounces. It began to rain about 9<sup>h</sup> a.m. which obliged us to remain in camp untill after dinner, when it cleared up, and we set out at 1<sup>h</sup> 27' p.m., the water of the river has now become whitish and less transparent in consequence of the rain and appears to be rising again altho' it seemed to have stopped since last night: the water was tolerably favorable in the afternoon having met with only one rapid of difficulty and considerable length: since we have had so much difficulty to encounter from the shoals and violence of the current, the Soldiers have exerted themselves with a considerable degree of vigor and perseverance and seem desirous that we should accomplish the end of our voyage. Therm<sup>r</sup> at 8<sup>h</sup> p.m. 52° Extremes 52°-76° Made this day 8 miles 2 perches. The weather clears up and begins to grow cold, we expect a north-wester in the morning.

Therm<sup>r</sup> in air 38° in river water 60° — river Friday 30<sup>th</sup>  
risen 19 inches — clear calm. Set off & continued our voyage against a strong current during the greatest part of the day, altho' frequently we found favorable eddies or little or no Current where the bed of the river became enlarged, which sometimes extended to 150 and even 170  
yards

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} yards in breadth. Saw great flocks of Turkeys to day, two of which were killed. At  $10\frac{1}{2}$  h a.m. arrived at the large branch on the left called 'Fourche des Cadaux' (Cadadoquis fork) about 100 yards wide at its entrance into the Washita; immediately beyond which on the same side the land is considerable elevated (ab<sup>t</sup>. 300 feet.) The wind from North and N.W. opposed us most of the day, so that our progress was not very rapid. At noon landed & observed the Sun's altitude in a difficult place, in some measure thro' the branches of trees, the Latitude deduced was  $34^{\circ} 11' 37''$ . As we advance to the north we perceive more of the effects of winter; the trees are now nearly stripped of their foliage, which a week below seemed to be nearly entire, altho' changed in color: Being informed of a saline or salt-lick, we landed before 3<sup>h</sup> p.m. and the Doctor with a party went to view it, therm<sup>t</sup> at 3<sup>h</sup> 57<sup>o</sup>. The Doctor returned in the evening with a quantity of water from the saline, which from taste appeared to be less impregnated than the former, and on trial its specific gravity was found to be when compared with the river water, which at that time was principally rain water, 1.017647. This salt pit was found in a low flat place subject to be overflowed from the river, it was wet and muddy, the earth on the surface yellowish, but on digging into the stratum which yielded the salt water, it was found to be a bluish clay; probably

ably the water was fresher in consequence of the rain of the day before, which had not fallen when the first water was collected. Ten quarts of this last water produced by evaporation six ounces of a saline mass, which from taste was principally marine salt, it was however evident that it contained besides marine salt, some soda and a bitter salt, which last no doubt was muriated magnesia, but the marine salt greatly predominated. Made 7 miles 28 perches.

Therm<sup>t</sup> in air 32° in river water 54°. Clear — calm — river fallen 18 inches. The morning was cold & damp; we passed a considerable Island on the right about  $\frac{3}{4}$  of a mile in length, called 'Isle du bayou des roches' (rocky creek Island) — we were greatly impeded this day by rapids, it was with much difficulty, some hazard, & great exertion of the men, that we ascended some of the rapids: we passed several points of high land full of rocks and stones, much harder and more solid than we have yet seen; the rocks were all silicious, and we began to observe, that their fissures were penetrated by sparry matter: indications of iron were frequent, & even fragments of poor ore, but no rich ores of that or any other metall have presented themselves to view. Some of the hills appear to be well adapted to the cultivation of the vine, the soil being a sandy loam with a considerable proportion of gravel & stone  
and

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} and a superficial covering of good vegetable black earth: the natural productions were sufficiently luxuriant, consisting of several varieties of oak, Pine, Dogwood, Holly &c with a scattering underwood of Whortleberry, Hawthorn, Chinabrier and a variety of small vines. It is probable that a skilful Vigneron, who shall undertake the establishment of a Vineyard in a well-chosen position in this neighbourhood, will find his labors amply compensated; the market of New Orleans is at hand, where his wines (if good) may be immediately sold and paid for at a high price. At noon we were detained upon a very bad rapid & shoal, by which we lost the opportunity of making a meridian observation: In the evening also we landed a little earlier than usual at the foot of a long and difficult rapid, which we did not think it prudent to encounter so late, from the danger of getting fast upon it all night: we are now encamped upon the declivity of one of those hills about 150 feet high, commanding a fine prospect both up and down the river, & will at a future day become a rich Vineyard. Therm<sup>r</sup> at 8<sup>h</sup> p.m. 35°. Extremes 32°—58°. Made this day 7 miles 148 perches.

Sunday 2<sup>d</sup>

Therm<sup>r</sup> in air 30° in river water 50° Clear — calm — river fallen 4 inches. Continued our voyage and passed over a series of strong rapids, which opposed us untill the hour of breakfast. The

Country



Country appears now to wear a new aspect ; high lands and rocks frequently approach the river ; the rocks are extremely hard, and altho' the grain resembles that of free-stone, yet the stone is hard enough to be used for the purpose of hand-mill stones, to which object it has been applied ; the river beaches also exhibit a great variety of fragments of flint and other stone of the most solid kinds ; the quality of the land seems to improve, the superficial stratum of Vegetable earth being of considerable thickness (from 6 to 12 inches) and of a dark brown color mixed with loam and some sand ; at 2½<sup>h</sup> p.m. passed a rock on the margin of the river consisting of blue slate, which we shall probably find time to examine on our way down ; more of the same is to be seen higher up. About a league from the river a little above the slate quarry is a considerable plane called 'prairie de Champignole,' often frequented by Buffalo ; some salt licks are to be found near it, and in many situations on both sides of this river at small distances from it, we are informed that Salines or salt-licks exist which may be rendered very productive ; when this river comes to be settled, so necessary an article as marine salt will therefore be in sufficient abundance for the consumption of a full population. We are greatly impeded today by rapids and were unable to get ourselves landed in a situation favorable enough to make an observation

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} servation for the Latitude before it was too late.

We encamped just below some rapids which we are to encounter in the morning, upon excellent level and rich land, being almost entirely an Oak forest; it is not improbable that this land is sometimes subject to inundation, having the appearance of alluvial Land which has acquired permanency & stability, it is now at least 20 feet above the level of the river water. Therm: at 8<sup>h</sup> p.m. 38° Extremes 30°-59°.

Monday 3<sup>d</sup>

Therm: in air 38°—in river water 48°—clear—calm—river fallen 8 inches. Continued our voyage with favorable water until breakfast, after which we encountered a great many very bad rapids during the remainder of the day; some were so difficult, that it was impossible to ascend without sending the greatest part of our people ashore with a good rope, & sometimes they were obliged to walk in the water; the exertions of the Soldiers on some very difficult and trying occasions were equal to every thing which could be expected, and exceeded greatly my expectations: at noon we had a good observation about 4 miles below the ‘Chutes’ (falls) Latitude deduced 34° 21' 25".5 we were now anxious to see the famous Chutes, which it was supposed at the Post, we should never be able to pass with so large a boat. The land on either hand continues to improve in quality; there appears to be in  
general

general a superficial stratum of good earth of a dark brown color, upon which vegetation is sufficiently luxuriant; hills frequently arose out of the level country, full of rocks & stones, generally of an extremely hard flinty kind, often resembling the Turkey oil stone, of this kind was a promontory which came in from the right hand, a little before we arrived at the Chutes: this promontory presented some appearance at a distance, of the ancient ruined fortifications & Castles so frequent in Europe, the effect was greatly heightened by a flock of swans which had taken their stations under the Walls which rose out of the Water; as we approached the Birds floated about magestically upon the glassy surface, and in tremulous melancholy accents seemed to consult each other upon measures of safety, the ensemble produced a truly sublime picture: several masses of the same hard rock insulated by the river conveyed the idea of redoubts and out-works; we expect to visit this place in our descent. A little after 4<sup>h</sup> p.m. we arrived at the Chutes. We found these falls to be occasioned by a chain of rocks of the same hard nature with those we had just seen below, here they extended quite across the river, the water making its way over the chain thro' a number of breaches, which by the impetuosity of the torrent had been worn out of the rock: this chain seemed to proceed from a lofty rocky hill

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} hill on the left side the appearance of which conveyed the idea, of its having been cut down by the abrasion of the waters to its present level: the various breaches thro' which the water poured, were so many cascades, thro' one of which it was necessary to pass; otherwise the Barge must remain below the Chutes: it was quite uncertain which of the Cataracts ought to be preferred; it was also doubtful whether our barge (9 feet wide) could find sufficient breadth & depth of water clear of pointed rocks to pass over the Chutes. We came up to the rocks & stoped between two of the Cascades, & sent a couple of Men with a small Canoe, who crept along shore & got above the Falls, they made fast a rope to a tree, and letting themselves gradually down by the same rope, came on board in great safety; having now got a number of hands ready to haul in upon the rope, we employed the remainder with poles to give a proper position to the Barge & to guide her into the best passage; we accordingly entered one of the Cascades, but after many fruitless attempts we found there was a deficiency of water; with some pointed rocks which opposed our passage; we therefore dropped down a little way, and moved laterally by poling to a second Cataract much more considerable than the one we had just attempted: the rolling impetuosity of the water is not easy to describe, above and below the fall there was a rapid descent, but

but just at the fall there seemed to be a step of nearly one foot perpendicular ; difficult & dangerous as this place appeared for a frail bark like ours, we were determined to make the attempt & we lost no time in entering the strait, in which our Barge soon stuck fast at the bows, we then concluded it would be impossible to pass; it seemed that an inch or two were just wanting to our success; we however continued our efforts by moving from side to side by the stern, while great efforts were making upon the rope; we perceived a small advancement by every new exertion, our hopes revived, the Barge was in this manner forced half way thro' the Cascade, & now she seemed so completely wedged into the narrow passage, that every effort to stir her in any direction proved ineffectual; the water tho' extremely rapid was not deep & we got four of our boldest men into the water at her bows, as far as possible from the suction of the fall, who by feeling for rocks on which she rested, & raising her sides with all their might, enabled us to advance a step or two farther, beyond which it seemed impossible to move: it was now night, the stars were visible, the water was cold, and altho' the weather was not freezing, it was far from being mild, the therm: being at  $45^{\circ}$ ; we now repented that we had made the attempt to pass so late in the evening, & wished we had delayed until the morning; at the same time the  
 river

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1804 } river was falling, & it seemed not proper to defer  
 December } the attempt, lest we should not get above the  
 Chutes until another swell of the river : in this  
 situation we determined to lighten the Barge, by  
 sending all the men, except four, ashore to haul  
 upon the rope, while the 4 who remained were  
 with hand levers to endeavour to raise up &  
 lighten the bows of the vessel: the first man who  
 went out discovered, that by the violence of our  
 exertions the rope was beginning to give way &  
 that one of the three strands of which the rope  
 was composed, had actually parted; we were now  
 in a perilous situation, for if the rope had sep-  
 arated, no force on board could have prevented  
 our being dashed to pieces upon the rocks: we  
 immediately ordered every man on board to his  
 pole to support the boat; in the mean time a man  
 was dispatched thro' the water with the end of  
 a rope from on board, which being made fast to  
 the same tree, we were again placed in a state of  
 security; we now sent the other men on shore  
 as had been intended, who gaining a firm footing  
 and exerting themselves with great vigor soon  
 extricated us and drew us safely ashore, greatly  
 rejoicing to find ourselves without accident above  
 the 'Chutes': we are encamped under the inces-  
 sant roar of the cataracts, which resembles no-  
 thing so much that I have heretofore witnessed,  
 as the horrid din of a hurricane at New Orleans  
 in the year 1779: the course of the chain of  
 rocks

rocks across the river is nearly S.W. and N.E. { 1804  
 —Made this day 7 miles 218 perches—Therm<sup>r</sup> { December  
 at 8<sup>h</sup> p.m. 44° — Extremes 38°–59°

Thermom<sup>r</sup> in air 36° in river water 48° — Tuesday 4<sup>th</sup>  
 clear — calm — river fallen 2 inches. Immediately above the Chutes, the water possesses little or no Current, owing no doubt to its depth & breadth & we went on without opposition untill after breakfast; about 8<sup>h</sup> a.m. passed a ledge of very hard freestone rocks with moderate current: this reach is spacious being not less than 200 yards wide & is terminated by a high rocky hill (about 350 feet perpendicular) crowned with beautiful pine woods, a fine situation for building: at 10½<sup>h</sup> passed a bald hill on the left being chiefly uncovered rock, and arrived at the foot of a most tremendous rapid full of breakers, the passage being studded with pointed rocks of all magnitudes, which raising their rough heads above water, seemed to threaten with destruction the unwary voyager who should presume to attempt their passage; this place appeared to me much more difficult and dangerous than the Chutes, the water descended along a plane of considerable inclination with a most impetuous velocity, the spray & white foam dashing over the rocks, occasioned a very perceptible mist or vapor which spread about at a small elevation, it is probable it might ascend into the atmosphere

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phere at a higher temperature. We stopped to contemplate this embarrassment & ordered out a rope, which was carried along shore by a certain part of the people, the rest using their poles on board; we made many fruitless essays to pass upwards by several openings near the shore; at length we attempted the center of the Cataract where the current was the most violent, but the water deeper, & by very great exertions we got over into moderate water, having consumed  $1\frac{1}{4}$  hour in making about  $\frac{1}{2}$  mile; 300 yards of this distance is difficult & perilous, the greatest prudence with unceasing exertion being indispensibly necessary to the safety of such a barge as ours. We landed above this rapid & by a good observation found the latitude to be  $34^{\circ} 25' 48''$ ; on our right stood a high rocky hill crowned with very handsome Pine-woods; the strata of this rock were inclined  $30^{\circ}$  to the Horizon in the direction of the river descending; this hill may be from 300 to 350 feet high: we have now frequently the hills touching the river on both sides; a border or list of green Cane skirts the margin of the river, growing out of the alluvial soil, beyond is generally a high & sometimes barren hill. At 2<sup>h</sup> p.m. we passed a hill on the left containing a great body of blue slate, in some places hanging over the river; a little farther came to another rapid or cataract, which appeared if possible more terrible than the



the last, the descent of the water was extremely precipitate; from the very irregularly undulating surface, it was evident that the bottom was composed of innumerable fragments of rock, many of which just shewed their heads out of water; we halted on the right shore & sent up our rope, but after many fruitless & some dangerous attempts, in which we were always repelled by the rocks, we were obliged to give up the expectation of passing up on that shore; we therefore had recourse to the expedient of swinging the barge into the middle of the river & by the aid of the rudder and the exertions of poling, we with some difficulty got hold on the opposite shore, notwithstanding that the rope was caught under a rock in the middle of the river. We hauled the rope on board and sent it up the shore, and passed up the most violent part of the rapid: we ascended a second rapid of less importance and encamped, our people being almost exhausted with fatigue; on the right is a creek called 'bayou de la saline'; about a league up the Creek is a salt-lick, which by digging yields salt water resembling what we have already seen; there is also blue slate near the same situation. This afternoon our hunters shot twice at a Buffalo & wounded him severely, the blood flowing as he run, but he escaped. Our tents were pitched on a stony and gravelly beach, they were completely paved with stones of a great

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1804 } great variety in kind, color and size. Therm<sup>r</sup> at  
 December } 8<sup>h</sup> p.m. 36°—Extremes 36°—50°. Made only 4  
 miles 164 perches.

Wednesday 5<sup>th</sup> Therm<sup>r</sup> in air 23° in water of the river 47°  
 — very serene — calm — river fallen 2 inches.  
 The morning tho' cold was agreeable, the air  
 being very dry: all night we hear'd the roaring  
 of a Cataract, which we were to encounter this  
 morning; we were presently at the foot of it;  
 the violence of the rapid was about 100 yards  
 in length, & as I sat in the cabin of the barge  
 with my eye lowered to the level of the still  
 water of the reach above the rapid, I found  
 there was a fall of 4½ feet; we sent our rope a  
 head as usual; but made very little progress for  
 some time, the rope being entangled among  
 sharp rocks which endangered its cutting, the  
 consequence of which might have been fatal to  
 all on board the barge, with the entire destruc-  
 tion of the boat and every thing contained in  
 it; the passage was full of breakers and studded  
 all over with pointed rocks, so that it was neces-  
 sary to guide with the utmost care, to be able  
 to pass clear of those unfriendly obstacles: the  
 men on shore exerted themselves greatly, but  
 were frequently obliged to rest, & the boat was  
 often at an entire stand, at length the rope  
 escaped from the rock which bent it out of its  
 course, and we began to move up very slowly,  
 frequent

frequent rests were necessary & in about an hour and a half we ascended above the rapid which was only about 150 yards in length; a small island here divided the river into two channels, we took the shortest tho' the most rapid, because it was most favorable for the use of the rope: The french hunters have denominated this place 'La Cascade' on account of the rapidity & great fall of the water within so small a space: below the Cascade, we had rocky hills on both sides, the quality very hard freestone, but that found in the bed of the river which was rolled down by the floods from the upper countries, was very frequently of the hardest flint, sometimes resembling the Turkey stone. Being embarrassed upon the rapids we could not land to observe at noon. We were obliged to use the rope a second time to ascend a very impetuous rapid, altho' much inferior to that of the morning: at 1<sup>h</sup> 45' p.m. passed a creek on the right called 'fourche au Tigre' (Tiger creek) 4 computed leagues from the Chutes; it would seem that the Early Hunters have calculated their leagues by the time required to ascend the stream, & not by distance, as it appears from our calculation, that the distances passed over are frequently not above half those by computation: we now carry the rocky hills with us very often on both sides; rich bottoms nevertheless are not infrequent, & the upland is sometimes of moderate elevation

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1804 }  
 December } tion & tollerably level : we are informed that up  
 the fourche au Tigre, & other Creeks there are  
 many extensive tracts of rich level land. The  
 stones and rocks we now meet with are chiefly  
 penetrated along their fissures by sparry and  
 chrystaline matter. Last night a band of Wolves  
 howled in our neighbourhood a great part of  
 the night. Turkeys become now much more  
 abundant & less difficult of approach than be-  
 low, our hunters generally kill some every day.  
 The opposition on the river was to day so great,  
 that we made only 3 miles 128 perches, altho'  
 by the old computation our days voyage was  
 little short of 3 leagues. Therm<sup>r</sup> at 8<sup>h</sup> p.m. 38°  
 Extremes 23°—56°

Thursday 6<sup>th</sup> Therm<sup>r</sup> in air 45° in river water 48°—cloudy  
 —light wind at S.W. river fallen 2 inches. We  
 were encamped last night upon excellent land,  
 tollerably level, and of a good dark brown or  
 blackish soil at the surface, about 12 inches  
 deep, lying upon a yellowish loam ; the growth  
 of timber is large and handsome, chiefly a forest  
 of Oak with an admixture of ash, hickory, elm  
 &c, a field of corn has been formerly cultivated  
 here by one of the hunters during the summer  
 recess from hunting. This morning the Weather  
 being cloudy we apprehended rain, but hoped to  
 reach the 'fourche of Calfat' (Caulker's creek)  
 the point which is to terminate our navigation,  
 &

& encamp before bad weather ; we accordingly proceeded on without material interruption until the hour of breakfast, carrying with us high hills on the left and good level lands on the right, subject perhaps to be inundated : at 9<sup>h</sup> a.m. arrived at the foot of a very long precipitous rapid, it seemed to be divided into four steps, one of which was at least 15 inches perpendicular exclusive of the inclined plane above and below, the whole could not be less than 5½ feet perpendicular from the beginning to the end, which was about 400 yards, altho' the swift water continued half a mile : the rope was carried along the bank as usual, and many stops were made upon the rocks before coming to the great fall ; at last the barge entered between two high rocks, the men exerted themselves vigorously both on shore and aboard ; the barge appeared to be ascending an inclined plane of 12 or 15 degrees ; great exertions were necessary, she however passed without touching any other obstacle but the impetuous torrent and in a few seconds was drawn into moderate water to the infinite joy of the whole party ; upon another part of the rapid higher up, we got upon a rock, which seemed to serve as a pivot, upon which the boat turned as a Center ; after reiterated exertions, we could neither advance nor retreat, we therefore unloaded about one quarter of the cargo which enabled her to pass up

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 December } up without difficulty: we immediately re-loaded  
 having spent three hours in getting over this  
 rapid, and proceeded a quarter of a mile farther  
 to Ellis' Camp a little below the 'fourche au  
 Calfat' (Caulker's creek): Here terminates our  
 voyage upon the river upwards, for the pre-  
 sent. Our pilot considers this the most conven-  
 ient landing, from whence to transport by land  
 our necessary baggage to the hot-springs, the  
 distance being about three leagues. There is a  
 creek about 2 leagues higher up, called 'bayou  
 des sources chaudes' (hot-spring Creek) upon  
 the banks of which the hot springs are situated,  
 about 2 leagues only from its mouth, but the  
 road is very hilly and therefore less eligible than  
 the path from this camp or landing, which is  
 almost a level road. Upon ascending the hill to  
 encamp we found the land extremely level and  
 very good, with some plants in flower & a great  
 many evergreen vines; the forest is chiefly oak  
 with an admixture of other timber as before  
 mentioned: soon after we arrived it began to  
 rain, we were however tented before it com-  
 menced. Therm<sup>t</sup> at 8<sup>h</sup> p.m. 56°. Extremes 54°–  
 67°. Our short voyage this day was only 2 miles  
 32 perches.

Friday 7<sup>th</sup> Therm<sup>t</sup> before sun-rise 38° in river water 47°  
 Cloudy — Wind N.W. river risen 4 inches. In  
 the morning Doctor Hunter with the Pilot &c  
 went

went to view a salt-lick about a mile to the West of our camp but found no salt water; the clay was extremely stiff and difficult to dig: after breakfast dispatched the Pilot with the greatest part of our people with their own baggage & some provisions to encamp at the hot-springs, hoping to find Cabins there sufficient to hut our party with orders to return early next morning so as to take out a load of more baggage and instruments. Took the sun's meridian altitude; Latitude deduced  $34^{\circ} 27' 31'.5$  — Therm: at  $3^{\text{h}}$  p.m.  $50^{\circ}$  — the weather cleared up about  $9^{\text{h}}$  p.m. and became very serene and cool with wind at N.W. some venison and turkey were procured by the hunters: altho' we have frequently seen the tracks and other marks of buffalo, we are hitherto disappointed in killing any of them.

Therm: in air  $10^{\circ}$  in river water  $43^{\circ}$  — very serene—light wind at N.W. river risen 4 inches. We found the weather this morning extremely cold, the therm: having fallen lower, than we expected in this latitude, particularly at the present early period of the winter season; it is perhaps to be ascribed to the elevation of the country and neighbourhood of mountains: as we have no barometer with us to indicate the pressure of the atmosphere, we shall when we get to the hot springs, ascertain the degree of the

1804 } the thermometer at which water boils, from  
 December } which scientific men may draw their own conclusions respecting the elevation of the land.

At 10<sup>h</sup> a.m. our people returned from the hot-springs, each giving his own account of the wonderful things he had seen: they were unable to keep the finger a moment in the Water as it issued from the rock, they drank of it after cooling a little and found it very agreeable; some of them thinking that it tasted like Spice-wood tea. The people after refreshment were dispatched with another load of necessary baggage.

Took the Sun's meridian altitude again to day & found the latitude to be  $34^{\circ} 27' 27''$  being  $4''$  less than yesterday; should no more observations for the Latitude be made here, we may consider it as fixed at  $34^{\circ} 27' 29''$ . The Therm: at 3<sup>h</sup> p.m.  $47^{\circ}$ . We may prepare for another cold night: a flock of swans passed us to day: we have had an abundance of venison & turkey since we landed here, sufficient to supply the whole party with fresh provisions. The bank or hill upon which we are encamped is at least 50 feet perpendicular above the present level of the river, and therefore I presume 30 feet clear of inundation. Some hills of considerable height are in view, clothed with pine trees, but the lands around us extending far beyond our view, lie very handsomely for cultivation; the superstratum



stratum is of blackish brown color from 8 to 12 inches deep, lying upon a yellowish basis, the whole intermixed more or less with stone & gravel & fragments of blue schistus, which is frequently found so far decomposed as to have a strong aluminous taste. The therm: at 8<sup>h</sup> p.m. 26°; very serene and calm, the stars shone with uncommon lustre: in an hour more the face of the heavens was changed, a general cloud produced an intense darkness; the therm: rose to 36° and we expected snow or rain; after midnight notwithstanding, the clouds were dissipated, the face of heaven recovered its brightness & the Stars shone with undiminished splendor. Extremes of the therm: 10°-47°

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Therm: in air 19° in river water 41° very serene — Wind moderate at N.W. river risen 2 inches. The people returned from the springs between 9<sup>h</sup> & 10<sup>h</sup> a.m. and after some time given for repose and refreshment, the party set out again with such baggage as was immediately wanted, and Doctor Hunter and myself accompanied them; the people complained of the length of the road and weight of the loads, we therefore diminished the latter; The Sergeant and one private remained in care of the Barge and her stores. We left the river camp about noon and with many delays and hauls for resting we arrived at the hot springs at 4½<sup>h</sup> p.m.—  
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the distance is computed to be 9 miles, which we shall verify by actual measurement, probably on our return : the first six miles were in a general westerly direction with many sinuosities and the last three northerly, which courses were necessary to avoid crossing some very steep hills. We found on the way three principal salt-licks & some inferior, which are all frequented by buffalo, deer &c the soil around consisted of a white tenacious clay, probably fit for Potter's ware; hence the name 'Glaise' which the french hunters have bestowed upon most of the licks which are frequented by the beasts of the forest, altho' salt is not always to be found in such places so as to merit attention: we saw on the way recent tracts of the Buffalo and several Deer skipped along before us; we did not follow the game, being desirous of arriving at our destination before evening. The people were much fatigued with this days labor, altho' the road is by no means bad or hilly, but there is no doubt that a heavy load constantly bearing a man down must be very fatiguing upon the best of roads: the time and difficulties of moving our small baggage and provisions, altho' nothing but what is essentially necessary, to so small a distance, naturally suggests the inconveniencies which must arise in transporting over unknown mountains between the sources of the red and Arcansa rivers, baggage & provisions indispensibly necessary,

cessary, with tools and implements for the construction of a boat or boats to descend the 2<sup>d</sup> river. Soldiers accustomed to carry moderate loads only, would find it intollerable to transport burthens which would be thought light by a Canadian or other woodsman enured to such hardships: a little calculation will shew what ideas we ought to form upon this subject. The provisions, instruments, arms & other baggage which may be deemed indispensable for 15 persons engaged on such an expedition, i. e. what must be transported from the head of one river to the commencement of navigation on the other, are certainly not over-rated at 3000 lib; of the whole party 10 carriers are the highest number we can calculate upon, some being necessary to guard the two camps while the scientific persons unattended would explore the environs: those 10 carriers from what we have seen could not be expected to carry for a number of days successively more than 50 pounds each (several of our people were incapable of doing so much) and ten miles to go loaded & return empty day after day even on a tollerably level road, is perhaps beyond what we can flatter ourselves with accomplishing; thus it would require at least six days to transport the baggage 10 miles, and the seventh would be demanded as a day of repose: now if the heads of navigation should be only 50 miles apart, & the passage not

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} rugged or mountainous, it would require at the  
 } least 35 days to pass along the unknown region ;  
 } and if allowance be made for such difficulties as  
 } ought to be expected including bad weather, we  
 } shall perhaps still flatter ourselves, if we expect  
 } to complete this portage in 50 days : on due con-  
 } sideration therefore it may be more advantageous  
 } (if the expedition is to be carried on by soldiers  
 } who cannot travel without their rations, tents,  
 } baggage & above all their execrable whisky) to  
 } explore one river only at a time. When arrived  
 } at the head of Navigation which will constitute  
 } a kind of head quarters and point of departure,  
 } the scientific men with a sufficient party may  
 } make with tollerable convenience excursions of  
 } 30, 40 or 50 miles in all directions, prolonging  
 } the time according to the fortune of procuring  
 } game, which will enable the party to reserve the  
 } provisions taken from Camp for their return : an  
 } advantage resulting from this plan would be the  
 } facility of transporting specimens of natural his-  
 } tory meriting attention ; it is evident that this  
 } benefit must, upon the other plan, be nearly given  
 } up excepting on the descent of the second river.  
 } I am not ignorant that the plan originally pro-  
 } posed may be carried into effect, but this must  
 } be done by persons chosen for the object, in order  
 } that it may be done with economy & in a rea-  
 } sonable time: Two young men of science of  
 } robust constitutions attended by four Canadian

or

or other woodsmen inured to fatigue and who can depend altogether on their guns for subsistence may accomplish this object; they will be able to transport at once, their blankets, their arms and amunition, a little parched meal, very light instruments, such as a 3 inch sextant which may be graduated to 20'' of a degree, a pocket case with a few re-agents for mineralogical assays, and 3 or 4 days provisions in case of disappointment in finding game; (spirituous liquors must be out of the question :) Such a party, each carrying a light ax for the purpose of building Canoes &c may accomplish the object proposed, upon supposition that no hostility is to be apprehended from the natives.

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From the river camp for about two miles, the lands are level and of second rate quality, the timber chiefly oak intermixed with others common to the climate and a few scattering pine-trees; further on, the lands on either hand arose into gently swelling hills, clothed chiefly with handsome pine-woods: the road passed along a valley frequently wet, by numerous rills and springs of excellent water which broke from the foot of the hills: as we approached the hot-springs the hills became more elevated and of steep ascent & generally rocky; those hills are here dignified by the name of mountains, altho' none of those yet in view exceed 4 or 500 feet; it is said that mountains of more than five times  
the

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} the elevation of these hills are to be seen in the North-west towards the sources of the Washita river; one of those has been called the glass, Chrystal or Shining mountain, on its surface is to be found vast numbers of large hexagonal prisms of very transparent colorless chrystal, generally surmounted by pyramids at one end, rarely at both; they do not produce a double refraction: many searches have been made over those mountains for the precious mettals, but hitherto without success, so far as I can learn.

We found at the Hot-springs an Open Log-Cabin and a few huts of split boards, all calculated for summer encampment, & which have been erected by persons resorting to the Springs for the recovery of their health; we shall endeavour to render our temporary lodging comfortable for the people and ourselves during the short time we expect to stay here: we are a little discouraged by the dilatory ways of the Soldiers; it is evident that to promote the advancement of an object similar to ours, they ought to be commanded by a commissioned officer, whose manners and disposition would render him an agreeable companion to his fellow laborers: it cannot be said that the Soldiers are disobedient, on the contrary they are to me uniformly respectful, but it sometimes appears that a spur is wanting, & there is no person here who treats them otherwise than with civility; there

there is also some appearance of design to prolong their return to new-orleans, the present service being much more agreeable to them than the duty of a garrison under the eye of their officer. { 1804  
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On our arrival we immediately tasted of the hot-spring water, that is, after a few minutes cooling, for it was impossible to approach it with the lips when first taken up, without scalding: having arrived here without prejudice for or against the springs I did not discover any other taste except that of very good water rendered hot by culinary fire; some of our people pretended to have discovered cathartic properties, which must be feeble, as I have been unable to detect the existence of such a quality in the waters. Therm: at 8<sup>h</sup> p.m. 28° Extremes 19°-42°

Therm: 26°—very serene. Wind moderate at Monday 10<sup>th</sup> N.W.—We spent a cold night in our new lodgings, not being able to keep up a large fire in the Cabin, which is only 12 feet square without a chimney. From the complaints of great fatigue by the people, we found it necessary to allow some repose, and ordered the people to go into the river camp, there to remain during the night and return the day following with more of our baggage, directing the loads to be made still lighter: the day proved serene and fine, but as we had been obliged to leave our instruments

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} struments yesterday at the river-camp, no astronomical observations could be made this day.

We visited all the hot springs; they issue from the sides and foot of a hill placed on the east side of the narrow valley where we are hutted, one small spring only rises out of the face of the west bank of the creek; from the quantity of calcareous matter deposited by it it does not appear to be of long standing; a natural conduit probably passes under the bed of the creek to supply it. There are four principal springs arising immediately on the east bank of the Creek, one of which may rather be said to spring out of the gravel bed of run; a fifth smaller one is that just mentioned rising on the west side of the creek; a sixth of the same magnitude is the highest or most northerly one rising near the bank of the Creek; those are all the sources which merit the name of springs near to our huts; but there is a considerable one some distance below, & all along the creek at intervals the water oozes out or drips from under the bank into the creek, which during the present cool season is very evident from the condensed vapor which floats along the margin of the Creek, where those drippings are visible & even where none is to be seen; a statement will hereafter be given of the temperatures of the respective springs with the quantity of water delivered and references to their respective positions;  
from



from some slight trials, it appears that the highest temperature is about  $148^{\circ}$  to  $150^{\circ}$  of Fahrenheit's thermometer. { 1804  
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In the afternoon we ascended the hill of the hot springs, it is of a conical form terminating at top with a few loose fragments of rocks covering a flat space of twenty five feet diameter: altho' we have said the hill is conical, yet it is not entirely insulated, for it is connected by a very narrow ridge with the neighbouring hills.

The primitive rock of this hill above the base is chiefly Silicious, some part of it being of the hardest flint, others of the nature of freestone extremely compact & solid, and of a great variety of colors; the base of the hill, & indeed for a considerable extent, is composed of blackish blue schistus, which divides into perpendicular laminae like blue slate; The water of the hot springs is therefore delivered from the siliceous rock, but this is generally invisible at the surface, being encrusted by or rather buried in the mass of calcareous matter, perpetually precipitated from the water; iron in small proportion was also deposited in form of a red calx, the colour of which was frequently distinguishable in the lime.

Under the hottest water we observed a lively green appearance, which at first induced us to suppose that copper might be present, but on closer inspection, we found it to be a soft tender matter,

1804 } matter, perhaps a feculum deposited by the water ;  
 December } it may possibly be of the same nature with the  
 green matter found in conduits or even in well  
 buckets under pure water at common tempera-  
 ture, respecting which a dispute arose (I think)  
 between Doctor Priestly and other Philosophers,  
 whether this green mater is a perfect vegetable  
 or only a feculum ; the question is perhaps now  
 decided (if we suppose the green matter of the  
 hot springs to be of the same kind) for by rea-  
 soning from analogy, no vegetable can be sup-  
 posed to exist in the temperature of 150° ; but  
 we must beware of presuming to set bounds to  
 the powers of Nature : we shall hereafter ex-  
 amine this matter with due attention ; we shall  
 only now observe, that this substance seems to  
 be deposited by successive thin laminæ.

As we advanced up the calcareous region of  
 the hill, we discovered several patches of rich  
 black earth, which appears to be formed by the  
 decomposition of the calcareous matter : in other  
 situations appeared an incrustation of limestone,  
 i. e. the superficial earth was penetrated, indu-  
 rated and encrusted by lime with fine laminæ or  
 minute fragments of iron ore : we entertained  
 no doubt that the water of the hot springs had  
 here issued formerly from the hill and run over  
 the surface, and that the entire mass of the cal-  
 careous rock to the height of one hundred feet  
 perpendicular has been created by the incessant  
 depositions

depositions of the hot springs; in this high situation we found a spring whose temperature is  $140^{\circ}$  } 1804  
December

After passing the calcareous region, we found the primitive hill covered by a forest, whose trees were not of the largest size; they consisted chiefly of Oak, Pine, Cedar, Holly, hawthorn with many others common to the climate, with a great variety of vines, some said to produce black & some yellow grapes, both excellent in their kinds: the soil is extremely rocky, interspersed with gravel, sand & fine black vegetable mold. When we had advanced about 250 feet perpendicular up the hill, we found a change in the soil; it was equally stoney & gravelly as below with a superficial coat of black mold but immediately under the last was found a basis of fat, tenacious, soapy, red clay, inclining to the colour of bright spanish snuff; it seemed to be very homogeneous with scarcely any admixture of sand and no saline taste, but rather soft and agreeable; the same timber continues but diminishing in size as we ascend the hill, and rocks increasing to the top: We estimate the whole height of the hill to be about 300 feet above the level of the valley where we are huttet. Therm<sup>t</sup> at 8<sup>h</sup> p.m.  $28^{\circ}$  Extremes  $26^{\circ}$ – $50^{\circ}$

Thermometer before sun-rise  $48^{\circ}$  Wind S.E. Tuesday 11<sup>th</sup>  
The weather changed very much in the night;  
it

1804 } it became much warmer and the heavens were  
 December } overcast with one general cloud; the air was still damp and penetrating, and our mansion pervious to the chilling blast, but we made good fires and comforted ourselves in the expectation of favorable weather to enable us to complete our observations and researches. The People arrived about one o'clock in the afternoon with a few things including the instruments.

At 3<sup>h</sup> p.m. the thermometer rose to 59° and in the evening at 8<sup>h</sup> fell to 50°, the weather being still disagreeable and cloudy. Some venison was brought in after dinner — The People five in number went back to the river to fetch tools and necessaries, while others were occupied in raising a log-chimney at the end of our Cabin, which we proposed to line with stone as a security against fire. No change in the appearance of the weather at bed-time. Extremes of the therm: 48°–59°

Wednesday 12<sup>th</sup> Thermometer before sun-rise 36° The weather has become colder, but still continues overcast, damp and disagreeable, the wind being about north, a few drops of rain fell last evening & during the night. As it still continues cloudy, no astronomical observations could be made, I therefore occupied myself in the forenoon in bringing up and completing my journals, and in the afternoon went to examine all the hot springs with  
 the

the thermometer: four principal springs seemed only to merit attention; those which yielded the greatest quantity of water were of the highest temperature and are in the following order. N<sup>o</sup> 1 — 150° N<sup>o</sup> 2 145°—N<sup>o</sup> 3—136 and N<sup>o</sup> 4 132° the last in order is the only one on the west side of the creek and I did not perceive any signs of hot water anywhere else on that side of the Creek, I therefore conceived that the spring N<sup>o</sup> 4 is supplied by a channel under the Creek from the general reservoir in the hill on the East: at the spring N<sup>o</sup> 3 was a small bason of some little depth, in which was a considerable quantity of the green matter in temperature 134° it had much the appearance of a vegetating body, being detached from the bottom yet connected by something like a stem which rested in Calcareous matter, the body of one of those pseudo-plants was about 4 to 5 inches diameter, the bottom a smooth film of some tenacity & the upper surface divided into ascending fibres of  $\frac{1}{2}$  to  $\frac{3}{4}$  of an inch long resembling the gills of a fish, formed into a kind of transverse rows; not being then prepared for a more minute investigation, a future examination will be made with the microscope. Should it prove that this is a vegetable production and not an accumulation caused by precipitation, it will be a new proof of the wonderfull powers of nature in the production of animal & vegetable life in temperatures

{ 1804  
December

1804 }  
 December } peratures which have been hitherto thought sufficient to extinguish the vital principle: Should this green matter prove to be vegetable, I shall confidently expect the discovery of animal life; for no plant I believe upon due research will be found without its animal inhabitant. A little farther on, we came to another small muddy bason, in which a vermes about  $\frac{1}{2}$  an inch long, was moving with a serpentine or vermicular motion, the water was found a little warm to the finger: I observed invariably that the green matter forming on stones & leaves covered a stratum of Calcareous Earth, sometimes a little hard & brittle, but at other times soft and imperfect, but whether the lime favors the production of the green matter or vice versa, we probably shall not have time to ascertain. Therm<sup>r</sup> at 8 p.m. 36°. Extremes 36°–50°

Thursday 13<sup>th</sup> Therm<sup>r</sup> before sunrise 26° Wind north. The weather still continues cloudy, dark and disagreeable; finding no probability of making any astronomical observations this day I determined to make an excursion upon the neighbouring western mountain, and having gained one of its summits about  $\frac{1}{2}$  a mile from the Camp, took various courses of Hills & points on the river, & having gone to its extreme summit to the westward about a mile distant, I took courses to the same points in order to ascertain nearly their positions:

We

We had several fine prospects from this hill, which we estimated to be 300 feet higher than the valley of the hot Springs where we first ascended, and 400 feet at its western extremity; the valley of the Washita river comprehended between the hills on either side, seemed a perfect flat & about 12 miles wide, on all hands we saw the hills, called here mountains rising behind each other: in the direction of north the most distant were supposed to be 50 miles off, & are considered to be those of the arcansa river, the rugged mountains which divide the waters of the arcansa from those of the Washita prevent the Osage Indians from visiting the Washita river, of whose existence they are in general ignorant; were it otherwise, their excursions here, would prevent this place being visited by White persons or even Indians of other tribes, as they make no difficulty of traveling round the mountains which give birth to the Washita by the great prairies, which lie east of the great dividing Ridge, and it is known that those robbers plunder indiscriminately all they can find. In the direction of S.W. we saw at about 50 miles distance, a ridge perfectly level which we supposed to be the high prairies or planes of the red river, so that we had under our Eye an horizon whose diameter was 100 miles, incomplete to the East & N.W. Notwithstanding the late severity of the weather, we found along the ridge a considerable

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} siderable number and some variety of plants in flower, & others retaining their verdure, We found indeed the ridge much more temperate than the valley; When we left the valley it was extremely damp, cold and penetrating; upon ascending the ridge, the atmosphere became dry & mild, so that walking thereon was perfectly agreeable: a few of the plants in flower were collected for specimens, but what surprised us much was to find upon this ridge a species of Cabbage, the plants grew with expanded leaves spreading on the ground, of a deep green with a shade of purple, the taste of the cabbage was plainly predominant with an agreeable warmth inclining to the raddish; several tap-roots penetrated into the soil, of a white colour, having the taste of horse raddish, but much milder; a quantity of them were brought to camp & when dressed proved palatable & mild; it is highly improbable that any Cabbage seed has ever been scattered upon this ridge, the hunters ascending this River have always pursued far different objects; we must therefore consider this Cabbage (untill farther elucidation) as indigenous to this sequestered quarter & may be denominated the Cabbage raddish of the Washita. I shall preserve and take with me several living plants in hopes of procuring in due time seeds from which the curious may be furnished. We also found growing here a plant which is now green, called by the



the French 'racine rouge' (red root) which is said to be a specific in female obstructions, it has also been used combined with the china root to die red, which last probably acts as a mordant : having understood that it has also been used with the bark or root of an aromatic Vine, (which I shewed to M<sup>r</sup> Bartram at Baton Rouge) for the same purpose of fixing a red die. The top of this ridge is in a manner crowned by rocks of a flinty kind. So very hard as to be improper for gun flints ; when applied to that purpose, it very soon digs out cavities in the hammer of the lock. This hard stone is generally white but frequently clouded with red, brown black & some other colours, and no doubt in the hands of a practical mineralogist, would receive a variety of denominations such as agate, jasper, calcedony, Carnelian & perhaps some of the adamantine genus. Notwithstanding the abundance of rock, a great deal of excellent black vegetable earth was found along the ridge, and generally an understratum of darkish or greyish brown earth producing oak & Hickory with other woods & a great number of grape vines, said to yield excellent black grapes, there is no doubt that this soil upon the top & sides of these hills is well adapted to reward the labors of an expert Vigneron. Here & there we met with fragments of Iron stone & often where a tree had been overturned by the roots, some schistose stones were brought to view

which

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which were suffering decomposition by their exposure to the atmosphere; in returning we descended the hill obliquely & found for 200 feet perpendicular the same kind of stone, much broken into loose fragments, and slipping under foot frequently endangered our falling, the hill being in many places extremely precipitous: in this position we dug into the side of the hill and found the 2<sup>d</sup> stratum to consist of a reddish Clay somewhat resembling that found near the top of the Conical hill to the East of our Camp, but not so highly coloured nor so argilacious, the proportion of silex being manifestly much greater. We continued to descend and found at  $\frac{2}{3}$  of the hill downwards, the rock to alter considerably. & altho' it still continued siliceous, yet it was rather a very hard freestone mixed with fragments of flint which had probably rolled from above, descending still lower we found a blue schistus, in a state tending to decomposition wherever it was exposed to the atmosphere; more interiorly the schistus was hard resembling coarse Slate. Few other argilacious stones presented themselves to view, the siliceous were always predominant; & we often found what had much the appearance of the Turkey oyl-stone. Towards the base of the hill was a considerable expansion of tollerably good land, lying sufficiently level for cultivation and is supposed to be a good soil for wheat. The timber such as above described

described with a large proportion of Pine. Therm<sup>r</sup> at 8<sup>h</sup> p.m. 30° Extremes 26°–40° wind North. { 1804  
December

Therm<sup>r</sup> 28° Wind N.E. Cloudy, dark, cold Friday 14<sup>th</sup> and sleet—This morning has made no improvement upon the weather; rain & sleet fell in the night & the ground is hard frozen. D<sup>r</sup> Hunter had proposed an excursion into the mountains with a Party this day, but the appearance of the weather forbids it: the bad state of our mansion calling for further repairs in the present severe weather, we employed some of our people in shutting up the cracks and openings between the logs, which will render our dwelling more comfortable; placed some of the flowers collected between hortus-siccus-paper and had the roots of the new Cabbage planted so as to be preserved until our return.

The day continues to drip a little from time to time, being still dark, damp and disagreeably cold. Therm<sup>r</sup> at 8<sup>h</sup> p.m. 32° Extremes 28°–40° We have news from the Sergeant that the river has fallen 5 feet.

Therm<sup>r</sup> 26° Wind N.W. strong. The morn- Saturday 15<sup>th</sup> ing was cloudy, but less dark and disagreeable than the day before. The air became drier and the clouds were dissipating by 9 & 10 o'clock; prepared for a meridian observation; the wind  
blew

1804 }  
 December } blew very strong down the valley, we are here placed as in a point of convergence; for whether the wind blows directly or obliquely into the valley from above or below, it is reflected from the faces of the hills on one hand & by three lesser vallies on the other so as to have its force directed against this point as a Center; there will therefore be a breeze here when there is none upon the adjoining hills, perhaps the rarefaction produced by the hot Springs may also contribute in some measure at this season. At noon had an observation altho' much disturbed by the frequent recurrence of violent blasts of wind which greatly agitated the mercury of the artificial horizon; it appears that the Lat. here will be about  $34^{\circ} 31'$ , but as I intend to make a short series of observations with the face of the Instrument both East & west, the final result will then appear. Therm<sup>r</sup> at 3<sup>h</sup> p.m.  $32^{\circ}$  at 8<sup>h</sup> p.m.  $30^{\circ}$

Sunday 16<sup>th</sup> Therm<sup>r</sup>  $21^{\circ}$  Wind moderate N W this morning is cold but promises fine weather, the wind nevertheless arose at 9 o'clock & continued to blow strong all day. Prepared for astronomical observations. Took corresponding equal altitudes of the Sun with corresponding azimuths before & afternoon, with the help of a common circumferenter, by which it appears that the magnetic variation is  $8^{\circ} 20'$  East; this being  
 about

about the expected variation, we may conclude, { 1804  
December that the needle is not here influenced by any local attraction Took also equal altitudes for the regulation of the watch before & afternoon. Took also the Suns mer. alt. with the face of the Instrument reversed, and in the Evening between 10 & 11 o'clock, the Therm<sup>r</sup> being at 22° perfectly serene & calm, took 9 lunar distances between the moon's east limb &  $\alpha$  Arietis; the evening was perfectly agreeable & not sensibly cold altho' the Therm<sup>r</sup> was so low; I conclude these observations to have been made with great accuracy from the advantages of the circumstances, the Circle was mounted on its pedestral very firmly, the Star towards the west & the moon over head so that when both were brought into the field of view & the Star made to move gently across the limb of the moon by a turn of the foot screw backwards & forwards, or by sliding the foot a little to the right & left so as to discover the true point of contact on the moon's limb, the Star being left a little open, the observer had only to wait with his eye fixed on a permanent steady object untill he was convinced of the contact being perfect; I consider one observation made in this way superior to any number or set of observations made by an instrument supported upon the arms of the most experienced observer; I would therefore recommend to all persons using a Sextant or reflecting

Circle

1804 } Circle by land, to adopt a pedestal of support  
 December } with the three necessary motions; the superiority is so great that he who has accustomed himself to use the one mode cannot reconcile himself to the manifest imperfection of the other; the observation being made the angle is read off without stirring the Instrument, so that every thing is ready fixed to the eye for the next observation; I perceive that when all things are favorable a set of distances may be taken by the difference of 1' of a degree precisely between the observations; i. e. by moving the index before making the observation, exactly one minute in advance, so that it may be written down by the assistant before the time of counting Seconds: this will operate as a check also upon the negligences of young assistants, a mistake in minutes of time would thus be easily detected; this mode I shall follow in future, as being easier and more perfect: Therm<sup>tr</sup> at 8<sup>h</sup> p.m. 22° Extremes 21°–34°

Monday 17<sup>th</sup> Therm<sup>tr</sup> before Sun rise 26° wind moderate N.W. The morning is bright & promises a fine day. Yesterday Doc<sup>tr</sup> Hunter made an excursion into the mountains, & to day he goes again. He discovered nothing of importance hitherto, the only metal of which we have seen any indications has been Iron, the ore of which is scattered about in small fragments upon the hills and in  
 the

the water courses. Prepared for observation — took equal altitudes of the Sun before & afternoon to correct the watch, which compared with the result of yesterday's equal altitudes will give the rate of the watch's going, by which the true time of the Lunar observations will be precisely ascertained: took the Sun's meridian altitude with the face of the Instrument again reversed: prepared to observe the distance of the moon from Aldebaran, expecting fine observations from so bright a Star, but we were disappointed, the evening become hazy, the Stars frequently obscured, and a large halo with a broad white brim appeared around the moon. The night became cloudy & some drops of rain or sleet fell. appearance of bad weather for to morrow Therm<sup>r</sup> at 8<sup>h</sup> p.m. 28° Extremes 26°—42°

Therm<sup>r</sup> 34° wind north, Cold, damp, disagreeable. The appearance of the weather prevents D<sup>r</sup> Hunter from making another excursion to day, some rain fell in the night, but the aspect of this morning bespeaks snow or sleet. Having no better occupation in the present state of the weather, I brought up my journals and began to form a list of all the vegetables I had seen here and in the neighbourhood upon the River which will be inserted in this journal when made a little more complete; The day continues dark, cloudy & rainy: in the afternoon it began to hail

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Tuesday 18<sup>th</sup>

1804 } hail & in the evening it snowed pretty fast ;  
 December } about 8<sup>h</sup> p.m. it was 3 inches thick ; Therm<sup>r</sup>  
 at the same hour 32° Extremes 32°–36°

This evening Doc<sup>r</sup> Hunter was very much indisposed but was relieved before bed time.

Wednesday 19<sup>th</sup> Therm<sup>r</sup> 30° wind in the valley West, but changeable; This morning we have a full prospect of a northern winter, the ground is covered 4 inches deep with snow and it continues from time to time to fall, tho' not remarkably fast, the eves of our Cabin hang with beautiful icicles, which we have the pleasure of admiring thro' the logs as we sit by the fire side: out-door business being out of the question, I continue to augment my list of vegetables from memory & with the help of the pilot, who proves to be tolerably intelligent. The Doctor has been unable to discover any thing in the water of the hot springs except some weak acid which is probably carbonic; the water has been from this cause a little hard & therefore not so proper for washing, as the soap is decomposed in some measure: the same state of the weather continues, the therm<sup>r</sup> at 3<sup>h</sup> p.m. being at 30° and at 8<sup>h</sup> p.m. 28° at bed time the weather still continues dark and threatening more snow.

Thursday 20<sup>th</sup> Therm<sup>r</sup> 30° wind in the valley west. There appears over head driving light clouds from the N. W.



N.W. The snow still continues lying on the ground, the night was very cold, but has greatly softened towards morning, from appearances we expect a thaw, it becomes a little clearer. The D<sup>r</sup> and myself both a little indisposed probably from cold & wet feet and the inclemency of the weather ; after breakfast, some hopes of the clouds dissipating. The Sun has shewn himself thro' the veil of clouds for a moment, Prepare for observation but disappointed the heavens are again completely veiled in clouds and a thaw comes on, the Therm<sup>r</sup> being at 36° at 3<sup>h</sup> p.m. Engaged writing great part of the day. Examined some water of one of the hot springs, which stood a little stagnated on one side, its temperature 132° found no living animal in it, by the aid of an excellent microscope examined also some of the green matter and the white coagulum lying under it which I shall further prosecute with day light, being unable yet to determine whether the green matter is vegetable or merely a feculum. Therm<sup>r</sup> at 10<sup>h</sup> p.m. 32° The weather continues cloudy & the snow lies upon the ground the thaw having stopped.

Therm<sup>r</sup>, 32° Wind N. No favorable change Friday 21<sup>st</sup> as yet in the weather ; cloudy, damp, dark & cold, the snow still lies upon the ground, so that the D<sup>r</sup> is unable to undertake another more considerable excursion as he intended. We were  
in

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} in hopes also of making another set of astronomical observations for the Long. of this place, but as the time is now much advanced we shall be desirous of getting away as soon as the weather permits the transport of our baggage: — in the meantime the Doctor is desirous of making another excursion while we are preparing to move: observed a spot of ground on the same side of the creek with the hot Springs, covered with herbage which had not lost but partially its verdure; upon this spot no snow lay, it appeared to thaw as soon as it fell, altho' on other places even very near some of the hot springs the snow remained undissolved; as soon as the weather permits I shall examine this ground and ascertain the temperature which resists the rigours of winter: what a fine situation for a green or hot house, where at a small expence all the tropical fruits may be propagated. Therm<sup>r</sup> at 3<sup>h</sup> p.m. 36° it has rained a little we were in hopes of seeing the snow carried away, that it might afterwards become dry under foot: yesterday our pilot & some of the people went out a hunting & fell in with some buffalo; two of them were shot at and grievously wounded, the blood streaming from their sides as this happened in the evening they were unable to follow the chase, but returned to the pursuit this morning, they discovered the tracks and blood which they followed great part of the day without coming

ing

ing up with the buffalo & were obliged to re-  
 turn without success ; it appears that the great  
 strength of this animal enables him to carry off  
 on many occasions several shots without falling,  
 it is necessary to shoot him thro' the heart to  
 make him fall speedily ; we are told that a rifle  
 bullet is by no means certain (if ever so well  
 directed) of penetrating thro' the scull into the  
 brain, or if it does, provided the ball only reaches  
 into the front or fore part of the brain, the an-  
 imal will not fall ; some even assert that the  
 thickness and strength of the scull with the im-  
 mense quantity of hair which covers the head  
 of the buffalo will resist the penetration of an  
 ordinary rifle bullet. Some venison was brought  
 in so that we are never without fresh provisions.  
 The Turkeys are not plenty in this neighbour-  
 hood, keeping near the river. Found a myrtle  
 wax tree covered with its fruit, which must  
 have hung since july or August, the wax is no  
 longer green having changed its colour to a  
 greyish white by being so long exposed to the  
 atmosphere ; examined the berries with the mi-  
 croscope ; the whole berry is a little oval and  
 less than the smallest garden pea, the nucleus or  
 real seed is as large as a raddish seed covered all  
 over with a number of brownish kidney shaped  
 glands of a brown colour & sweetish taste, those  
 glands secrete the wax, which completely en-  
 velopes them & gives the whole the appearance

at

{ 1804  
 { December

1804 } at this season of an imperfectly white berry;  
 December } this is a valuable plant and merits cultivation;  
 its favorite position is a dry soil rather poor &  
 looking down upon the water, it is excellently  
 adapted to ornament the Margins of Canals,  
 lakes or rivulets; the Capina Yapon is equally  
 beautiful & proper for the same purpose. It  
 grows here along the banks of this stoney Creek  
 intermingled with the myrtle, and bears a beau-  
 tiful little red berry very much resembling the  
 red Currant. Therm<sup>r</sup> at 8<sup>h</sup> p.m. 31°

Saturday 22<sup>nd</sup> Therm<sup>r</sup> 31° wind N. dark & cloudy, the Snow  
 continues upon the ground. without any pros-  
 pect of favourable change; after breakfast it be-  
 gan to rain, the water the rain froze as it fell  
 upon the branches of the trees, many limbs broke  
 down around us in consequence of the weight of  
 the Ice adhering to them; we are still confined  
 within doors by the inclemency of the weather  
 which greatly retards us, so that we cannot even  
 prosecute our intended researches respecting the  
 hot springs. Engaged writing great part of the  
 day; we had 10 quarts of the hot spring water  
 evaporated which produced about 10 grains of  
 matter, of which the chief part appeared to be  
 carbonated lime with some feculum, the greater  
 part dissolved with effervescence in the muriatic  
 acid. The Therm<sup>r</sup> at 3<sup>h</sup> p. m. 36° The day  
 continues unfavorable & keeps dropping rain  
 from

from time to time, yet the snow does not melt : { 1804  
 The temperature of the hot springs remains the } December  
 same as in the former trial & the temperature of  
 boiling water was ascertained to be  $212^{\circ}$ ; hence  
 it appears that this place is not elevated so as  
 sensibly to alter the pressure of the atmosphere,  
 otherwise water would boil at a smaller temper-  
 ature. Caused a number of the grape vines to be  
 dug up ready to carry along with us. The Doctor  
 goes on with some more experiments upon the  
 Spring water, the results will be hereafter given.  
 Therm<sup>r</sup> at 8<sup>h</sup> p.m.  $34^{\circ}$  Snow falls again this  
 Evening — no prospect of a change.

Therm<sup>r</sup> before sunrise  $30^{\circ}$ . Wind N.W. by Sunday 23<sup>rd</sup>  
 the clouds. blows down the valley reflected from  
 the side of the hill N.N.E; this morning some  
 appearance of a change. The clouds (scudding  
 from the N.W.) begin to dissipate, the blue  
 celestial Sky appears in several parts of the hea-  
 vens. The snow still lies partially on the ground  
 — but we hope it will soon dissolve as the Sun  
 appears; prepare for taking equal altitudes in  
 which I succeeded so far as to take the triple  
 contact in the morning for the regulation of the  
 watch and also one azimuth with time & alti-  
 tude for finding the variation of the magnetic  
 needle; prepared for a meridian observation in  
 order to complete my set of 4 observations for  
 the Latitude of this place, but was disappointed  
 by

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December

} by the intervention of Clouds ; seeing no prospect of taking correspondent altitudes in the afternoon determined on visiting the hot springs & adjacent places : It requires a length of time to form a good judgement of a new object, such as the curious one now before us, on the first view we see a creek with a margin of rock & the hot springs here and there trickling over or passing thro' them ; the Creek seems to be undermining the rock, which frequently cracks, divides and falls into the Creek ; upon a closer examination it will be found that the water of the Creek does not undermine the rock, but on the contrary the rock is continually encroaching upon the breadth of the creek ; the hot water is perpetually depositing calcareous matter, perhaps some siliceous matter also : the new formed rock by those means is continually augmenting & projecting its cliffs and promontories over the running water, which prevents this formation below its own surface : wherever the calcareous crust is seen spreading over the bank & margin of the Creek, there most certainly the hot water will be found, either passing over the surface or thro' some channel perhaps below the new rock, or dripping from the projecting edges of the over-hanging precipice ; the progress of nature in the formation of this new rock is curious & worthy the attention of the mineralogist ; when the hot water issues from the fountain it frequently

quently spreads over a superficies of some extent ; so far as it reaches on either hand there is a de-  
 position of dark green matter which may either be a plant or only a feculum, I have not yet been able to pronounce which, several laminae of this green matter will be found lying over each other; immediately under and in contact with the inferior lamina which is not thicker than paper is found a whitish matter resembling a coagulum ; when viewed with the microscope, this last is also found to consist of several, sometimes a great number of laminae, of which that next the green matter is the thinnest and finest being the last formed, those below encreasing in thickness & tenacity, until the last terminates on a soft earthy matter, and this last reposing on the more solid rock ; each lamina of the coagulum is penetrated in all its parts by calcareous grains which are extremely minute and divided in the more recent web but much larger and occupying the whole of the inferior lamina ; I think it probable that the coagulum is silex and no doubt the grains are lime the under stratum is continually consolidating & adding bulk and height to the rock ; when this acquires a certain elevation the water always seeking the quickest descent will find its way over another part of the rock, hill or margin of the creek & forms accumulations by turns over the whole of the adjacent space ; the green matter is also designed by nature  
 for

{ 1804  
 December

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} for a useful purpose ; when the water by seeking new channels has entirely forsaken its former situation, the green matter which acquires sometimes a thickness of half an inch, is speedily converted into a rich vegetable earth & becomes the food of plants, the calcareous surface itself decomposes and forms the richest black mold intimately mixed with a considerable proportion of silex (formed as I have supposed from the coagulum) plants and trees of every kind now vegetate luxuriantly upon this soil ; many however thrive upon the rock, where very little earth is to be seen, particularly the cedar which seems to grow from between the clefts of the hard rock. The grape vine also seems to prosper in this unpromising situation. I proceeded to examine the piece of ground (above-mentioned) upon which the snow would not lie: I found it covered in a great measure with herbage, which was in part turned brownish by the season, altho' there was on a part of it a very small fine grass which was green, a calcareous Crust appeared in some places at the surface but in general there was a depth of 5 or 6 inches & in some places a foot of the richest black mold, the surface was manifestly warm to the touch; the Therm<sup>r</sup> in the air was then at 44° when placed 4 inches under the surface & covered with earth, it rose rapidly to 68° and when placed at 8 inches or upon the calcareous rock and covered up it rose to 80°

this



this result was very uniform over the whole surface which was about a quarter of an acre : { 1804  
December

in searching we found a spring about 15 inches under the surface which raised the Therm<sup>re</sup> to 130°. Under the black mold was found a brown mixture of lime and silex very loose and divisible, which appeared to be advancing in its progress of decomposition towards the formation of black mold, under the brownish mass it gradually became whiter and harder and at the depth of six to 12 inches was nearly hard calcareous stone sparkling with silex : it was evident from every thing we saw around that the water had passed over this place & formed a flat superficies of siliceous limestone, and that its position nearly level had facilitated the accumulation of earth in proportion as the decomposition advanced : Similar spots of earth were found higher up. The hill resembling little Savannahs near which were always found hot springs, which had once flowed over the Savannahs ; it seems probable that the hot water of the springs, at an early period had all issued from its grand reservoir in the hill at a much higher elevation than at present, the Calcareous crust may be traced up in most situations on the west side of the hill looking down upon the Creek & valley to a certain heighth, perhaps 100 feet perpend: from that division the hill above rises precipitously & is studded all over with hard siliceous stones ;

below

1804 } below the descent is more gradual, the soil cal-  
 December } careous black earth, the rock itself very often at  
 the surface, & frequently there is a precipice  
 on the margin of the Creek or a very precipi-  
 tous descent along the calcarious new formed  
 rock. The Therm<sup>r</sup> at 3<sup>h</sup> p.m. was at 44° and at  
 8<sup>h</sup> p.m. 38°. Doctor Hunter continues indis-  
 posed.

Monday 24<sup>th</sup> Therm<sup>r</sup> before Sun rise 32°. Wind moderate  
 from N.W. Some prospect this morning of a  
 favorable change, the moon is visible, and the  
 Sun yet behind the hill, announces his approach  
 with a bright blase: prepare for observation  
 — took the suns triple contact, hoping to ob-  
 tain correspondent observations in the afternoon  
 to regulate the watch. The moon was already  
 eclipsed by the Pine tree tops on the western  
 hill before the sun was risen high enough in  
 the East to enable us to take their distance; We  
 were therefore obliged to wait with patience  
 and ordered all the intervening trees to be cut  
 down to facilitate future observation: at noon  
 obtained a good altitude of the Sun but soon  
 afterwards it became cloudy, so that we got no  
 corresponding altitudes for the regulation of the  
 watch.

The Doctor found himself a little better, we  
 agreed to walk up the hot spring hill to make  
 new observations on this natural curiosity: we  
 now

now found it easy to trace out the separation between the primitive hill & that which has been accumulated upon its west side by precipitation from y<sup>e</sup> waters of the hot Springs; this last is entirely confined to the west side of the hill washed at its base by the waters of the Creek, no hot spring being visible in any other part of its circumference; by actual measurement along the base of the hill, the influence of the Springs is found to extend 70 perches in a direction a little to the eastward of North; along the whole of this space the Springs have deposited stoney matter, which is probably principally Calcareous, but there is also evidence of Silex and Iron. All the Springs deposit red calx of Iron in their passage to the Creek; the existence of Silex does not appear to me to be so fully decided; there is certainly sparkling chrystals mingled with the lime, particularly remarkable in the calcarious matter partially decomposed, but having observed by the aid of the microscope that the whole of the calcarious rock exhibits nothing but a mass of congregated sparry matter, it is not improbable that those shining chrystals may be chrystalised lime; the Doctor is now employed upon an analysis which will, no doubt, decide the point; from some specimens I shall carry home with me, I shall hope to investigate the matter more at leisure. The accumulation of calcarious matter is much more considerable at the

north

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1804 } north end of the hill than towards the south;  
 December } the first may be above one hundred feet perpendicular, but sloping much more gradually than the primitive hill above, until it approaches the creek, where not unfrequently it terminates in a precipice of from 6 to 20 feet: the difference between the appearance of the primitive and secondary hill is so striking, that the most superficial observer cannot avoid taking notice of it: the first is regularly very steep studded with rock and stone of the hardest flint and other siliceous compounds all extremely hard, a superficies of two or 3 inches of good mold covers a body of red clay above described: below on the secondary hill, which carries evident marks of recent formation, no flint or siliceous stone is to be seen; the Calcareous rock has concealed all from view, & is itself frequently covered by much fine rich black earth; it would seem that this compound which is precipitated by the hot waters, encloses in its own bosom the seeds of its destruction, for it is remarkable that when the waters have ceased to flow over any portion of the rock, a superficial decomposition will there speedily take place; tho' I am inclined to suspect that heat communicated from the interior of the hill below contributes much to this operation of nature, because it is observable, that insulated masses of the rock remain without change.

The

The Cedar, the Wax-Myrtle and the Cassina Yapon, all beautiful evergreens attach themselves particularly to the calcareous region, & seem to grow and thrive in the clefts of the solid rock : at small intervals along the line of separation between the primitive and secondary hill, we discover many sources of hot water ; some flowing with some degree of freedom, & others in a manner stagnated and shut in by the accumulations of Stoney Concretion extracted by their own operation from the bowels of the hill. Any spring enjoying a freedom of position proceeds with great regularity in depositing its solid contents ; the border or rim of its bason forms an elevated ridge, from whence proceeds a glacis all around ; when the waters have flowed for some time over one part of the brim, this becomes more elevated & the water can no longer escape on that side, but is compelled to seek a passage where the resistance is least, thus it proceeds with the greatest regularity forming in miniature a Crater resembling in shape the conical summit of a volcano ; the hill being steep above, the progress of petrification is stopped on that side, & the waters continue to flow and spread abroad, encrusting the whole face of the hill below. I am persuaded that the accumulations and extent of the calcareous matter would have been vastly greater, perhaps the whole valley might have been filled up with it, did not the

{ 1804  
December

1804 } the continual running of the creek water put  
 December } a stop to its progression on that side: the last  
 formed calcareous border of the circular bason,  
 (covered by the green feculum) is soft and easily  
 divided, a little under it is more compact, and  
 at the depth of six inches, it is generally hard  
 white stone; if the bottom of the bason is stirred  
 up, a quantity of red calx of iron arises and es-  
 capes over the summit of the crater.

It is surprising to see plants, shrubs and trees  
 with their roots absolutely in the hot water; this  
 circumstance being observed by some of the  
 visitants of the hot springs has induced some of  
 them to try experiments by sticking branches of  
 trees into the run of hot water; we found some  
 branches of the wax-Myrtle thrust into the bot-  
 tom of a spring-run, the water being at tem-  
 perature 130° of Farheneit's thermometer, the  
 foliage & fruit of the branch were not only sound  
 and healthy, but at the very surface of the water  
 fresh roots were actually sprouting from the  
 branch; the whole being pulled up for exami-  
 nation, it was found that the part which had  
 penetrated into the hot mud was decayed: this  
 phenomenon is so new & singular, that few per-  
 sons will at first be disposed to believe, judging  
 that deception or want of accuracy has led us  
 into error; it is however in the power of every  
 curious person who will give himself the neces-  
 sary trouble to try the experiments himself; in  
 the

the meantime Doctor Hunter and his son are  
 evidences of the truth of the above statement. { 1804  
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— A luxuriant vegetation clothes the decomposed surface of the calcareous region, the black rich mold being of a good depth in some few places (6 or more inches) & in others shallower, and the rock in other situations is nearly unchanged, giving nourishment however to a mass of very short moss, which is gradually forming a soil different in appearance from that which is generated from the decomposed lime. The primitive part of the hill is greatly inferior in fertility to the secondary or recent portion, but it is far from being sterile: grape vines abound in both, particularly in the calcareous soil.

It may be proper to pause for a moment and enquire what may be the cause of the perpetual fire which keeps up without change the high temperature of so many springs flowing from this hill at considerable distances from each other. Upon looking around us, no data present themselves sufficient for the solution of the problem; nothing of a volcanic nature is to be seen in this country, neither have we been able to learn that in any part of the hills or mountains connected with this river, there is any evidence in favor of such a supposition. An immense bed of blackish blue schistus appears to form the basis of the hot-spring hill and of all those in its neighbourhood. The bottom or bed of the  
 creek

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creek is composed of scarcely any thing else ; I have frequently taken up pieces of this stone, rendered soft by decomposition and possessing a very strong aluminous taste ; it seemed to require nothing but lixiviation and chrystalisation to complete the manufacture of alumn. As all bodies which suffer chemical changes, generally produce an alteration of temperature, it may be enquired whether the decomposing schistus is capable of generating a degree of Caloric corresponding to the temperature of the hot springs. Another cause we shall notice which perhaps will be thought more satisfactory : it is well known that in several positions within the Circle of the waters of this river, vast beds of martial pyrites exist ; they have not yet been discovered in the vicinage of the hot springs, but it is extremely probable that they may be accumulated in immense strata under the bases of those hills, and as we have noticed at one place at least some evidence of the existence of bitumen,\* we cannot doubt that due proportions of those principles united, will in the progress of decomposition by the admission of air & moisture produce the degrees of heat necessary to support the phenomina of the hot springs. No sulphuric

\* Having thrust a stick down into the crater of one of the hot springs some distance up the hill, several drops of petroleum or naphtha rose and spread upon the surface, it ceased to rise after three or four attempts.

acid



acid is present in this water ; the springs may be supplied by the vapor of heated water ascending from the Caverns where the heat is generated ; or the heat may be immediately applied to the bottom of an immense natural Caldron of rock contained in the bowels of the hill, from which as a reservoir the Springs may be supplied. Therm<sup>t</sup> at 8<sup>h</sup> p.m. 34°. Extremes 32° -45°

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Therm<sup>t</sup> 34° Wind N.W. Cloudy — The state of the heavens did not admit of any astronomical observations in the morning ; it cleared away before noon, so that we had a good meridian altitude of the Sun, which was scarcely over when the clouds overspread again the face of heaven, & it rained a part of the afternoon : the present being Christmas Day, we indulged the men with a holy-day, for which object they had hoarded up their rations of whisky, to be expended in merriment on this occasion, which terminated with inebriety but no ill consequence ensued. We amused ourselves with farther experiments on the hot waters ; the conduct of the analysis being left to Doctor Hunter as a professed Chemist, the results will be hereafter given. Thermom<sup>t</sup> at 8<sup>h</sup> p.m. 44°. Extremes 34° -51°

Tuesday 25<sup>th</sup>

Therm 34°. Wind N.W. clear. prepare for Wednesday 26<sup>th</sup> observation

1804 } observation. Took the Sun's contacts in the  
 December } morning hoping to get equal altitudes in the  
 afternoon ; but as this is not always certain, I  
 make it a rule to note down the Sun's altitude,  
 so that the apparent time may be calculated ;  
 and if the corresponding altitudes are taken  
 after noon ; the calculation of the correction  
 for change of declination during the interval is  
 greatly facilitated by noting the altitudes. Before  
 instruments were brought to their present state  
 of perfection, the method hitherto in use was  
 to be preferred ; but no reason can be assigned  
 why we should not now adopt a mode equally  
 correct, which saves half the labor, and more  
 especially that by using the altitudes, we do not  
 require that the Latitude should be previously  
 known.

This afternoon took the Altitude of the hill  
 west of the camp by measurement of a base  
 and two correct angles of elevation with the  
 circle of reflection, and found it to be 300 feet,  
 which is less than we had supposed : very steep  
 hills are extremely imposing ; the ascent of the  
 hill was not much more than double its perpen-  
 dicular height, i. e. about 700 feet of inclined  
 plane and the angle at its base made by the  
 summit with the horizon above  $26^{\circ}$ . We had  
 no favorable position to ascertain by the same  
 means the height of the hill of the hot springs,  
 but having been on the tops of both distinctly  
 seen

seen from each other, we judge them to be of equal elevation. { 1804  
December

In the morning between 10 and 11<sup>h</sup> made a set of Lunar observations, by taking twelve distances of the sun and moon's limbs: the moon being advanced within less than 60° of the sun, appeared with a very faint light in presence of the sun's image altho' darkened considerably, and it required very particular attention to obtain fine contacts, which are supposed to be very correct, altho' the eye remained greatly fatigued. —The afternoon being cloudy prevented taking the correspondent equal altitudes for the regulation of the watch. Therm: at 8<sup>h</sup> p.m. 44°. Extremes 34°–50°

This morning being fine Doctor Hunter prepared to make his long meditated excursion of 3 or 4 days into the mountains, which the unfavorable state of the weather has hitherto prevented: the therm: stood at 26° before sun rise, and the face of the hill and creek were shrouded in condensed vapor. After breakfast the Doctor set out with our Pilot and three of the people; the rest were dispatched with loads of baggage to the river. Took a set of observations for equal altitudes, but we were again disappointed in obtaining the correspondent afternoon observations by the intervention of clouds; the mornings' altitudes of yesterday and this day will nevertheless  
be

1804 }  
 December } be sufficient for the regulation of time by the watch and obtaining her rate of going. At noon had a very fine altitude of the Sun, which is the seventh observation for the Latitude of this place, and concludes our astronomical observations here, from whence will be deduced (it is hoped) with sufficient precision the Latitude and Longitude of this point of Louisiana, rendered remarkable by the presence of so great a natural curiosity as the Hot-springs. The mean of the seven observations whose respective results were all very near to each other makes the Latitude of the Hot-spring N<sup>o</sup> 3 to be  $34^{\circ} 30' 59''.82$ . This may be farther corrected by introducing the deviation in north polar distance, occasioned by the nutation of the Earth's axis; this being common to the Sun and to all the Stars ought not to be neglected when great precision is required. The series of observations above mentioned being reduced to the 21<sup>st</sup> December as the mean or middle time of the series; it will be found that the Sun's Right ascension was then 9 signs and the place of the moon's ascending node 9 signs 27 degrees; from whence results a correction in the Sun's declination of  $-4''.34$  which quantity being additive to the Latitude deduced, gives for the true Latitude  $34^{\circ} 31' 4''.16$ . The Longitude will be calculated at leisure & will be hereafter noticed.

After

After the Doctor set out I amused myself { 1804  
with pursuing experiments on the analysis of { December  
the hot waters &c — Thermometer at 8<sup>h</sup> p.m.  
38° Extremes 26°-45°

Therm: 34° Wind S.W. — Cloudy — ap- Friday 28<sup>th</sup>  
pearance of rain or snow — Dispatched six of  
our people with loads to the river Camp: after  
breakfast set out upon a geographical tour round  
the Hill of the hot-springs; young M<sup>r</sup>. Hunter  
with one of the people and my negro servant  
attended: in the course of this survey there was  
no indication of any hot spring but those of  
which we have already spoken, all lying on the  
same side of the hill within a space of 70 perches  
as has been already noted: Every new inspec-  
tion of those Curious springs brings forth some  
addition to the limited knowledge we have ac-  
quired of them; we find it now pretty evident  
that most of the springs if not all have flowed  
from a more elevated part of the hill than at pre-  
sent; and the perpetual accumulations of Calca-  
reous matter confining the sources have probably  
elevated them to nearly the level of the grand  
recervoir within the bowels of the hill; during  
this process the calcareous rock has been formed  
which we now see attached to the side of the  
hill; at length however the issues of the waters  
have become so obstructed and probably the level  
of the water in the grand recervoir so elevated,  
that

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} that by the superincumbent pressure of the waters, new passages have been forced in lower situations: it is evident that the springs which now break forth along the margin of the Creek, cannot be supposed to have flowed for a long time (comparatively) in their present situation; the formation of calcareous rock created by the springs in their actual position, resembling only small excrescences growing from the base of considerable precipices, is a proof of what we have advanced: some of those new springs have formed small flats of 20 to 30 feet extent; in general they have formed little elevations of 5 to 6 feet perpendicular, with a glaxis of 10 or 15 feet terminated by a precipitate fall into the creek. Those small accumulations when compared with the great mass of rock spreading along the face of the hill to the perpendicular height of one hundred feet, are certainly a demonstrative proof of the recent existence of the inferior springs: an ingenious observer of Nature, by some years attention might determine the quantity of calcareous matter precipitated in a given time from some one spring, which would furnish us with a datum, from whence to form a proximate calculation of the antiquity of the Springs. We have already noticed that some springs still exist even at the very limit which separates the calcareous region from the primitive hill; their temperature is similar to those

those below, they are all feeble and are soon lost upon the face of the hill, & perhaps contribute to augment the inferior springs. { 1804  
December

We found the circuit of this hill to be about  $3\frac{1}{5}$  miles, measuring round its base as correctly as the uneven surface would permit: altho' this hill when seen from the hill to the west of the valley appears to represent a handsome conical monticule in an insulated situation, yet our geographical survey discovered to us that it is connected in the rear by a very narrow ridge, with a chain of inferior hills dividing the Creek of the hot-springs from a branch of the Calfat. We find invariably the upper half of the hills to be filled up with the hardest flinty rocks, with an admixture of the hardest freestone; much of both particularly the first have rolled down & are found all the way to the base: At the foot of those hills & at some elevation are found immense strata of schistus, some of a yellowish color, which forms by decomposition an earth of the same color, presenting at first view the appearance of clay, but it is greatly deficient in tenacity: The base of the hills and the vallies contiguous to the hot-spring hill seem chiefly occupied by a bluish black Schistus, altho' there be veins of the siliceous genus crossing this last in several places: there is no doubt that a manufacture of Alumn might be established here upon an immense scale; the schistus under foot is frequently

1804 } frequently found in a state ready to yield alumn,  
 December } as appears from the astringent and sweet taste it  
 possesses.

After our return to Camp, I determined to have another microscopic examination of the green matter and hot water before leaving finally this place. I procured some of the green matter of a very beautiful kind, resembling a moss whose fibres were more than half an inch in length; a film of the same green matter was spread upon a calcareous base, & from the film sprung the fibres representing a beautiful vegetation completely immersed in water of  $130^{\circ}$  temperature; This moss (if it shall be found to be vegetable) was brought to this state of perfection by growing in a small natural bason containing some depth of water in a state of comparative repose, communicating freely with one of the springs, but no current passed thro' it.

This moss sparkled before the microscope with innumerable nodules of lime, some part of which seemed to be beautifully chrystalized, and altho' the fine green color of the moss was visible thro' the lime, yet it was thereby so much concealed, that it was impossible to decide whether it possessed the true organic structure of a vegetable; I incline however now to believe that the green matter is a true vegetable, not only from its great resemblance to some of the mosses particularly the Byssi, but also from the  
 discovery



discovery I have just made that this moss is the residence of animal life: after frequent search I at length discovered a very minute shell-fish of the bi-valve kind inhabiting this moss; its shape is nearly that of the fresh water muscle; the color of the shell is greyish brown with certain spots of a slight purplish appearance; when the animal is undisturbed it opens its shell & thrusts out four legs very transparent, and articulated like those of a quadruped; the extremities of the forelegs are very slender & sharp, but those of the hind legs somewhat broader as if armed with minute toes; from the extremity of each shell, issues 3 or 4 forked hairs, which the animal seems to have the power of moving; the forelegs seem formed for making incisions into the moss for the purpose of procuring access to the juices of the living plant, upon which no doubt it feeds, and I think it highly probable that the animal is provided with a proboscis, tho' I was unable to discover it; the hind legs seem well adapted for propelling the animal in its progress over the moss or thro' the water.

} 1804  
 { December

A considerable quantity of snow fell while we were engaged on the survey and after our return. Thermometer at 8<sup>h</sup> p.m. 30°. Extremes 30°–34° — at 3<sup>h</sup> p.m. 32°

Therm: 25°. Wind at N.W. strong all night, Saturday 29<sup>th</sup> some flying clouds appear in the morning. — Got the

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} the people ready with their loads between 9 & 10<sup>h</sup> a.m. and I set out with them myself for the river camp ; it began to snow at 10 o'clock, but did not continue ; the weather continued cloudy, but the exercise of walking rendered the temperature (tho' cold) very agreeable ; the low grounds thro' which we passed were a little watery, in consequence of the rains which had fallen, but not more so, than when we first walked out to the hot springs ; the soil of the flat lands under the stratum of vegetable mould was chiefly yellowish and was evidently decomposed schistus, of which there were immense beds in every stage of its progress from the hard stone recently uncovered, partially decomposed and down to the yellowish earth apparently homogenous. The covering of vegetable mould between the hills and the river is in most places sufficiently thick to constitute a good soil, being from 4 to 6 inches, and it is the opinion of the people upon the Washita that wheat would grow here to great perfection. Altho' the higher hills (300 to 600 feet) are very rocky, yet the inferior hills and sloping bases of the first are generally clothed with a soil of a middling quality, the natural productions are sufficiently luxuriant, consisting chiefly of black and red oak intermixed with a variety of other woods and a considerable undergrowth ; and even on those rocky hills, Nature has bestowed a soil which will  
reward

reward the future labors of the industrious Vi- { 1804  
December  
gneron : Nature herself unaided by man has al-  
ready planted on them three or four species of  
Vines, which are said to produce annually an  
exuberance of excellent grapes. A great variety  
of plants, some of which in their season, I am  
informed produce flowers highly ornamental,  
would probably reward the researches of the  
Botanist.

On the way into the river I took the courses  
by compass and the distances by time ; when the  
Doctor comes with the last party I have ap-  
pointed two good hands to chain the same dis-  
tances, to be noted down by young M<sup>r</sup> Hunter  
— At 8<sup>h</sup> p.m. the therm<sup>r</sup> was down at 24°—the  
wind blew strong all the afternoon, but fell calm  
by night.

I omitted to observe in its proper place that  
having observed from the bottom of one of the  
hot springs a frequent ebullition of gas, we should  
have collected some for examination, but no ap-  
paratus was provided for the purpose, it was so  
unfortunate that we had not even a funnel at the  
Springs, which with a bottle might have suf-  
ficed: it was not hydrogen, because I failed in  
several attempts to inflame it by a lighted torch :  
there can be no doubt of its being Carbonic acid,  
having always found indications of an excess of  
a weak acid, by which the lime and iron were  
dissolved in the water. With respect to the quan-  
tity

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tity of hot water delivered by the springs I made the following rough estimate. — There are four principal springs, two of inferior note, one rising out of the gravel and a number of drippings and drainings all issuing from the margin or from under the rock which overhangs the creek. Of the four first mentioned, three deliver nearly equal quantities, but one (N<sup>o</sup> 1) the most considerable of all and the hottest delivers about five times as much as one of the other three, the 2 of inferior note may be equal to one, and all the drippings & small springs are probably underrated at double the quantity of one of the three; that is, taking all together, the whole will amount to a quantity equal to eleven times the water delivered by the standard spring, which was the only one commodiously situated for measurement; I neglect the springs up the hill, because it is probable that what is not evaporated unites with the springs below. We found a Kettle containing eleven quarts was filled by the standard Spring in eleven seconds; Hence the whole quantity of hot water delivered by all the springs issuing visibly from the base of the hill may amount in one minute to 165 gallons and in 24 hours to 3771½ Hhds of 63 gallons each, which is equal to a handsome brook and might work an over-shot mill. In cool weather condensed vapor is seen arising out of the gravel bed of the Creek from springs which cannot be taken into the

the

the account; during summer and fall I am informed the Creek receives little or no water, but what is supplied by the hot-springs, at those seasons probably many small springs may be seen rising out of the bed of the Creek, which are now invisible; during that time the Creek itself is a hot bath, too hot indeed near the springs, so that a person may chuse the temperature most agreeable to himself, by selecting a natural bason nearer to or farther from the principal springs; at 3 or 4 miles below the springs, the water is tepid and unpleasant to drink.

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Therm! in air  $9^{\circ}$  in river water  $36^{\circ}$  — wind Sunday 30<sup>th</sup> very light at N.W. This morning & the night past are the coldest we have experienced this winter. The People set off very early to bring in Doctor Hunter's baggage from the springs. Employed myself in bringing up my journals &c — The Doctor arrived with the people about 3<sup>h</sup> p.m. — The Sky was most serenely clear this day, its color over head was that of the darkest prussian blue and during last night the stars shone with uncommon lusture. People have conceived an idea that they see more stars here and at the hot springs than any where else; which idea arises from the extreme transparency of the atmosphere, which causes the stars to strike the eye with greater brightness, and no doubt stars of inferior magnitude will be seen in a pure

1804 } pure sky which are invisible in an ordinary one.  
 December } This evening some light clouds appeared about  
 the sun-setting, which is an indication of change  
 of weather ; we now anxiously expect rain, as  
 we wait only for the first rise of the river to go  
 down with safety over the falls and rapids ; 5 or  
 6 feet perpendicular will be sufficient. At night  
 the atmosphere became again extremely bright  
 — at 8<sup>h</sup> p.m. the therm<sup>t</sup> was at 21°. Extremes  
 9°–38° — It became very cold at 10<sup>h</sup> p.m.

Monday 31<sup>st</sup> Therm<sup>t</sup> in air 29° in river water 36° — Wind  
 S.E. During the night the Weather altered  
 greatly ; the temperature was much molified  
 and the stars disappeared ; in the morning one  
 general cloud enclosed the horizon, and from  
 the damp penetrating chilliness of the morning  
 we look for snow : ordered setting poles to be  
 made & every thing to be prepared for the first  
 favorable moment to depart. The day continued  
 cloudy, & in the afternoon the therm<sup>t</sup> having  
 risen to 32° it began to snow and continued all  
 day and part of the night : Examined some of  
 the green moss from the hot-springs, with a  
 view to shew Doctor Hunter one of the Bivalved  
 testaceous animals, found a large one which un-  
 der the microscope measured  $\frac{1}{50}$  of an inch in  
 length by the micrometer.

1805 }  
 January }  
 Tuesday 1<sup>st</sup> } This morning the thermometer was at 26° —  
 It

It had ceased snowing in the night but recommenced after day light ; the snow was sounded and found in most places to be from 11 to 13 inches ; we are in hopes that the melting of this snow united to the rain which will probably accompany the thaw, will be sufficient to take us down in safety ; being desirous however of ascertaining what aid we had to expect from the snow, I made the following experiment — I took a Cylindric Kettle 10 inches deep & having by sounding found a flat piece of snow of the same depth, I pressed down the Kettle bottom upwards perpendicularly to the ground ; I was thus enabled to return the Kettle completely filled with its column of snow, and having thawed it gradually to the temperature of  $33^{\circ}$  I found the water to measure exactly 1.07 inches, that is, 9.346 inches of snow will yield one inch of water in the circumstances above mentioned ; it is observable that the snow fell lightly without wind, it is therefore probable that the proportion of ten to one may be adopted as a general standard to be varied according to circumstances. The snow continued frozen all day, and the therm<sup>r</sup> at 3<sup>h</sup> p.m. did not fall below the freezing point and in the evening at 8<sup>h</sup> p.m. it was fallen to  $18^{\circ}$

Thermometer in air  $6^{\circ}$  in river water  $32^{\circ}$  Wednesday 2<sup>d</sup>  
 Calm — The night proved extremely cold ;  
 large

1805 } large fires with all the covering that could be  
 January } conveniently used were necessary to render our  
 situation comfortable in a bad tent negligently  
 chosen at New Orleans. The sun arose bright  
 and shone with splendor upon the surface of  
 the snow which covered every object upon the  
 ground; the river alone presented a bleak ap-  
 pearance with a condensed vapor floating upon  
 its surface; the temperature of the river was at  
 the freezing point; a kettle of water being  
 brought up to Camp and placed on the ground  
 four feet from a large fire, its surface began im-  
 mediately to shoot into icy chrystalizations. —  
 Our hunters are tolerably successful, bringing in  
 every day abundance of Venison and Turkies. —  
 The day became pleasant and agreeable, the  
 temperature at 3<sup>h</sup> p.m. being 45°; and at 8<sup>h</sup> p.m.  
 the thermometer fell to 32°.

Thursday 3<sup>d</sup> Thermometer in air 22° in river water 34° —  
 wind moderate at N.W. The atmosphere be-  
 came cloudy in the night and we looked confi-  
 dently for a change of weather, but this morning  
 it has become serene and fine; the vicissitudes  
 of the weather have of late been frequent, a  
 change is now extremely desireable but the sea-  
 son seems obstinately bent against all change.  
 The day became pleasant and of an agreeable  
 temperature, the thermometer at 3<sup>h</sup> p.m. being  
 at 48° and at 8<sup>h</sup> in the evening 30°

Thermometer



Thermometer in air  $22^{\circ}$  in river water  $36^{\circ}$  — { 1805  
January  
Friday 4<sup>th</sup>

Calm — during the night it became cloudy, not a star was to be seen but before morning it cleared away & became perfectly serene and cloudless. The day proved fine, the sky overhead of a bright but deep prussian blue, the temperature mild, the thermometer at 3<sup>h</sup> p.m. being up to  $50^{\circ}$ . In the afternoon the Doctor made an excursion upon the river to examine some of the neighbouring hills: I continued to bring up and arrange my Journals. The evening was fine, the thermometer at 8<sup>h</sup> p.m. was at  $32^{\circ}$  — no favorable appearance yet of rain to raise the river; the snow is disappearing without producing any beneficial effect: we continue here as prisoners, waiting for what is usually called bad weather, to bear us away from this place.

Thermometer in air  $22^{\circ}$  in river water  $36^{\circ}$  Saturday 5<sup>th</sup>

Wind N.W. The atmosphere became cloudy in the night, but was perfectly serene and clear at day-break, so that we have no near prospect of our departure. The day became fine and seemed to invite us to recommence astronomical observations, and altho' a sufficient series had been made both for Latitude and longitude at the hot-springs connected by survey with this place, yet we began a new series. Equal altitudes of the sun were taken before and after noon; three distances of the moon and sun's limbs were

1805 } were taken near 2<sup>h</sup> p.m. and in the evening  
 January } three distances of the moon's west limb from  
 Aldebaran were taken between 6 & 7<sup>h</sup> p.m. —  
 a greater number would have been taken, but  
 in the first case the Sun got behind some trees  
 and in the second case, the moon was in a simi-  
 lar situation, if tomorrow proves fine we shall  
 prosecute the same operations to more advan-  
 tage, having ordered several trees to be cut down  
 which stood in the way — Wind S.E.

The day continued fine and of a mild tem-  
 perature; some few clouds keep up our hopes  
 of a change — Thermometer at 8<sup>h</sup> p.m. 28° —  
 Extremes 22°–55°

Sunday 6<sup>th</sup> Thermometer before sun-rise in air 28° in river  
 water 38°. This morning proved cloudy contrary  
 to expectation and revived our hopes of a change  
 of weather favorable to our descent: This state  
 of the atmosphere continued all day; from time  
 to time there was a little light rain or mist.  
 The rain increased a little after dark, but still  
 very light: the snow seems now melted away to  
 about one fifth or sixth of the original quantity;  
 we began to apprehend that the whole would  
 disappear without any influence upon the river,  
 but now it has risen about 12 inches: Thermom-  
 eter at 8<sup>h</sup> p.m. 44°. Extremes 28°–50°

Monday 7<sup>th</sup> Thermometer in air 64° in river water 44°  
 Last

Last night it rained very lightly by intervals, so little indeed that a cylindric vessel placed to receive it, did not contain enough to be measured. During the night the temperature was extremely warm, and the weather continues to be cloudy, but not very dark, so that our prospect of rain is not very flattering; the river has nevertheless risen 18 inches since last night, which has no doubt been caused by the melting of the snows. The sun shews himself at intervals between the clouds: it became so warm that we dined abroad under the shade of lofty pine and oak trees, upon the wild game of the forest and the river, such as Venison, wild Turkey, bear, Cygnet &c: The thermometer at the hour of dinner was at  $75^{\circ}$  which at this season produces the sensation of a summer's sun of  $90^{\circ}$ ; the river continues to rise, and we have taken the resolution to wait the issue of the present state of the weather and to set out at all events; if there be not water enough to go over the falls with safety by the oar, we shall pass along by letting ourselves down by the help of a rope, step by step, until the danger is passed. Thermometer at 8<sup>h</sup> p.m.  $38^{\circ}$  Extremes  $38^{\circ}$ – $78^{\circ}$  In the evening the river continues to rise.

Thermometer in air  $28^{\circ}$  in river water  $46^{\circ}$  Tuesday 8<sup>h</sup>  
 Last night was cloudy, moist and cold, the river rose considerably in the night; we suppose it to  
 be

1805 }  
 January } be about 6 feet perpendicular, higher than the level of the river when we came up, we now think ourselves secure of going down with speed and safety; orders were therefore given to embark our baggage and prepare for departing. We had the satisfaction of taking with us an abundance of fresh provision chiefly venison, to supply us to the Post of the Washita. We accordingly set off between 9 & 10 o'clock and landed a little below upon the opposite shore and went to examine the first rapids, which we found to be very safe; we re-embarked, and by directing our course between the breakers, passed along with the rapidity of an arrow in perfect security: we continued moving with great rapidity on the face of the current, but thought it prudent to land and view a second rapid, and after exploring the best passage we passed down in perfect safety.

We got over the great 'Chutes' about 1 o'clock, two of our oars having been violently dashed overboard by the willows, the Pilot thinking it safest to keep the eastern shore on board; we halted below and regained our oars by sending up the Canoe. There we dined and went on & stopped a little below to examine the flinty promontory already noticed on the 3<sup>d</sup> December. We took some specimens of the rock resembling the Turkey oil-stone: it appears to me to be too hard; I remarked that the strata  
of

of this chain ran perpendicularly nearly East and West, crossed by fissures at right angles 5, 6 to 8 feet apart; the laminae were from  $\frac{1}{4}$  to 4 or 5 inches thick. About a league below on the same side, landed at Whetstone hill and took several specimens; this projecting hill consists of a mass of greyish blue schistus of considerable hardness and about 20 feet perpendicular; near the top, it was in a state of progression towards decomposition, being there extremely crumbly and part of it changing into a dirty yellowish color: the laminae were in general perpendicular, but not regularly so, and from  $\frac{1}{4}$  to 2 inches in thickness, but did not split asunder with an even surface: went on and encamped about ten leagues below Ellis' Camp. Thermometer at 8<sup>h</sup> p.m. 37° Extremes 28°–37° It rained lightly after we encamped, which rendered the flat ground of our encampment very wet and the wood difficult to burn.

Thermometer in air 42°, in river water 44° Wednesday 9<sup>th</sup>  
 — The river fallen about six inches — During the night it rained by intervals, but very lightly, the air was moist and cold, the soil here immediately under the vegetable stratum is yellowish and of little consistency, resembling greatly the understratum observed near the hot springs, produced probably by the same cause, the decomposition of schistus. Last evening ordered provisions

1805 } provisions to be dressed for the day, to save the  
 January } time of landing during the day for that purpose;  
 about two miles below our Camp landed to examine some freestone and blue slate in sight of ‘Bayou de la Prairie de Champignole’ mentioned the 2<sup>d</sup> Dec<sup>r</sup>. The freestone of which we took specimens, seems proper for grindstones, scythe-stones &c; but the blue slate as it is called is only bluish schistus, hard & brittle; and not proper for the roofing of houses; we have not seen slate good for that purpose except some discovered on one of the Doctor’s excursions on the Bayou Calfat. Much game on the river, such as Geese, ducks, swans &c; they continue equally wild and difficult of approach as before, so that we derive little benefit from that source.

The day continued dark, cloudy & cold with the wind at North; at 11<sup>h</sup> a.m. it began to snow and hail with rain by intervals: we observed nothing this day meriting remark, different from what we saw on our way up. Towards evening it began to clear away; and soon after we encamped the sky became serene. By the Pilot’s estimation we made this day nineteen leagues, which probably do not exceed forty miles: we passed five of our night encampments on the way up. Encamped a league above ‘Cache à Maçon’ —slept a little higher on the 27<sup>th</sup> Novem<sup>r</sup>. Thermometer at 8<sup>h</sup> p.m. 24°, Extremes 24°–42° at  
 3<sup>h</sup>.

3<sup>h</sup> p.m. 36° The moon and stars shone with uncommon lusture. { 1805  
January

Thermometer in air 23°, in river water 42° — Thursday 10<sup>th</sup>  
 river fallen 7 inches. The face of the heavens changed much in the night, it became extremely dark and cloudy, and this morning with the wind at north; it is cold, damp and penetrating; the river fallen seven inches during the night. After setting out, the clouds began to dissipate & the sun to shew himself, a very agreeable sight to travellers in cold & unpleasant weather; it continued never-the-less cold all day, the sun not possessing power to soften the rigorous cold which prevailed, the thermometer not rising above the freezing point from morning until night. We made this day by the Pilots account fourteen leagues and encamped at 'auges d'Arclon' (Arclon's troughs) three leagues below the little misouri; slept near this place on the 23<sup>d</sup> november: it appears by reference to the Journal, that we were thirteen days in going up from this place to Ellis' Camp, which has required but three broken days to come down, having made several stops to examine certain objects on our way down, and to day we made a more considerable delay at the Camp of a M. Le Fevre. This was an intelligent man, a native of the Illinois, now residing at the Arcansas; he is come here with some Delaware and other  
 Indians

1805 } Indians whom he has fitted out with goods, and  
 January } receives peltry, fur &c at a stipulated price, as it  
 is brought in by the hunters. This gentleman informs us that a considerable party of the Osages from the Arcansa river have made an excursion round by the prairies towards the red river, and down the little misouri as low as the ‘fourche d’Antoine’, and there meeting with a small party of Cherokees, are supposed to have killed four of their number & others are missing ; Three Americans and ten Chicasaws went a hunting into that quarter, who may also have been in danger, those Ozages being no respecters of persons. M. Le Fevre possesses considerable knowledge of the interior of the Country ; he confirms the accounts we have already obtained that the hills or mountains which give birth to the various sources of this little river are in a manner insulated ; that is, they are entirely shut in and enclosed by the immense planes or prairies which extend beyond the red river to the South & beyond the Missouri (or at least some of its branches) to the north and range along the eastern base of the great chain or dividing ridge, commonly known by the name of the sand hills, which separate the waters of the Mississippi from those which fall into the western pacific ocean : The breadth of this great plane is not well ascertained, it is said by some to be at certain parts or in certain directions not less than  
 than



than two hundred leagues, but I believe it is agreed by all that have a knowledge of the Western Country, that the mean breadth is at least two thirds of this quantity; a branch of the Misouri called the river platte or shallow river is said to take its rise so far south, as to derive its first waters from the neighbourhood of the sources of the Red and Arcansa rivers. By the expression planes or prairies in this place is not to be understood a dead flat resembling certain savannahs, whose soil is stiff and impenetrable, often under water & bearing only a coarse grass resembling reeds; very far different are the western Prairies, which expression signifys only a country without timber: Those Prairies are neither flat nor hilly, but undulating into gently swelling lawns and expanding into spacious vallies in the center of which is always found a little timber growing upon the banks of brooks and rivulets of the finest water, the whole of those prairies is represented to be composed of the richest and most fertile soil; the most luxuriant & succulent herbage covers the surface of the Earth interspersed with millions of flowers and flowering shrubs of the most ornamental and adorning kinds: Those who have viewed only a skirt of those prairies, speak of them with a degree of enthusiasm as if it was only there that Nature was to be found in a state truly perfect; they declare that the fertility and beauty of

{ 1805  
January

1805 } of the rising grounds, the extreme richness of  
 January } the Vallies, the coolness and excellent quality  
 of the waters found in every valley, the Salu-  
 brity of the atmosphere and above all the gran-  
 deur and Majesty of the enchanting landscape  
 which this Country presents, inspires the Soul  
 with sensations not to be felt in any other region  
 of the Globe. This Paradise is now very thinly  
 inhabited by a few tribes of savages and by im-  
 mense herds of Wild Cattle (Bison) which peo-  
 ple those countries ; the Cattle perform regular  
 migrations according to the seasons, from south  
 to north, and from the planes to the mountains ;  
 and in due time taught by their instincts take  
 a retrograde direction : those tribes move in the  
 rear of y<sup>e</sup> Herds and pick up stragglers & such as  
 lag behind, which they kill with the bow and  
 arrow for their subsistence ; should it be found  
 that of this rich and desireable Country there is  
 500 miles square, and from report, there is prob-  
 ably much more, the whole of it being cultiva-  
 ble, it will admit of the fullest population, and  
 will at a future day vie with the best cultivated  
 & most populous countries on the Globe : in  
 this particular the province of Holland exceeds  
 perhaps all others ; there, one million of acres  
 support two millions of Inhabitants ; but as Mar-  
 itime Countries enjoy superior advantages re-  
 specting population, by the interchange of their  
 manufactures for the necessaries of life, which  
 last

last in an inland country must be totally drawn from the product of the proper soil, we shall suppose this new Country to be populated in the proportion of one tenth only of that of Holland, in which case it will be capable of subsisting a nation composed of twenty six millions of Souls. This Country is not exposed to be ravaged by those sudden and impetuous deluges of rain which in most hot countries and even in the Mississippi Territory, do sometimes tear up & sweep away with irresistible fury the crop and the soil together; on the contrary, rain is said to become more rare in proportion as the great chain of mountains is approached, and it would seem that within the sphere of attraction of those elevated chains little or no rain falls upon the adjoining planes; this relation is the more credible, as in that respect our new Country may resemble other flat or comparatively low countries similarly situated, such as the Country lying between the Andes and the Western pacific: the planes are supplied with nightly dews so extremely abundant as to have the effect of refreshing showers of rain, and the spacious vallies which are extremely level may with facility be watered by the rills & brooks which are never absent from those situations: such is the description of the better known country lying to the south of the red river, from Nacoches towards S<sup>t</sup> Antonio in the province of Texas:

{ 1805  
January

1805 } Texas: \* the richest crops are said to be pro-  
 January } duced there without rain, but agriculture in that  
 quarter is at low ebb; the small quantities of  
 maize furnished by the Country, is said to be  
 produced without cultivation, a rude opening is  
 made in the earth just sufficient to deposit the  
 grain at the distance of four or five feet in  
 irregular squares, and the rest is left to nature;  
 the soil is naturally tender, spongy and rich, &  
 seems always to retain humidity sufficient with  
 the bounteous dews of heaven to bring the crops  
 to maturity.

The red and Arcansa rivers whose Courses are very long pass thro' portions of this fine Country, they are both navigable to an unknown distance by boats of proper construction; the Arcansa river is however understood to have greatly the advantage over its neighbour with respect to the facility of Navigation: some difficult places are met with in the red river below the Nakitosh, after which it is good for 150 leagues (probably the computed leagues of the Country of nearly 2 miles each) there the Voyager meets with a very serious obstacle. viz the commencement of the Raft as it is called, that is, a natural covering which conceals the whole river for an extent of 17 leagues continually augmenting by the drift wood brought down by

\* The x is pronounced gutturally, precisely in the same tone as the Scotch pronounce the gh in night, light &c

every considerable fresh; this covering which for a time was only drift wood, supports at this time a vegetation of every thing abounding in the neighbouring forest, not excepting trees of considerable size, & the river may be frequently passed without any knowledge of its existence; it is said that the annual inundation is opening for itself a new passage thro' the low grounds near the hills, but it must be a long time before Nature unaided will dig out a passage sufficient for the reception of the waters of the red river; about 50 leagues above the natural bridge is the residence of the Cadeaux or Cadadoquis Nation, of whose good qualities we have already spoken; the Inhabitants estimate the Post of Nakitosh to be half way between New Orleans and the Cadeaux Nation: above this point the red river is said to be embarrassed by many rapids falls and shallows, none of which are said to be met with in the Arcansa river as high as it is known, except in the very lowest state of its waters; the navigation is reported to be safe and agreeable, the lands on either side are of the best quality & well watered with springs, brooks & rivulets, & many situations proper for mill-seats; from the description it would seem, there is along this river a regular gradation of hill and Dale presenting their extremities to the river; the hills are gently swelling eminencies and the Dales are spacious Vales with  
 living

{ 1805  
 January

1805 } living water meandering thro' them: the forests  
 January } consist of handsome lofty trees, & chiefly what  
 is called open woods, without cane-brake or  
 much underwood; the quality of its lands is sup-  
 posed much superior to that of the red river,  
 until it ascends to the Prairie Country, where  
 the lands are probably very similar. About 200  
 leagues up the arcansa, is an interesting place  
 called the salt Prairie, there is a considerable  
 fork of the river there, and a kind of Savannah  
 where the salt water is continually oozing out &  
 spreading over the surface of a plane; during the  
 hot dry Summer Season, the salt may be raked  
 up into large heaps; a natural crust of a hand-  
 breadth in thickness is formed when the dry  
 season prevails; this place is not often approached  
 on account of the danger from the Ozage In-  
 dians; much less do the White hunters venture  
 to ascend higher where it is generally believed  
 that silver is to be found. We have been also  
 informed that high up the arcansa river, salt is  
 to be found in form of a Solid rock, & may  
 be dug out with the Crow-bar. The waters of  
 the Arcansa like those of the red river, are not  
 potable during their low state; they are both  
 charged highly with a reddish earth or marl  
 and are also extremely brackish; this inconven-  
 ience is not greatly felt upon the Arcansa, where  
 springs, rills & brooks of the finest fresh water  
 are so frequent; the red river I believe is not

so favorably situated. Every account seems to demonstrate that immense natural magazines of salt must exist in the great chain of mountains to the westward, all rivers flowing from those mountains during the dry season retain a strong impregnation of salt, until that property becomes imperceptible by the accession of the fresh waters of many other rivers. — The great western prairies, besides the herds of wild Cattle (Bison commonly called Buffalo), are also stocked with vast numbers of a species of wild goat, (not resembling the domestic goat) extremely swift of foot; as the description given of this goat has not been very perfect, I have supposed from its swiftness, it might be the antelope; or it may possibly be a goat which has escaped from the spanish settlements of new Mexico: I have conversed with a Canadian who has been much with the Indians to the westward, this man told me that he had seen great flocks of an wool-bearing animal larger than common sheep; the Wool is much mixed with hair. This is probably the same animal which has been described & of which a plate has been given in the medical repository of New York. The Canadian pretends also to have seen an unicorn; the single horn he says rises out of the forehead & curls back, according to his description so as to convey the idea of the fossil Cornu Ammonis; this man says he has travelled beyond the great dividing ridge

{ 1805  
January

1805 }  
 January } ridge so far as to have seen a large river flowing to the westward; the great dividing mountain is so lofty that it requires two days to ascend from its base to its top, other ranges of inferior mountains lie before and behind it; they are all very rocky & sandy, large lakes and vallies lie between the mountains; some of the lakes are so large as to contain considerable islands, and rivers flow from some of them: great numbers of fossil bones of very large dimentions are seen among the mountains, which the Canadian supposed to be of the Elephant; he does not pretend to have seen any of the precious metals, but has seen a mineral which he supposed might yield Copper: from the top of the high mountain, the view is bounded by a curve as upon the ocean and extends over the most beautiful prairies which seem to be unbounded particularly to the East; the finest of the lands he has seen are on the Missouri, no other can compare in point of richness and fertility with those of that river.

This Canadian as well as M. Le Fevre say that the Osages of the tribe of white hairs in the month of December (early in the month), plundered all the white hunters and traders upon the arcansa river. All the old french hunters agree in accusing the Osages of being extremely faithless, particularly those on the arcansa, the others they say are but very little more to be depended upon;



upon; they pretend to make peace & enter into terms of amity, but on the first favorable occasion, they rob, plunder and even kill without hesitation, The other indian tribes speak of them with great abhorrence, and say they are a barbarous uncivilized race. The different nations who hunt in their neighbourhood, have been concerting plans for their destruction.

{ 1805  
January

M. Le Fevre informs me that the Nation of the arcansas always waging a defensive war with the Osages, propose sending in the spring of the year a deputation of three Chiefs to the Government of the United States. They say that the Country from the Washita river on the south to the river S<sup>t</sup> Francis on the north is their property, that they propose to say to the Government of the U. S. "We will relinquish to your people all our lands to the North of the arcansa river, on the white river and on the river S<sup>t</sup> Francis; we will also relinquish our lands upon the mississippi lying between the rivers arcansa and Washita to an extent west-erly far beyond any settlements which have been attempted by the white people, the limits of which we will ascertain; but we request that the powerful arm of the U. S. will defend us their children in the possession of the remainder of our hunting grounds, lying between the Arcansa and Washita rivers." —

Thermometer at 8<sup>h</sup> p.m. 19°, Extremes 19°—

32°

1805 } 32° The Moon & Stars shine with uncommon  
 January } splendor.

Friday 11<sup>th</sup> Thermometer in air 11°, in river water 39°  
 River fallen 4½ inches. Wind moderate at North.  
 The morning is fine, the sky perfectly serene,  
 but the air very cold and penetrating: passed  
 the petit ecor à Fabri, the osier which grows  
 abundantly upon the beaches above is not seen  
 any lower upon this river, and at this place we  
 begin to see the small tree called ‘Charnier’  
 which grows only at the water side, and is to be  
 seen all the way down the Washita below this  
 place, the Latitude here is about 33° 40’ which  
 is the limit Nature seems to have placed to those  
 two vegetables, one on the north & the other to  
 the south.

I have already remarked in my Journal of  
 the 17<sup>th</sup> November that we saw no long moss  
 (Tilandsia) above Latitude 33° & conjectured  
 that Nature had limited its vegetation to that  
 parallel; having this circumstance in my recol-  
 lection, I asked M. Le fevre for information re-  
 specting its existence at the Arcansa settlement,  
 which is known to be not far beyond 33° of  
 Latitude; he informed me that about ten miles  
 to the south of their settlement the growth of  
 the Tilandsia is limited, & that so curiously as  
 if a line had been drawn East and West for the  
 purpose, as it ceases all at once & not by degrees;  
 hence

hence it would appear that Nature herself has marked with a distinguishing feature the line which Congress has thought proper to draw between the territories of Orleans and of Louisiana. It is a question of curiosity at what Latitude the limit of the *Tilansia* is found in the atlantic states, and also the *Cypress*, which last upon this small river is not found higher than  $34^{\circ}$  of latitude, it is believed to be much higher on the Mississippi: our maps represent a *Cypress* swamp on the confines of the states of Maryland & Delawar, in Latitude  $38^{\circ} \frac{1}{2}$  at the sources of Pocomock River. Q. Is it the same species of *Cypress* which is found in the Carolinas, Mississippi Territory &c?

The weather continued clear & very cold all day, we landed at the Cadaux path to make a fire and dine, the Thermometer at  $3^{\text{h}}$  p.m.  $32^{\circ}$  and at  $8^{\text{h}}$  p.m. it fell to  $26^{\circ}$ —Encamped  $1 \frac{1}{2}$  league below ‘petite pointe coupée’, being nearly the same place where we found the latitude on the 21<sup>st</sup> November to be  $33^{\circ} 29' 29''$ ; having made by the pilot’s reckoning about 15 leagues; we stopped twice to day, which has retarded us nearly two hours; our rate of going has been about  $2 \frac{1}{4}$  of those leagues p<sup>r</sup> hour.

Thermometer in air  $20^{\circ}$ , in river water  $40^{\circ}$  Saturday 12<sup>th</sup>  
 —river risen an inch. Much vapor ascending from the river. Part of the night was cloudy and

1805 } and this morning the heavens are not entirely  
 January } cloudless, we therefore expect an approaching  
 change of weather. The air is damp and penetrating so that it continues yet very cold on board the boat; as the day advanced, it proved more cloudy and disagreeable and altho' at 3<sup>h</sup> p. m. the thermometer was found at 43°, the sensation of cold to the human body was greater than in a dry air at 22° — the face of the heavens was overspread with clouds & the atmosphere extremely moist: we made a good encampment in the evening called 'Campement des bignets' (fritter camp) being about 18 of the Pilots leagues, tho' not much exceeding two days of our voyage up, about 37 or 38 miles by our own reckoning; we passed this place between breakfast and dinner on the 19<sup>th</sup> november. The Thermometer at 8<sup>h</sup> p. m. 30°

Sunday 13<sup>th</sup> Thermometer in air 27°; in river water 40° — river risen 1½ inches — Calm. The morning is very fine and the atmosphere dry, consequently the temperature not cold to the human body. These two mornings the river has risen a little, notwithstanding that we have been without rain for several days past, & it will be remembered that the three first days of this voyage, the river was found each morning to be fallen; this is to be accounted for by the boat gaining upon the velocity of the stream more  
 in

in the day than it loses in the night. Since we { 1805  
 have got below the rapids, the current is much { January  
 more gentle and we make only two of the Pilots  
 leagues p<sup>r</sup> hour, which does not exceed perhaps  
 4 english miles, it appears that in nine hours  
 (one day's) rowing down we have made the same  
 distance which we made in 13 hours coming up,  
 the current at the time of our ascent being no-  
 thing, and the space passed over 36 miles, it will  
 be found from these data that in each 24 hours  
 we gain upon the Current  $6\frac{1}{2}$  miles; we have  
 therefore reason to conclude that we have got  
 beyond the apex of the tide or wave occasioned  
 by the fresh, & are descending along an inclined  
 plane, but as we always encamp at night, it is  
 not surprising that in the morning we find our-  
 selves in deeper water because the Apex of the  
 tide is constantly endeavouring to overtake us,  
 and in the morning we find ourselves on a more  
 elevated part of the inclined plane, which we  
 had left behind us the evening before.

This morning no condensed vapor was visi-  
 ble on the surface of the river, yesterday it was  
 considerable; hence it appears that  $13^{\circ}$  differ-  
 ence of temperature (the river being highest)  
 does not condense vapor with sufficient rapidity  
 to render it visible, altho'  $20^{\circ}$  are more than are  
 necessary; it must not be omitted to be men-  
 tioned that this morning the atmosphere was  
 extremely dry, and therefore greedy of moisture,  
 and

1805 } and yesterday it was very moist, and consequently  
 January } not disposed to dissolve water rapidly. The day  
 proved cool, tho' not disagreeably so; the wind  
 in the afternoon N.E. and air moist: Made  
 this day by the computed distances about  $15\frac{1}{2}$   
 leagues and encamped about one league below  
 where we found our Latitude to be  $33^{\circ} 13' 16''.5$   
 on the 17<sup>th</sup> November, so that we have again  
 completed two days voyage ascending in one  
 descending. Thermometer at 8<sup>h</sup> p.m.  $30^{\circ}$  Ex-  
 tremes  $27^{\circ}-53^{\circ}$

Monday 14<sup>th</sup> Thermometer in air  $23^{\circ}$ , in river water  $40^{\circ}$  —  
 river risen  $1\frac{1}{2}$  inch. Wind very light at N.W.  
 The atmosphere is dry and the temperature  
 to the human body seems not very cold; there  
 is a thin condensed vapor upon the surface of  
 the river, the difference of temperature between  
 the river water and air being this morning  $17^{\circ}$ ;  
 yesterday the atmosphere being nearly in the  
 same state  $13^{\circ}$  were insufficient to render the  
 vapor visible. If our hygrometers were instru-  
 ments of a less dubious nature, and capable of  
 indicating by a scale the absorbing, dissolving or  
 attracting power of the atmosphere for water,  
 without being influenced by heat and cold we  
 should then be able to determine à priori at  
 what difference of temperature between water  
 and air corresponding to a given degree of the  
 hygrometer, ascending vapor will be visibly con-  
 densed.

densed. A green moss is found upon the branches of trees which are immersed in the waters of the inundation, none of the same species appears in a more elevated situation ; when the waters subside vegetation does not seem entirely at a stand in those mosses which are but a foot or two above the surface, they continue to be of a lively green & hang to the length of 5 or 6 inches : the vegetation of this moss must commence under water ; it may be of the same nature with the green matter deposited in fresh water conduits which has been examined by Priestly & others, & which here has arrived to a higher state of perfection from its free & open situation ; it is evident this moss must vegetate under the impulse of a considerable current.

In the afternoon passed Latitude  $33^{\circ}$  and the Island of Mallet noticed in the Journal of the 15<sup>th</sup> of November : made about 19 leagues this day, being about  $2\frac{1}{2}$  day's voyage ascending ; since we have got into the low alluvial Country the channel is narrower and the velocity of the current greater ; we are now encamped where we passed in the afternoon of the 14<sup>th</sup> November. The day continued fine and of an agreeable temperature ; at 3<sup>h</sup> p.m. the thermometer was at  $53^{\circ}$ , at 8<sup>h</sup> p.m.  $32^{\circ}$ . An eclipse of the moon will take place this night after midnight, we prepare to observe it ; regulated the watch as near as possible to the apparent time at the setting

{ 1805  
January

1805 } setting of the Sun ; to-morrow we shall give an  
 January } account of our observations, the sky is perfectly  
 serene.

Tuesday 15<sup>th</sup> Thermometer in air 30°; in river water 40°  
 — no vapor visible on the surface of the river:  
 river risen 1½ inch—wind light at S.E. cloudy.  
 Prepared last evening to observe the Eclipse  
 of the Moon, with a very indifferent Spy-glass  
 magnifying about 8 times. The commence-  
 ment of the Eclipse was not correctly noted,  
 occasioned by the very strong effect of the pe-  
 numbra in our perfectly serene & clear sky, the  
 moon not being far removed from the Zenith,  
 which induced a belief that the Eclipse had  
 actually commenced at 12<sup>h</sup> 32', this circum-  
 stance produced some inattention at the instant  
 of the true commencement, which was supposed  
 to have happened at 12<sup>h</sup> 40'; but the com-  
 mencement of total darkness was observed with  
 due attention, and is believed to be as correct  
 as circumstances with our instruments would  
 admit, and took place at 13<sup>h</sup> 37'. It is believed  
 that the uncertainty of the moment of observa-  
 tion did not exceed half a minute, I am rather  
 disposed to say a quarter of a minute, for the  
 transparency of the atmosphere was as perfect  
 as can ever be expected in situations not more  
 elevated than ours. We shall ascertain the error  
 of the watch below at some known point, whose  
 latitude



latitude & position can be deduced by referrence { 1805  
to our geographical Journal, & this we shall { January  
again perform on our arrival at the post of Washita, from which we shall gain the rate of the watch's going & the whole may be referred to the meridian of the Post & will serve to compare with the results of our lunar observations made there on our way up.

This morning the heavens are veiled by clouds; during the night the thermometer was down to  $28^{\circ}$  with a pure serene sky and the atmosphere so dry that the cold was not very sensible; this morning with a higher temperature and moist air, it is cold and penetrating. We saw this morning the first long moss (*Tilandsia*) called generally by the french 'barbe espagnole (spanish beard) on trees growing on the margin of the river about  $2\frac{1}{2}$  leagues (5 miles) above the 'Bayou des Butes.' At this time also we emerge from the alluvial country noticed in the former part of this Journal; the banks are now of a good elevation, about 15 to 18 feet above the present level of the river & probably not liable to be inundated, whereas the alluvial lands we have just quitted, are subject to be overflowed from 8 to 12 feet; we saw none of the green moss along the alluvial tract, which I much regret, having intended to take some specimens for examination, I am in doubt whether any of the same species grows below, as yet  
we

1805 } we do not see it at the 'bayou des butes.' The  
 January } Sun at last broke forth and we landed to take  
 his altitude for the correction of the watch,  
 the position was recognized by the mouth of a  
 Creek, so that by a reference to the geographi-  
 cal Journal, we found that the Latitude of this  
 point is  $32^{\circ} 49' 24''$ , being the same which  
 will correspond with N  $10^{\circ}$  W  $8^h 8\frac{1}{2}'$  on the  
 $14^{\text{th}}$  nov<sup>r</sup>: ascending; the Sun's d̃ble Alt: lower  
 limb was  $66^{\circ} 36' 45''$  Ind: err:  $+12' 20''$  taken  
 at  $10^h 56' 24''$  a.m. — The day became cloudy  
 in the afternoon and the thermometer rose to  
 $63^{\circ}$  which we consider as an indication of  
 rain.

We made this day nearly 15 computed leagues,  
 being the eighth day from Ellis Camp, and are  
 now encamped within five of those leagues from  
 the post of the Washita, being about a mile above  
 the place where we dined on the  $12^{\text{th}}$  Novem-  
 ber, Latitude then found was  $32^{\circ} 34' 47''$ . The  
 moon and stars shine with a mild lusture, no  
 appearance of change in the weather notwith-  
 standing the increased temperature of the atmos-  
 phere. Thermometer at  $8^h$  p.m.  $43^{\circ}$ .

Wednesday  $16^{\text{th}}$  . . . in river water  $41^{\circ}$  — river risen  $1\frac{1}{4}$   
 inch: a . . . proceeding from atmospheric  
 moisture, being very different from what we see  
 arising out of the river under considerable differ-  
 ences of temperature — Arrived at the Post of  
 Washita

Washita about noon — The day proved very fine and warm, the thermometer at 3<sup>h</sup> p.m. being at 65° and at 8<sup>h</sup> p.m. it remained at 60° — Found all well at the post — no news of any importance — our people all in good health except one Soldier who has been a good deal incommoded by a dysentery; but he is not in danger. Returned the hired boat.

{ 1805  
January

Thermometer in air 60°; in river water 44° — Thursday 17<sup>th</sup> river risen one inch. Wind at S.W. — very clear during the night but cloudy this morning — made the following observation to correct the watch and ascertain her rate of going. At 8<sup>h</sup> 53' 7" Sun's apparent double altitude of the lower limb 36° 44' 45" Ind: err: + 12' 30".

Employed the people in getting Mast and Oars for our large boat. Judging it of importance to get to Natchez as soon as possible, I determined after being disappointed in procuring horses, to take the Canoe with one Soldier and my own Domestic, and push down to Catahoola, from whence there is a road to Concord about 30 miles across the . . . [page torn].

{ Friday 18<sup>th</sup>  
& Saturday  
19<sup>th</sup>

Set off about day-break, and arrived after night at the lower settlement, about 20 computed leagues from the Post. Called at the house of an old hunter with whom I had conversed on my way

way

1805 } way up: This man informs me that at the place  
 January } called the mine on the little Missouri, there is a  
 smoke, which ascends perpetually from a particu-  
 lar place, and that the vapor is sometimes insup-  
 portable; the river or a branch of it passes over  
 a bed of mineral, which from the description  
 given is no doubt martial pyrites. In a creek  
 or branch of the Washita called 'fourche à  
 Luke'\* there is found on the beaches and in  
 the cliffs a great number of globular bodies,  
 some as large or larger than the head of a man,  
 which when broken, exhibit the appearance of  
 Gold, Silver and precious Stones; this most prob-  
 ably is pyrites with chrystalized spar: also at the  
 'fourche des glaises à Paul', † there is near to  
 the river a cliff full of hexagonal prisms termi-  
 nated by pyramids, which appear to grow out  
 of the rock, some an inch in diameter & six to  
 eight inches long: there are beds of pyrites  
 found in several small creeks communicating  
 with the river Washita: but it appears that . . .  
 [page torn] indications on the Missouri were  
 most considered, because some of the hunters  
 actually worked upon it & sent a parcel of the  
 ore to New Oreleans as observed above: it is the  
 belief of the people here that the mineral con-  
 tained precious metal, but that the Spanish Gov-  
 ernment did not chuse that any mine should

\* 3 leagues above Ellis' Camp.

† higher up the river than 'fourche a Luke.'

be opened so near to the British Settlements, for which reason an express prohibition was issued against any farther work being done upon the mine; since which time it has been no more spoken of. This man procured me some small roots & a few seeds of the patate à chevreuil; he also took me to the next house where I saw a solitary tree of the 'bois d'Arc' (bow-wood) or yellow wood, which was raised from a seed brought from the little Missouri; I requested some large branches, but could only obtain from the Old Lady mistress of the place, two very small ones; the fruit fallen before maturity lay upon the ground, some were of the size of a small orange, with a rind full of tubercles; the color tho' in appearance faded, still retained a resemblance to pale gold: the tree in its native soil when loaded with its golden fruit (nearly as large as the Egg of an Ostrige), presents I am told the most splendid appearance; its foliage is of the finest deep green greatly resembling the varnished foliage of the orange tree, and upon the whole no forest tree can compare with it in respect . . . ental grandeur. The bark of the young tree which I saw resembled in its texture externally the Dogwood bark; but its color is a reddish or brownish yellow; the appearance of the wood recommends it for trial as an article which may yield a yellow die: I hope to succeed in raising trees  
from

{ 1805  
January

1805 } from the cuttings and a small Cion which I  
 January } have procured; the people suppose this tree too  
 young to mature its fruit, as it has always hith-  
 erto fallen when of the size of an orange, I am  
 inclined rather to suspect that the failure may  
 be occasioned by its open and exposed situation,  
 as it naturally grows under the shade of the for-  
 est, this tree is about six inches in diameter, it  
 is deciduous and appears to be in a sound and  
 healthy state; the branches are numerous and  
 full of short thorns or prickles, it seems to re-  
 commend itself as highly proper for hedges or  
 live fences, which are greatly wanted in many  
 parts of the United States: this tree is known to  
 exist near the Nakitosh (perhaps Lat:  $32^{\circ}$ ) and  
 upon the river Arcansa high up (perhaps in Lat:  
 $36^{\circ}$ ), it is therefore probable it may thrive from  
 Lat:  $28^{\circ}$  to  $40^{\circ}$  and will be a great acquisition  
 to a great part of the U. S. should it possess no  
 other merit than that of being ornamental.

On my way down I endeavoured to discover  
 a place said to produce Gypsum, but being with-  
 out a proper guide I failed in the research; I  
 have no doubt of its existence, and have taken  
 notes of the positions of two places where it has  
 been found; one of which is the first hill or  
 high land which touches the river on the west  
 above the large Creek called Bayou Calumet  
 and the other is the second high land on the  
 same side; as those are two points of the same  
 continued

continued ridge, it is probable that an immense body of Gypsum will be found in the bowels of the hill connecting those two points and perhaps extending far beyond them; it has been said that fossil coal is found on the east side of the river opposite to the second hill; it is probably Carbonated wood only: a person who pretends to have been up among the sources of the Washita 100 leagues higher than the hot springs, declares having found true mineral coal, which burns with a strong heat and bright flame without the aid of other fuel, a property which Carbonated wood does not possess. I do not give entire faith to this last report, the person who informed me being fond of the marvellous.

Continue my voyage with contrary winds and arrived the evening of the 22<sup>d</sup> at the Catahoola, which by computation is fifty leagues from the post of Washita: At this place a french man named Hebrard is settled, who keeps a ferry across the black river: here the road from Natchez forks, one branch of it leading to the settlements on the red river and the other up to the Post of the Washita: The proprietor of this place has been a hunter and great traveller up the Washita & into the western countries; he confirms generally the accounts we have received; it appears from what he and others say, that in the neighbourhood of the hot-springs,  
higher

{ 1805  
January

{ Monday 21<sup>st</sup>  
and Tuesday  
22<sup>d</sup>

1805 } higher up among the mountains, and upon the  
 January } little misouri, during the summer season, Ex-  
 plosions are very frequently heard proceeding  
 from under ground, and not rarely a curious  
 phenomenon is seen which is termed the blow-  
 ing of the mountains, that is, confined elastic  
 gaz forces a passage thro' the side or top of a  
 hill driving before it a great quantity of earth  
 and mineral matter : it appears that during the  
 winter season the explosions and blowing of  
 the mountains entirely cease, from whence we  
 may conclude that the cause of those phenom-  
 ena is comparatively superficial, being brought  
 into action by the increased heat of the more  
 direct rays of the summer-sun.

Upon my arrival at the house of M. Hebrard,  
 I enquired for horses to carry me across the low  
 country to Concord opposite to Natchez, the  
 distance by the road is computed 30 miles, but  
 it is probable the direct distance falls short of  
 25, and it is remarkable that the river Washita  
 preserves a kind of parallelism to the Mississippi  
 until it comes within the influence of the high-  
 lands of the arcansa, & thence it is deflected  
 to the North west & probably holds a middle  
 ground between the red river and the arcansa ;  
 the inclination of the mississippi is such that  
 the walnut-hills are 30 miles to the east of the  
 Natchez, the Post of the Washita will be found  
 therefore nearly under the same meridian with  
 that



that of Natchez very contrary to the general idea. — M. Hebrard very obligingly engaged to furnish me with horses, which it was necessary to hunt up in the woods; In the meantime I went to view the Indian mounts spoken of in the beginning of this Journal; I find this to be a very interesting place, it is the point of confluence of three navigable waters viz The Washita river, The tenza and the Catahoola, the second communicates with the missisipi lowlands by the intervention of other creeks and lakes & by one in particular called the Bayou d'argent which enters into the mississippi about 14 miles above Natchez, during high water there is navigation for batteaux of any burthen along those bayoux, a large lake called S: John's lake occupies a considerable part of this passage between the Mississippi and the Tenza; it is in a horse-shoe form, & has been at some former period the bed of the Mississippi, the nearest part of it is about one mile removed from the river of the present time; this lake possessing elevated banks similar to those of the river has been lately occupied & improved; many similar possessions and improvements have been made since the first news of the cession of Louisiana by the french to the American Government; I omitted to mention in its proper place that it is understood, that even the hot-springs included within a tract of some hundreds of acres were granted by the late

{ 1805  
January

1805 } late Spanish Commandant of the Washita to  
 January } some one of his friends, but it is not believed  
 that a regular patent was ever issued for that  
 place, & it cannot be asserted that residence  
 with improvement can be set up as a plea to  
 claim the land upon.

The Catahoola bayou is the third navigable stream ; during the time of the inundation there is an excellent communication by the Lake of that name & from thence by large Creeks to the red river ; The Country around the point of union of those three rivers is altogether alluvial ; but the place of M. Hebrard's residence is no longer subject to inundation for reasons which have been already assigned ; there is no doubt that as the country augments in population and riches, this place will become the site of a commercial inland town, which will hold pace with the progress and prosperity of the country. On this place are to be found a number of indian mounts, one of which is of very considerable elevation, with a species of rampart surrounding a very large space which was no doubt the position of a fortified town ; having taken some notes respecting this place, the whole will be digested and introduced into an Apendix which will be added to this Journal.

Wednesday 23<sup>d</sup> This morning is cloudy and threatens rain, the horses are not found, therefore no prospect of  
 of

of setting out to day; a little rain fell about 9<sup>h</sup> { 1805  
 a.m. — in the afternoon one of the horses only { January  
 is found.

Last night there was much thunder and light- Thursday 24<sup>th</sup>  
 ning and this morning the rain falls very fast:  
 Having no other employment I endeavoured to  
 collect information, here I met with an Amer-  
 ican who pretends to have been up the Arcansa  
 river 300 leagues; the navigation of that river  
 he says is good to that distance for boats drawing  
 3 or 4 feet water: I do not give implicit faith  
 to this man, when he speaks largely of the silver  
 which he pretends to have himself collected upon  
 that river, and even says that on the Washita 30  
 leagues above the hot springs he has found silver  
 ore so rich that 3 lib of it yielded one of silver, &  
 that this was found in a Cave: he asserts also that  
 the ore of the mine upon the little Missouri was  
 carried to Kentucky by a certain Boon, where it  
 was found to yield largely in silver: This Amer-  
 ican says he has also been up the red river, that  
 there is a great rapid just below the raft or natu-  
 ral bridge & several others above it: The Cadaux  
 Nation is 50 leagues above the raft, and near to  
 their Village commences the Country of the  
 great Prairies, and extend 4 or 500 miles west to  
 the sand mountains as they are termed; those  
 great planes extend south far beyond the red  
 river; north over the Arcansa river and among  
 the

1805 } the numerous branches of the Missouri. This man  
 January } confirms the accounts of the beauty and fertility  
 of the western Country &c.—

This evening the other horse has been found  
 so that I hope to set out tomorrow morning.

Friday 25<sup>th</sup> The horses being late of fetching up, we set  
 out only at 9 o'clock; the weather was cloudy  
 but not cold; the meeting of three rivers here  
 which form the black river, has given it a consid-  
 erable width at this place, little short I think of  
 400 yards. There is no apparent current here  
 and the river is rising very fast, which is attrib-  
 uted to the Mississippi flowing up into the red  
 river. The rain which has fallen these two days  
 past, has rendered the roads extremely wet and  
 muddy; we made only one league in the hour;  
 arrived at the bayou Crocodile at 2<sup>h</sup> p.m. This  
 place is considered half way from the black river  
 to the Mississippi, & is one of those creeks which  
 are extremely numerous in the low grounds &  
 serve to assist in venting the waters of the inun-  
 dation: the whole of the Country thro' which  
 we have passed to day appears to be subject to  
 the annual inundation; there are some places  
 higher than others upon which Canes are found  
 growing, the margins of water courses are always  
 found more elevated than the lands at some dis-  
 tance, which degenerate into Cypress swamps  
 and lakes.

At

At this place we found the waters of the Mississippi had already flowed in so abundantly, that there was a necessity to prepare a raft for crossing, & having in company three white men who understood the business, the raft was prepared of logs of the driest wood we could procure lashed together with our horse ropes and halters; after two hours delay we got to the other side of the bayou which was about 60 yards wide including the overflowed low margin of the Creek; we had yet 5 leagues to make & it was already 4 o'clock; we pushed on, but the roads were little better than mud and water for several miles together; we were unable to get on fast enough to pass over this bad part of the road before it became extremely dark, and we expected to be obliged to spend the night in the woods without fire, perhaps without a spot of dry land to rest upon: it was difficult to preserve the path; in this respect we trusted chiefly to the sagacity of our horses, at length they brought us out of the woods & at 9<sup>h</sup> p.m. We got to a new settled plantation four miles short of Concord, where we were hospitably entertained with good homely fare, particularly milk, of which I had not seen a drop upon the Washita, not even at their principal settlement; In those new Countries and all over the Opelousa Country, the Horned Cattle are in a semi-savage state, no provision is made or laid up for them during winter; in the fall of  
the

{ 1805  
January

1805 } the year it is therefore necessary to turn out the  
 January } Calf with the Cow, otherwise she would abandon her young in the hands of its owner where it would infallibly perish; the Cattle move off in search of winter food & the proprietor frequently knows nothing of the situation of his stock, untill the warm weather of the Spring & Summer season calls them out in search of the young tender herbage of the open fields.

Saturday 26<sup>th</sup> Set out in the morning with a very cold freezing air; I now think it extremely fortunate that we were not detained last night in the woods, as we certainly should have spent a very disagreeable night. Arrived in an hour at Concord; the settlement of this place has commenced only since the treaty of limits between the U. S. and Spain, but it has received its most considerable augmentation since the cession of Louisiana to the U. S. by citizens of the Mississippi territory who have either established their residence altogether upon newly acquired lands, or what has perhaps been equally common, have taken up tracts of land under the authority of the Spanish Commandant & have gone to the expense of improvements either in their own names or in the names of others before the 20<sup>th</sup> of December 1803 hoping thereby to hold their new possessions under the Sanction of the law. Exclusive of the few actual residents on the banks of the  
 Mississippi

Mississippi, there are two very handsome lakes { 1805  
in the interior, on the banks of which settle- { January  
ments of a similar nature have been made.

Crossed the ferry and breakfasted at Natchez  
and arrived at my own house at ten o'clock  
where I had the satisfaction to find my family  
all well.





JOURNAL of a Geometrical Survey  
commencing at S<sup>t</sup> *Catherine's* landing  
on the East shore of the *Mississippi*  
descending to the mouth of the red  
river, and from thence ascending that  
river, the black river and river of the  
*Washita* as high as the Hot Springs in  
the proximity of the last named river.



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## Preamble

**T**HE distances are taken by time from a portable chronometer, and proportioned by a log-line divided into perches, run out for half a minute: consideration was always had for the velocity of the Current by deducting it immediately from the rate per log, when it merited attention: it is to be understood that the rate per log noted, continues the same untill it is again noted with change.

All meridian or other altitudes of the Sun above the horizon, noted in the following Journal, are to be understood of the lower limb, unless otherwise expressed.

An excellent Circle of reflection with a triple Index, made by Troughton of London graduated to 10'' of a degree, was used for taking altitudes, lunar distances &c; this Circle is supported on a pedestal which gives it a solidity & perfection never to be expected from any instrument held in the hand; the index error was regularly ascertained immediately after taking a meridian altitude, by observing the Sun's contact with his reflected image both above and below: for facility in practice the greater contact was added to the apparent double altitude when the index error was additive; and the lesser contact was added when the error was subtractive; which includes the Sun's semi-diameter and the correction of the index error giving at once the apparent double altitude of the Sun's center, being careful to subtract the correction of refraction from the altitude of the lower limb only: altho' this was my

practice, I have agreeably to custom given always the Index error : some small differences will be found in calculating the Latitudes, arising from my practice, of preferring the Sun's semidiameter taken from my instrument (generally smaller) to that found in the nautical almanack, M<sup>r</sup>. Maskelyne astronomer royal has long since observed that the Sun's diameter as taken from Mayer's tables is 3'' too much, I observe that this error is corrected in the almanac for 1805.

The rate of going of the Chronometer having been frequently changed by being carried in the pocket, it was not proposed to depend upon its keeping the Longitude otherwise than as a good second hand watch to note the instance of astronomical observations, and was always preserved carefully in a horizontal position untill a connected series of observations was completed, during which time it is believed that the rate of going was sufficiently equable.



*Journal of a Geometrical Survey* commencing at S<sup>t</sup> Catherine's landing on the East shore of the Mississippi descending to the mouth of the red river, and from thence ascending that river, the black river and river of the Washita as high as the Hot Springs in the proximity of the last named river.

**T**HE following courses and distances from S<sup>t</sup> Catherines landing to the mouth of the red river were taken on the return of the boat at the termination of the voyage, but are now placed with more propriety at the commencement of the survey.

South 210 perches.

S 70 W 1212 . . . . . at 810 Hootsell's plantation on the right 1½ mile above the Island.

S 30 W 120 passed between the Island and right bank.

South 240

S 40 E 210

S 30 E 240

S 20 W 930

S 60 W 240

West 492

S 35 W 282

S 20 W 189

- S 5 W<sub>1470</sub> At 1418 passed Homochilo river on the left.
- S 40 E 528
- S 20 W 600
- S 50 W 540
- S 20 W 420
- S 60 E 595
- S 75 E 925 At 805 Buffalo river on the left; arrived at Fort adams.
- S 30 W<sub>2250</sub> At 1940 the Line of demarcation on the left  $31^{\circ}$  North Lat : &  $6^{\text{h}} 6'. 42''$ .  
Long : West of Greenwich; the last by M. DeFerrer.
- S 60 W 40
- N 65 W 160
- N 15 W 360
- N 40 W 312
- N 60 W 120
- N 85 W 960 to the mouth of Red river.

## RED RIVER

ARRIVED at the mouth of the Red river the evening of the 17<sup>th</sup> of October: The Latitude and Longitude of this place having been accurately ascertained by Doctor Jose Joakin de Ferrer, we did not think it necessary to lose any time on that account — Lat  $31^{\circ} 01' 15''$  North, and Long:  $6^{\text{h}} 7' - 11''$  west of Greenwich — proceeded to take the Courses and distances of the Red river as follows, beginning at the mouth of the river on the right margin. { 1804  
October

Thursday, 18<sup>th</sup>

N  $14^{\circ}$  E  $0^{\text{h}} 23'$  to a point on the same side: rate p<sup>r</sup> Log 4 per: p<sup>r</sup> half minute, no opposing Current. River 550 yards wide.

N 8 W  $-.47$  to a point on the left side.

N 20 W  $-.23$  to a point, right bank.

N 5 E  $-. 5$  along shore. River 300 yards wide.

N 22 E  $-.22$  to a point left side — a Creek to the right.

N 10 W  $-. 9$  along shore. Rate of going 4 per.

N 25 W  $-. 6 . . . d^{\circ}$ .

N 45 W  $-.11$  a lake on the right side.

N 80 W  $-.22$  to point right side.

N 40 W  $-. 4$  — river 250 yds wide.

N 10 W  $-. 4$  — no sensible current.

N 32 E  $-.17$  to a p<sup>t</sup> on the left 200 y<sup>ds</sup> wide.

N 25 W  $-.11$  to a p<sup>t</sup> on the right.

1804 }  
October }

- N<sup>o</sup> 10 W -.16 to a p<sup>s</sup> on the left.  
 N<sup>o</sup> 15 W -. 6 to a p<sup>s</sup> on the right.  
 N<sup>o</sup> 25 W -.27 to a p<sup>s</sup> same side, a bend to the  
 right.  
 N<sup>o</sup> 38 W -. 7 along shore.  
 N<sup>o</sup> 40 E -.20 d<sup>o</sup>  
 S 75 E -.42 to a p<sup>s</sup> on the left.  
 N 40 E -. 7 along shore.  
 N 5 E -.41 to a p<sup>s</sup> on the right.  
 N 40 E -. 6 to a p<sup>s</sup> on the left — a large Creek  
 on the right.  
 N<sup>o</sup> 80 W -.24 to a p<sup>s</sup> on the right.  
 N<sup>o</sup> 10 E -.13 along shore.  
 N<sup>o</sup> 75 W -.23 along shore.  
 S 85 W -.16 d<sup>o</sup>  
 N 75 W -.19 d<sup>o</sup>  
 S 50 W -.46 to a point on the right. Made this  
 day 12 Miles 296 perches.

Friday 19<sup>th</sup> Thermometer before Sun rise 46<sup>o</sup>

N 75 W 0<sup>b</sup>.19' to a point on the left. Rate 7  
 perches per  $\frac{1}{2}$  Minute.

Same course 0.27 to do. on the right.

N 30 W 0.30 along shore.

W 0.11 . . . d<sup>o</sup>

N 60 W 0.14 a point on the left: rate of going  
 7 perches per  $\frac{1}{2}$  Minute.

W 0.23 along shore.

Same course 0.26 a point on the right.

N 75 W 0.33 along shore.

N 50 W 0.26 to a point on the left: at 5' a Creek  
 on the left.

N 70 W 0.22 a point on the right; wind contrary  
 hove the log rate of going 4  
 perches.



- N 35 W 0<sup>b</sup>.22' along shore.
- N 10 W 0.13 a point on the left, landed to observe and dined. { 1804  
October
- Face of the Doub. ap. alt. ☉ lower limb 97°-0'-  
Circle West 0'' In: er: -13' 21''.5 Lat: found  
31°-15'-48''.
- N 60 W 0.40 a p' on right . . rate 5 perches.
- N 50 W 0.20 along shore to the mouth of black  
river 150 y<sup>ds</sup> wide, red river the  
same width; entered Black river.
- N 35 E 0.25 a point on the left.
- N 10 E 0.31 along shore.

## BLACK RIVER

- N 40 W 0<sup>b</sup>.16' along shore. river 100 yards wide.
- S 75 W 0.20 to a point on the right: sounded  
20 feet, black sand, encamped for  
the night; made this day 15 miles  
102 perches.
- Saturday 20<sup>th</sup> Thermometer before Sunrise 47°.
- W 0.30 along shore — hove the Log, 4  
perches per ½ min.
- N 45 W 0.45 to a point on the right — tempera-  
ture of the river 73°.
- N 10 W 0.28 to a point on the left — Chalybeate  
spring, temperature 66°.
- N ——— 0.16 along shore.
- Same course 0.42 to a point on the right 6½ perches  
per log.
- N 20 W 0.30 along shore rate of going 4 perches  
per log.

1804 }  
October }

N 50 E 0<sup>h</sup>30' along shore river 80 yards wide —  
Canes on the right.

E 0.10 to the left shore landed to observe  
at noon & dine.

Face of the ☉ doub: mer: ap: alt: 95°-34'.  
Circle East 5". In: er + 13' - 32". 5 — Lat found  
31° 22' 46". 6.

S 75 E 0.58 to a p<sup>t</sup> on the right & continue to the  
left — Log 4½ perch per ½ Minute.

N 63 E 0.47 to a point on the right and continue  
to a point of the left; Thermom-  
eter at 3<sup>h</sup> 80°

N 25 E 0.40 along shore — Canes on the right.

N 45 W 0.27 along shore.

S 80 W 1. 6 . . ditto; encamped for the night.  
Soundings 5 fathoms, black sand.  
This day's voyage makes 13 miles  
40 perches.

Sunday 21<sup>st</sup> last } Thermometer before sun rise 60°  
course continued } a little cloudey near the Horizon.

S 80 W 0.48 along shore.

N 45 W 0.51 to an Island; rate per log 4½  
perches.

N 13 W 1. 3 hoist sail, rate per log 8 perches:  
cane brake, little settlement.

N 20 E 0.25 to a point on the left. Rate per log  
4½ perch.

N 25 W 0.14 to a point on the right.

N 40 E 0. 6 to the left; landed to observe and  
dine, clouds came over just at the  
moment before the Sun came upon  
the meridian, went off in a little  
time, he had dipped: the double  
alt: is 94° 37'. 0".

In' er : +13'. 34'' which is too small, { 1804  
 the latitude is too far north. } October

N 75 E 0.40' along shore.

N 40 E 0.22 ditto Thermometer 83°

S 30 E 0.23

Same course 1. 6 (sent the men to track) along shore,  
 rate per log 5 perches.

S 13 E 0.46 continue tracking; cross and go on  
 to a point on the left.

N 75 E 0.35 to the right — encamped for the  
 night. Extremes of the Thermom-  
 eter 60° to 83° cloudy; wind S.S.E.  
 made this day 14 Miles 59 perches.

Monday 22 — Thermometer before Sun rise 65°  
 Wind S.S.E. cloudy, rain before  
 day.

Continued

N 75 E 0.20 to a point on the right.

S 65 E 0.35 along shore — by log 5 perches per  
 $\frac{1}{2}$  Minute.

E 1.14 to a point on the left, cloudy.

N 0.30

Hoist sail

N 40 W 0.18 to a point on the left — by Log 8  
 perch's per  $\frac{1}{2}$  Minute.

Wind fails

W 2.12 to a point on the right — by Log  
 4 perches, long reach, rain at noon,  
 no observation.

N 20 W 0.35 along shore — Thermometer 79°

N 40 E 1. 3 to a point on the left — by Log 5  
 perches.

N 10 W 0.19 along shore.

N 45 W 0.20 to a point along shore — sounded

1804 }  
October }

3½ fathom, black sand — extremes of the thermometer 65° to 79° made this day 13 Miles 76 perches.

Tuesday 23<sup>d</sup> Thermometer 68° before sun rise.  
Wind N.N.W. the river fell 3 inches in the night.

N 65 W 2<sup>h</sup> 5' along shore by log 5¾ perches.

N 10 W 0.50 to a point on the right.

N 10 E 0.38 along shore contrary wind — by log 3¾ perches observed ☉ Doub:  
alt: 92° 58'.45". In: Er: +13'.  
45".5.

dinner  
continue

N 10 E 0.50 along shore.

## WASHITA

N 30 E 0<sup>h</sup>15' to the left shore, wind N.N.W. arrived at the mouth of Catahoola, West course; thermometer 75°.

N 10 E 0.8 the mouth of Washita: Bayu Tensa forks with Washita bearing N 80° E: log 5¾ perches.

N 65 W 0.7 along shore on the right: encamped. Extremes of the thermometer 68°–75° took information at the mouth of the Catahoola which detained us 2½ hours; sounded, 6 fathoms; made this day 9 miles 77½ perches. By our reckoning the mouth of Washita is distant from the mouth of Red river 77 miles 57 perches;

and by the old estimation 32 french leagues. } 1804  
October

Wednesday 24 Thermometer before sunrise 54°  
Wind North, cloudy, temperature of the river 71° no current worth estimating.

N 65 W 0.9 continued to the right shore — rate of going per log 4½ perches.

N 35 E 0.23 along shore.

N — 0.20 ditto — high land on the right.

— W 0.12 ditto, by log 5 perches. Bayu Ha-ha on the right coming in f<sup>m</sup> East.

N — 0.12 ditto, oblique strata of clay, some dipping under y<sup>c</sup> horizon 30° in the direction of the river.

N 60 E 0.11 to the left shore.

breakfast

N 30 E 0.27 along shore by log 5 perches cloudy.

N 45 W 0.13 ditto, river 80 yards wide.

W 0.18 to a point on the right luxuriant vegetation, grapevines, &c in rich dark festoons.

N 30 W 0.6 along shore.

N 30 E 0.3 clearing up — wind north.

N 50 E 0.19

N 0.49 landed on the right to observe ☉

dinner  
Doub: alt: 92° 4'. 50'' In: = er:  
+ 13'. 45'' land high no appearance of overflowing, oak forest, white, red, black, rich shrubbery. Lat: found 31° 42' 30''.5.

continued

N 0.42 to the right shore.

- 1804 }  
 October } N 55 W 0.31 rich herbage along shore.  
 N 40 E 0.11 along shore — low and small timber, upon the high bank.  
 N 70 E 0.17 along shore }  
           E 0.17 ditto } continue taking all  
 N 45 E 0.5 ditto } day rate per log 5  
 N        0.8 ditto } perches.  
 N 60 W 0.83 ditto }  
           W 0.9 }  
 S 72 W 0.24 to the left — a large bayu going to S. W. called Barchelet.  
 N 15 W 0.39 made this day 14 miles 48 perches.  
 Thursday 25 Thermometer 49° temperature of the river 68° Wind North, cloudy.

contin<sup>d</sup>

- N 15 W 0.20 at 12'. pine point on the left, and Villemont's prairie on the right, per Log 4 perches.  
 N 45 E 0.3 to a point on the right — high land.  
           E 0.43 at 3'. bayu on the left.  
 N 20 E 0.29 to Bayu Louis on the right, here commences the rapids.

Breakfast.

- N 1 mile so many shoals in this course that no time or log could be kept — by estimation we went one mile and then were completely embayed, being enclosed by a bar of gravel and sand with only 8 to 12 inches of water; cloudy, no observation; This day we made only 3 miles 120 perches.

Friday 26 Thermometer 40° Wind N.W. light clouds took

At 10<sup>h</sup>42'. A. M. ☉ ap. dble alt : 82° 9'. 10'' In : er : + 13'. 48'' to regulate the watch. } 1804  
 At 11 .20.45 Do 88.10 . 5 Magnetic Azim : } October  
 S 20 1/4 E.  
 At noon took the ☉ mer : alt : (doub) 90° 30'. 10''  
 In : er : + 13'. 48''. Lat. 31° 48'. 57''. 5. thermometer at 3 o'clock 70°

Saturday 27<sup>th</sup> Thermometer 32° temperature of the river 64° wind North, clear above — a fog on the river. no observation all our efforts being employed to get through a gravelly bar untill 1 o'clock ; the rapids continuing occasioned frequent stops so that we could only estimate the remainder of this course at 3/4 of a mile ; the rocky pass which completed the rapids being 200 yards from the end of this last course.

Course }  
 continued } 3/4 mile  
 North }

— W 0<sup>h</sup>15' to a point on the right — per log 4 1/2 perches.

N — 0.38 at 11 a bayu on the left — a point on the left : encamp : extremes of the thermometer 32°-73° : this day made 2 miles 77 perches.

Sunday 28. Thermometer 40° temperature of the river water 63° wind N.W. — clear above — fog on the river.

N 45 W 0.17 rate by log 4 1/2 perches.

N 0.17 at 5'. a prairie or natural meadow on the left to a point on the left.

N 15 W 0.13 Bayoo Boeuf on the right at 5'.  
 Rocky hill on the right.

N 45 W 0.17

N 15 E 0.18

N 70 W 0.20

1804 }  
October }

S 55 W 0<sup>h</sup>10' on the right— here we made the following observations

A. M. ☉ doub: alt: 53° 19'. 00''. at 9<sup>h</sup>- 5'-16''. — Mag: Az: S 60 E }  
do 58 . 14 . 10 at 9<sup>h</sup> 20 -28. d<sup>o</sup>. S 57 E }  
In: Er: + 13'. 58.  
Apparent distance of the Sun and Moons nearest limbs 53° 24'. 50''.  
In: Er: + 13'. 58''. at 9<sup>h</sup> 47'. 28½''.

Same course 0.6 on the right, tracking the boat; by log 5 perches.

W 0.14 ditto.

N 10 E 0.14

N 10 W 0.17

W 0.17

S 10 W 0.11 To the right. landed to observe.  
dinner ☉ ap: doub: alt: 88° 58'. 45''. In:  
er: + 13'. 58''. Lat: found 31° 53'.  
35'' . 5.

Contin<sup>d</sup>

S 10 W 0. 8

S 78 W 0. 8

S 80 W 0.10

N 30 W 1. 8 a large prairie or savannah on the right— thermometer 78° at 3<sup>h</sup> the plane is named "Prairie noyée."

S 45 W 0.32

N 45 W 0.13 to the left.

N 80 W 0.31

S 45 W 0.15

S 30 E 0.16 rate by log 5½ perches.

S 82 W 0.12 to the encampment. Sounded, 3 fathom, mud and sand, made this day 12 miles 116 perches.

Note the rate of going of the watch to be ascertained from the



morning altitudes of the Sun of this day and the 26<sup>th</sup> } 1804  
 } October

In future I have determined to take down the distances by the hour and minute as first placed upon the slate or blotter, being less liable to error; the differences as above stated may be taken afterwards at leisure.

Monday 29<sup>th</sup> Thermometer 41° temperature of the river water 62° wind N.W. fog on the river.

Set out at 6<sup>h</sup>22' rate per Log 5½ perches.

S 32 W 6.31

N 35 W 6.40

N 65 W 7. 8

W 7.20 to the right bank.

N 45 W 7.30 to the left.

N 55 E 7.48 a Creek on the left: landed and made the following observations of the distances between the nearest limbs of the sun and moon.

|   |   |   |                      |
|---|---|---|----------------------|
| A. M. {   | { | At 8 <sup>h</sup> 57'.10'' dis: 41°58'.20''           | In: Er:<br>+13'.45'' |
|   |   | 9. 6 .10 . . . 41.55.40                               |                      |
|   |   | 9.26 .18 . . . 41.50.10                               |                      |
|   |   | Took the following doub: alt: of the Sun and azimuth. |                      |
| At 9 <sup>h</sup> 47'. 46'' doub: alt: 68° 44'.30'' |   |   |                      |
| Sun's magnetic Az: S 45° E.                         |   |   |                      |
| In: Er: the same +13'. 45''.                        |   |   |                      |

Set off at 10<sup>h</sup> 4'.

N 55 E 10.20 rate per log 5½ perches.

N 30 W 10.31

N 15 E 10.43

1804 }  
 October }

— W 11<sup>h</sup> 1'

N — 11. 7

N 45 E 11.41

— W 11.47 took the  $\odot$  mer: ap: doub: alt:  
 88° 10'. 00" In: Er: +13'. 45"  
 Lat: found 31° 58'. 2".

dinner 1.12 p.m.

Contin<sup>d</sup> W 1.19

N 25 W 1.42

N 65 W 2. 4 to the left.

N — 2.35

N 45 W 2.46

N 85 W 3.15 rate per log 6 perches thermom-  
 eter 85°

N — 3.25

N 85 E 3.58 lost 4'. Cliffs and pine woods,  
 soil thin greyish sandy loam.

N 80 W 4.14

N 45 W 4.32

S 55 W 4.55 Wind S.W. Log 5 perches.

W 5.13

N 35 W 5.28

N 55 E 5.35 to the right encamped. Soundings  
 3 fathom, thermometer 62°

Note. The watch having been  
 suffered to run down last night,  
 the times of the altitudes of this  
 day have consequently no connec-  
 tion with the former. This day  
 made 14 miles 65 perches.

Tuesday 30<sup>th</sup> Thermometer 47° temperature of the  
 river water 60° fog on the river  
 wind W.N.W. clear.

Set off at 6. 5

- |            |                    |   |                     |
|------------|--------------------|---|---------------------|
| N 75 E     | 6 <sup>h</sup> 26' | rate per log 5 perches.   | } 1804<br>} October |
| N 20 E     | 6.34               |   |                     |
| N 70 W     | 7.10               |   |                     |
| S 50 W     | 7.35               | lost 2'.  |                     |
|            | W                  | 7.50  |                     |
| Breakfast  | 8.47               |   |                     |
| N 10 W     | 9.12               |   |                     |
| N 40 E     | 9.25               |   |                     |
| N 82 E     | 9.47               |   |                     |
| N 68 W     | 10.25              |   |                     |
| S 50 W     | 10.55              | wind W.   |                     |
| N 50 W     | 11. 7              |   |                     |
| N —        | 11.14              |   |                     |
| N 60 E     | 11.34              | landed and took the Suns mer:<br>doub: altitude 87° 16'. 10" In: er:<br>+ 13'. 20", some uncertainty at-<br>tended this observation; the alti-<br>tude observed may have been a<br>minute too small, which would<br>place the latitude ½ minute too<br>far north; it is however recorded<br>with this remark latitude found<br>32° 5'. 24". |                     |
| Set off at | 1.20               |   |                     |
| N 50 W     | 2. 8               | rate per log 5 perches.   |                     |
| N 30 E     | 2.35               |   |                     |
| N 45 W     | 2.42               | wind W.   |                     |
| — W        | 2.48               |   |                     |
| S 60 W     | 3.37               | lost 9'.  |                     |
| N 55 W     | 4. 7               | lost 4'. a rapid: river 30 yards wide.  |                     |
| N 60 E     | 4.28               |   |                     |
| N —        | 4.34               |   |                     |
| — W        | 5.15               | lost 14' creek on the left, perhaps<br>Bayu Calumet.  |                     |

1804 } N — 5<sup>h</sup>25' to the left — encamped extremes  
 October } of the thermometer 47°-83°. Made  
 15 miles 150 perches.

Wednesday 31 Thermometer 44° river water 62°  
 Wind N.W. Clear.

Set out at 6.30

N 45 E 6.50 strong current, rate per log re-  
 duced, 2 perches.

N 20 W 6.55

S 65 W 7.46 lost 5'.

N 40 W 8.10 got upon a shoal: breakfasted.

Set off 9.58

N 40 W 10.44 lost 10'

N 10 W 11.18

N 25 E 11.35 per log 4½ perches: landed and  
 took the Suns apparent: mer:  
 double alt: 86° 27'. 10'' In: er:  
 + 13'. 40'' latitude found 32° 10'.  
 13'' at seting out got upon a bar  
 which detained us.

Set out again

at 2.00 got over the bar.

N 25 E 3.00 lost 6'. per log 4 perches.

N 74 W 3.10 a small plantation on the right.

S 25 W 3.35 Thermometer 84°

— W 3.40 .

N 5 W 4. 8

N 35 W 4.45 to a small plantation — another  
 joining below: this day made 6  
 miles 165 perches.

November } Thermometer 48° river water 62° calm  
 Thursday 1<sup>st</sup> } clear.

W ½ mile. The first part of this  
 course could only be estimated by

the eye, as a great part of this morning was employed in getting over a rapid, which we effected about 12 (noon) it may be put down at half a mile. { 1804  
November

Set off after dinner } 2<sup>h</sup>20'

continu'd W 2.33 rate by log 3 perches against a current.

N 40 W 3.12 a cliff 100 feet crowned by pines, lost 14'. this course upon a shoal.

N 30 E 3.14  
E 3.42 lost 2'.

N 30 E 3.44 rate per log 4½ perches.

N 15 E 3.54 Thermometer 85°

N 45 E 4.36 lost 22' upon a shoal.

N 25 E 4.40

W 5.24 a sand bar half way across : river 50 yards wide.

N 70 W 5.44

N 5.50

N 45 E 5.55 at 8<sup>h</sup> thermometer 64° extremes 48°-85° made this day 4 miles 115 perches.

Friday 2<sup>d</sup> Thermometer 48° river water 62° light clouds ; wind S.S.E. a little fog on the river.

Set off at 6.50

N 45 E 7.16 rate per log 4½ perches.

N — 7.23

N 65 W 7.30

S 55 W 8.26 lost 3'.

breakfast 9.19

W 10.00 lost 20' on a shoal.

- 1804 }  
November }
- N 55 W 11<sup>h</sup>.54' lost 1½ hour on a log under water.
- N 10 E 12.30 lost 7'. on a shoal.
- N 15 W 12.53 landed to dine.
- Set of at 2.25 got immediately upon a log and after getting off set out again at 4.00 Thermometer 84°
- N 75 W 4.14
- N 25 W 4.30
- N ——— 4.37 a cliff and pine hill on the left.
- N 85 E 4.50
- S 80 E 5.23
- N 30 E 5.39 lost 4'.
- N 45 W 5.50 encamped at a sand bar on the right made this day 8 miles 104 perches.
- Saturday 3<sup>d</sup> Thermometer 52° river water 64° light clouds.
- Set out at 6.19
- N 45 W 6.34 by log 4½ perches.
- N 22 W 7.12
- N 40 E 7.22
- S 70 E 8.10 lost 25' on a shoal.
- breakfast
- Set out at 9. 8
- S 70 E 9.42
- S 40 E 9.47
- S 10 E 10.00 lost 3'.
- S 40 E 10. 5 rate per log 5 perches.
- S 75 E 10.11 wind E S E.
- N 10 E 10.34 lost 5'.
- N 50 E 10.47
- E 11.00
- S 45 E 11. 8

11<sup>h</sup>15' stoped by a shoal.

S 10 E 11.23 went ashore & prepared to ob- } 1804  
 serve. } November

Set out after 1.31 ☉ ap: do: alt: 84° 18'. 40. In:  
 dinner. er: +13'. 30''. Lat: 32° 17'. 17''.

Set out at 1.31 after dinner.

S 10 E 1.38

S 60 E 1.45 towing the boat rate 5½ perches.

N 60 E 1.55

N 30 E 2. 4

N — 2.17

2.32 stop upon a shoal.

N 20 W 2.45

N — 3. 5 lost 3'. thermometer 86°.

N 45 W 3.25 lost 10'. rate per log 4½ perches.

S 65 W 3.57 lost 14'. upon a shoal.

N 45 W 4. 3

N 20 E 4.20 lost 8'. — towing, rate per log 5½  
 perches.

N 45 E 4.35 current — rate 4 perches.

N — 5. 5 lost 9'.

N 45 E 5.15 encamped on the left, Thermome-  
 ter at 8<sup>h</sup> p. m. 72° made this day  
 11 miles 140 perches.

Sunday 4<sup>th</sup>: Thermometer 54° river water 64° clear.

Set off at 9.18 got aground in the morning.

N 45 E 9.26 rate per log 4 perches.

N 25 E 9.36

N 20 W 9.44

N 45 W 10.26 lost 16' upon a shoal.

S 75 W 10.50 lost 3'.

N 65 W 11.00

N 50 W 11.29 landed and observed the ☉ ap:  
 mer: alt: double 83° 33'. 45''.

1804 }  
November }

In: er: 13'. 32". Lat: 32° 21'.  
10".

Set out at 1<sup>h</sup>36'  
N 20 W 3.25 lost 57' upon a shoal rate per log  
2 perches.

Same course  
N 20 W 4.00 lost 12' got out the tow line to  
track; per log 5½ perches.

N 20 E ½ mile this course being over  
shoals and rapids could only be  
estimated by sight made this day  
4 miles 233 perches.

Monday 5<sup>th</sup> Thermometer 52° river water 62° heavy  
fog, had to unload two turns of  
our canoe to get over a shoal.

Set off at 9.55

Last course

Cont<sup>d</sup> 10. 4 rate per log 5 perches.

N 20 W 11.15

N 45 W 11.21 lost 3'.

— W 11.32 dark misty and cloudy.

N 45 W 12.00 lost 5'.

N 45 E 12.13

N 25 E 12.42 lost 2'.

N 45 E 1.34 lost 10'.

N 10 W 1.43 wind N.W. dined.

Set off at 3.00

N 75 W 3.12 rate per log 6 perches.

S 50 W 3.55 Thermometer 68° Sun shines  
dimly through a blackish mist.

— W 4. 2

N 60 W 4.25 lost 2'.

N 30 W 4.39

N — 4.55



N 35 W 5<sup>h</sup> 8'  
 N 15 W 5.25 encamped on a sand bar on the right made this day 11 miles 276 perches. { 1804  
November

Tuesday 6<sup>th</sup> Thermometer 45° river water 64° heavy fog, wind west.

Set out at 6.32

N 80 E 6.48 rate per log 5½ perches.

S — 7.10 lost 1'.

S 45 E 7.30

E 7.40

N 65 E 7.55

Breakfast 8.57

Contin<sup>d</sup>

N 65 E 9.42 rate per log 4½ perches.

N 35 E 9.55

N 45 W 10.28 lost 5'.

N — 11.13 lost 3'.

N 40 W 11.18

S 65 W 11.30 landed and observed ☉ apparent double altitude 82° 5'. 33". In : er : + 13'. 30". latitude found 32° 28'. 58".

Dinner 1.30

Cont<sup>nd</sup>

S 65 W 1.52 rate per log 5 perches.

S 60 W 2.00

N 10 W 2. 6

N 15 E 2.20

E 2.25

S 55 E 2.47

N 70 E 2.52

N — 2.55

N 25 W 3.25 arrived at the post of Washita.

1804 }  
November }

made this day 9 miles 257 perches amounting in the whole from the mouth of Red river 196 miles and 256 perches.

Wednesday 7<sup>th</sup> Took the ☉ ap: mer: doub: alt: 81° 28'. 00" In: er: +13'. 33".5 latitude found 32° 29'. 52".5.

The place where the observation was made is about 450 feet to the south of the post where Lieut: Bowman and his garrison are stationed, the latitude of the post is therefore 32° 29'. 57".

8<sup>th</sup> & 9<sup>th</sup> Both cloudy days remained at the post.

9<sup>th</sup> Thermometer 42°-72° river 61°.

Saturday 10<sup>th</sup> Thermometer 40° made the following observations.

|       |   |   |  |
|-------|---|---|--|
|       |   |   | by cal.  |
|       |   |   | var <sup>n</sup>                                       |
|       |   |   | found  |
| A. M. | { | 10 <sup>h</sup> 0'. 18". ☉ ap. dble<br>lower limb Alt 63°. 5'. 50" ☉ mag: Az S 46 E<br>10. 12. 15    65. 56 . 53                    S 43 E<br>10. 16. 12    66. 50 . 34                    S 42 E | In: er:    10°. 9'.<br>+13'. 47".5    10 . 8<br>10 . 8 |

☉ Ap: mer: d̄ble: Alt: 79° 45'. 3"  
In: er+13'. 47".5 Lat: found 32° 29'. 35".

There is a difference of 17". between the Lat: found this day and on the 7<sup>th</sup> I give the preference to the observation of this day, because on the 7<sup>th</sup> some interruption from visitants occasioned a moments inattention and it is believed the Sun might have dipped a little before the altitude was taken.

☉ triple contact as follows

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P M. { Lower limb a 3-1-6 } ☉ ap : D : Alt : 49°. 15'. 30''.  
 { Center 3-2-50 } In : er : + 13'. 47''. 5.  
 { Upper limb 3-4-36 }

Note the center contact was uncertain from intervening branches. Distances between the Sun and moons nearest limb are as follows.

|        |               |   |           |                              |
|--------|---------------|---|-----------|------------------------------|
| P M. { | dis : ☉       | & | ☉ limbs   | } Index er : + 13'. 47''. 5. |
|        | At 3.26'.49'' |   | 92° 34.00 |                              |
|        | 3.33.43       |   | 92.35.55  |                              |
|        | 3.39.56       |   | 92.38.25  |                              |
|        | 3.42.36       |   | 92.39.00  |                              |
|        | 3.46.5        |   | 92.40.00  |                              |
|        | 3.50.14       |   | 92.41.50  |                              |

Triple contacts of the moons limbs and center.

|                           |            |                                    |                              |
|---------------------------|------------|------------------------------------|------------------------------|
| At 4 <sup>h</sup> 1'.11'' | upper limb | } ☉ ap : D : Alt : 62° 55'.00      | } In : er :<br>+ 13'.47''.5. |
| 4 . 3 . 1                 | center     |                                    |                              |
| 4 . 4 . 52                | lower limb |                                    |                              |
| At 4 . 8 . 55             | upper limb | } ☉ ap : Dble : Alt : 64° 37'.45'' |                              |
| 4 . 10 . 41               | center     |                                    |                              |
| 4 . 12 . 24               | lower limb |                                    |                              |

These contacts of the moon are not to be considered as so perfect as similar contacts of the Sun, on account of the pale light of her disk in the presence of the Sun, the illuminated part being also but a small proportion of the whole disk, the following mer : alt : of the moon taken in the evening was very correct . . . ☉ ap : mer : dble : alt : 89° 17'. 20'' In : er : + 13'. 47''. 5, these were taken, because the ☉ moon's alt : could not be taken at the same instants with the distances between the Sun and moon's limbs

1804 }  
November }

and may be used or not as a check  
at the pleasure of the calculator.

Distances of the moons west  
limb from  $\alpha$  arietis

|                            |                       |   |                        |
|----------------------------|-----------------------|---|------------------------|
| At 7 <sup>h</sup> 42'.57'' | Distance 71° 45'.00'' | } | In : er : - 13' 47½''. |
| 7 .51 .27                  | 71 .42 .15            |   |                        |
| 7 .59 .38                  | 71 .38 .55            |   |                        |

Sunday 11<sup>th</sup> Thermometer 24° At the post of Washita  
took the sun's ap : mer : dble : alt :  
79° 12' 7'' In : er : + 13'. 32''.5  
Lat : 32° 29' 30''.5.

Sett out at 3<sup>h</sup>54' from the post of Washita.

N 45 W 4.30 lost 2' ; per log 8 perches per ½  
minute.

N 30 W 4.55 to Baron Bastrop's plantation ;  
encamped, made this afternoon 3  
miles. The meridian observations  
of this day and yesterday for the  
Lat : being in my opinion both as  
good as the instrument admits, I  
take the mean of the two for the  
truth, and as the distance of the  
post from the place of observa-  
tion is 450 feet North, I consider  
the true latitude of the post as  
fixed at 32 29' 37''. 8.

Monday 12<sup>th</sup> Thermometer in air 36° in river water  
54° clear, calm.

Sett off at 8.26 took in some fresh beef &c.

N 55 E 8.35 rate per log 8 perches.

N 8.39

N 60 W 9.15 lost 24' upon shoals.

N 10 W 9.20

N 25 E 9.40

N 9<sup>h</sup>46' Bayu Siard on the right computed } 1804  
 2 leagues from the Fort. } November

N 70 W 10.15 river 100 yards wide.

N 30 W 10.23 at 10<sup>h</sup>20' Bayu d'Arbonne, enter a narrow passage to the left which contains the whole river, being shut up on the right except during freshes: the course of the old river upwards is east: and the new channel with high banks is from 30 to 40 yards wide.

N 30 E 10.25

N 60 E 10.31

E 10.33

S 45 E 10.45 at 10.39 return to the great river.

N 60 E 10.55

N 30 E 11.20

E 11.50 landed to observe  $\odot$  mer: ap:  
 dble: alt: 78° 28' 52" In: er:  
 +13' 31" Latitude 32° 34' 47".

After dinner

set off at 1.48

Continued

E 1.53

N 2.00

N 70 W 2.10

N 2.15

N 40 E 3.3 at 2.30 a rapid — 2.45 another rapid and shoal.

S 70 W 3.17 lost 5' upon a shoal.

Stoped untill 4.27 upon a shoal.

N 50 W 5.30 lost 25' encamped; thermometer at 8<sup>h</sup> p.m. 54° made this day 16 miles 32 perches.

|                  |   |                          |   |
|------------------|---|--------------------------|---|
| 1804<br>November | } | Tuesday 13 <sup>th</sup> | Thermometer in air 33° in river water   |
|                  |   |                          | 55° — fog — calm.   |
|                  |   | Set off at               | 6 <sup>h</sup> 51' per log 8 perches.   |
|                  |   | Continued                |   |
|                  |   | N 50 W                   | 6.55  |
|                  |   | N                        | 7. 2  |
|                  |   |                          | E 7.23  |
|                  |   | N 45 E                   | 7.40  |
|                  |   | N 45 W                   | 7.44  |
|                  |   | S 85 W                   | 8.00  |
|                  |   | S 55 W                   | 8.40  |
|                  |   |                          | lost 10'. at 8 <sup>h</sup> 10' an Island; at 8 <sup>h</sup> 12' a strong rapid landed to breakfast.  |
|                  |   | Set off at               | 9.42  |
|                  |   |                          | 9 computed leagues from the post: an Island on the right rocks called Roque rau.  |
|                  |   | N                        | 9.46 rate per log 7 perches.  |
|                  |   | N 45 E                   | 9.53 wind south.  |
|                  |   | N 45 W                   | 10.31 river 150 yards wide — banks about 25 feet high.  |
|                  |   | N                        | 11.10 lost 17' on shoals — at 11 <sup>h</sup> 3' gravelly rapids and a house on the right. Otter Bayou on the left at the end of the course: an Island at the mouth of the Bayou. |
|                  |   | S 70 E                   | 11.30 lost 12' the river has a more spacious appearance than below.   |
|                  |   | N 80 E                   | 11.55 Two settlements at the end of the course on the right called 'Ecoraux Noyers' 30 feet bank, 4 feet clear at high water. Some Cypress grows along the bank.                  |
|                  |   | N 30 E                   | 12.10   |
|                  |   | N 70 E                   | 12.30 at 12 <sup>h</sup> 26° a house on the right.  |

N 10 E 12<sup>h</sup> 36' a shower of rain — landed to dine. { 1804  
 Set off at 3. 3 Thermometer 66°. { November  
 Continued

- N 10 E 3.17 rate per log 8 perches.
- N 35 E 3.30
- N 15 E 3.50
- N 40 E 4.00 a 3.54 Bayu Bartelemi 12 computed leagues from the post.
- N 55 W 4.11 rate per log 6½ perches.
- S 75 W 4.25 lost 8'.
- N 45 W 4.27
- N 25 E 4.29
- N 65 E 4.38
- E 4.46
- N 30 E 4.51
- N 20 W 5.00
- N 60 W 5.10 Bayou Pawpa.
- N 20 W 5.20 encamped on the right, made this

day 16 miles 312 perches. At 8<sup>h</sup> p.m. Thermometer in air 62°.

Wednesday 14<sup>th</sup> Thermometer in air 44° in river water 55° clear, calm.

Set off at 7. 6 rate per log 5¼ perches.

N 20 W 7.24 Bayu Mercier on the left.

N 10 E 7.50 lost 2'.

\*N 10 W 8.12 landed to repair the rudder irons & to breakfast.

Set off 10.24

Continued

\* On our return we landed 37 perches below the end of this course i. e. at 8<sup>h</sup> 8½' on the 15<sup>th</sup> January 1805 and took the Sun's alt: to correct the time of the watch, at 10<sup>h</sup> 56' 24'' a.m. ap: alt: ☉ l.l. 66° 36' 45'' In: er: + 12' 20''.

1804 }  
 November } N 10 W 10<sup>h</sup> 35' wind N.W.  
 N 40 W 11.19 at 11.3 'Bayu Buttes' (mount  
 Creek).

N 11.21

N 65 E 11.25 rate per log 6 perches.

N 11.30

N 70 W 11.40 landed to observe  $\odot$  ap : mer : dble :  
 alt :  $76^{\circ} 54' 35''$  In : er : + 13'  
 47''.5. latitude found  $32^{\circ} 50' 8''.5$ .

After dinner

Set off at 1.40

Continued

S 70 W 1.47

N 80 E 2. 3

N 2.13

N 55 W 2.27

N 35 W 2.30 lost 8'; at 3<sup>h</sup> 6' an Island begins,  
 main channel on the left—qr. 3<sup>h</sup>  
 30' at 3<sup>h</sup> 13' End of the Island  
 and Bayu on the left.

N 10 W 3.40 rate per log 7 perches; low coun-  
 try commences.

N 15 E 3.53

N 35 E 3.59

N 45 W 4. 4 river from 50 to 60 yards wide.

N 75 W 4. 7

N 4.15 small timber; overcup white oak  
 along the banks subject to be  
 overflowed.

N 35 E 4.19

N 4.22

S 70 W 4.26

N 60 W 4.28

N 4.29



|         |       |                    |  |
|---------|-------|--------------------|--|
| N 50 E  | 4.33' | } 1804<br>November |  |
| N 20 W  | 4.35  |                    |  |
| N 45 W  | 4.39  |                    |  |
| N       | 4.42  |                    |  |
| N 45 E  | 4.44  |                    |  |
| S 85 E  | 4.50  |                    |  |
| N 15 E  | 4.53  |                    |  |
| N 60 W  | 4.55  |                    |  |
| N 80 W  | 4.58  |                    |  |
| N 40 W  | 5. 2  |                    |  |
| *N 40 E | 5. 6  |                    |  |
| N 80 E  | 5.10  |                    | Wind west — river 35 to 40 yards wide. |

N 5.13

N 30 W 5.17 Encamped on the left, made this day 12 miles 303 perches.

Thursday 15<sup>th</sup> Thermometer in air 33° in river water 55° hoar frost — some clouds.

Set off at 9.14

Continued

N 30 W 9.35 rate per log 7½ per :

N 10 W 9.42

N 40 W 9.50

N 10. 3

N 50 W 10.10

S 70 W 10.24 lost 8'.

N 10.53 lost 5' a rapid.

N 70 E 11.00 Bank low overflows 20 feet perpendicular.

N 20 E 11. 4

N 20 W 11. 7

\* On our return down the Washita, on the 14<sup>th</sup> January 1805 we observed an Eclipse of the moon at this place, from whence the longitude was deduced.

1804 } N 45 W 11<sup>b</sup> 23'  
 November } N 30 E 11.24 No more long moss (*Tilansia*)  
 seen above this.  
 N 45 E 11.35 at 11<sup>b</sup> 33' 'Isle de Mallet'—  
 landed to observe and placed the  
 Instrument on the left shore 90  
 yards higher than the point of  
 the Island: ☉ ap: dble: mer:  
 alt: 76° 5' 28'' In: er: +13'. 30''  
 Latitude found 32° 59' 27''.5.  
 The division line between the  
 Territory of Orleans and that of  
 Louisiana will traverse the river  
 32½'' of a degree north of the  
 place of observation, and may be  
 found at any time by following  
 the above remarks respecting the  
 situation of the N.E. end of the  
 Island of Mallet.

## Set off after

|           |      |  |
|-----------|------|--|
| dinner at | 1.28 |  |
| N 10 W    | 1.46 |  |
| N 35 E    | 1.55 |  |
| N 25 W    | 1.58 |  |
| N 30 W    | 2.10 | rate per log 7 perches.                                    |
| N 80 W    | 2.17 |  |
| N 25 W    | 2.30 |  |
| N         | 2.35 | } 3 sand beaches ('les trois bat-<br>tures').              |
| N 60 W    | 2.42 |  |
| N 10 W    | 2.51 |  |
| W         | 3.13 |  |
| S 45 W    | 3.24 | Thermometer 60°.   |
| W         | 3.33 | rate per log 8 perches 'Bayu grand<br>marais' on the left. |

{ 1804  
November

N 45 W 3<sup>h</sup>35'  
Stop 3.47  
N 3.57  
N 50 W 4. 5  
N 4. 7  
N 60 E 4.12  
N 4.15  
N 40 W 4.34  
N 4.42

Cypriere Chattereau on the right  
— a point of high land approaches  
within half a mile of the river on  
the same side.

N 45 W 4.46  
S 80 W 4.56  
S 75 W 5. 2  
N 45 W 5. 5

Encamped on the left — Ther-  
mometer at 8<sup>h</sup> p.m. 50° extremes  
33°-60° made this day 16 miles  
42 perches.

Friday 16<sup>th</sup> Thermometer in air 38° in river water 54°  
— cloudy — calm.

Set out at 6.58

Continued

N 45 W 7.10 rate per log 7½ perches.  
N 10 W 7.16  
N 45 W 7.23  
N 15 W 7.26 a Creek on the left.  
N 5 E 7.35  
N 45 W 7.39  
— W 7.40  
S 70 W 7.43  
S 80 W 7.49  
N 45 W 7.51  
N 45 E 7.54

|                  |   |                   |                     |   |
|------------------|---|-------------------|---------------------|---|
| 1804<br>November | } | N 65 E            | 7 <sup>h</sup> .58' |   |
|                  |   | N 25 E            | 8. 2                |   |
|                  |   | N 10 W            | 8.10                |   |
|                  |   | N 45 E            | 8.22                |   |
|                  |   | N                 | 8.27                |   |
|                  |   | Breakfast         | 9.35                |   |
|                  |   | Continued         |                     |   |
|                  |   | N                 | 9.42                | rate per log 7½ perches.  |
|                  |   | N 65 E            | 9.45                |   |
|                  |   | S 60 E            | 9.50                |   |
|                  |   | N 45 E            | 9.55                |   |
|                  |   | N                 | 10. 8               |   |
|                  |   | N 20 E            | 10.18               |   |
|                  |   | N 20 W            | 10.24               |   |
|                  |   | N 45 W            | 10.37               |   |
|                  |   | N                 | 10.40               |   |
|                  |   | E                 | 10.53               |   |
|                  |   | N 30 E            | 10.56               |   |
|                  |   | N 15 W            | 11.10               |   |
|                  |   | N 50 W            | 11.19               | on the right, 'marais de la Saline'<br>— a large lake and point of high<br>land about a mile distant — Tulip<br>creek on the right. |
|                  |   | N 80 W            | 12. 2               | lost 24'.   |
|                  |   | S 70 W            | 12.22               |   |
|                  |   | N 45 W            | 12.29               |   |
|                  |   | S 45 W            | 12.53               | Great Saline Bayu on the right.   |
|                  |   | Dinner            | 2.34                |   |
|                  |   | Cont <sup>d</sup> |                     |   |
|                  |   | S 45 W            | 2.39                | rate per log 7½ perches.  |
|                  |   | W                 | 2.43                |   |
|                  |   | N 20 W            | 2.45                |   |
|                  |   | N 30 E            | 2.57                |   |
|                  |   | N 75 W            | 3. 4                |   |

|        |                    |        |
|--------|--------------------|--------|
| S 80 W | 3 <sup>h</sup> 24' | } 1804 |
| S 25 E | 3.34               |        |

S 60 W 3.39  
W 3.54

N 20 E 4.00

N 45 E 4.14

N 20 W 4.23 the 3 pine trees.

N 55 W 4.46 lost 8'.

N 4.50

W 4.52

S 4.54 encamped: Thermometer at 8<sup>h</sup>  
p.m. 42° extremes 38° 51° made  
this day 17 miles 185 perches.

Saturday 17<sup>th</sup> Thermometer in air 40° in river water  
54° fog on the river, calm, river  
rose 2½ inches in the night.

Set off at 7.19

Course continued

S 7.23 rate per log 6 perches.

S 75 E 7.27

N 7.40

W 7.42

S 45 W 7.55

N 45 W 8.00

N 20 E 8. 9

N 60 E 8.17

N 30 W 8.18

N 80 W 8.27

N 20 W 8.30

N 5 W 8.56

W 8.58 'marais de cannes' (cane marsh) on  
the right.

Breakfast 10. 7

S 15 W 10.23 rate per log 7 perches.

|                  |           |        |  |
|------------------|-----------|--------|--|
| 1804<br>November | S 65      | W10.42 | long leaf-pine.  |
|                  | N 45      | W10.49 | saw the first swan, shot by one of the hunters.  |
|                  |           | W10.52 |  |
|                  | S 45      | W11. 1 | pirsimmons and small black grapes.   |
|                  | N 45      | W11.18 |  |
|                  | S 75      | W11.25 | small cane — Sun breaks out — serene.  |
|                  | N 55      | W11.30 | no long moss (tilandsia) seen since we entered the low alluvial lands.   |
|                  | N         | 11.42  | landed to observe. ☉ mer : ap : dble: altitude $74^{\circ} 37' 52''$ In : er : + $13' 57''.5$ latitude $33^{\circ} 13' 16''.5$ . |
|                  | Dinner    | 1.42   |  |
|                  | Continued |        |  |
|                  | N         | 1.49   | rate 8 perches.  |
|                  | N 45      | E 1.50 |  |
|                  |           | E 2. 5 |  |
|                  | N         | 2. 9   | a rapid.   |
|                  |           | W 2.21 | canes pines.   |
|                  | N 70      | W 2.39 |  |
|                  | N 45      | E 2.52 | saw an alligator.  |
|                  | N         | 3.10   |  |
|                  | N 80      | W 3.30 | the Eagle.   |
|                  | S 45      | E 3.31 |  |
|                  | S 30      | E 3.48 | lost 10'.  |
|                  | S 15      | W 3.52 |  |
|                  | S 70      | W 3.57 |  |
|                  | N 80      | W 4. 4 |  |
|                  | N 60      | W 4.17 |  |
|                  | S 80      | W 4.19 |  |
|                  | S 55      | W 4.29 |  |
|                  | N 80      | W 4.32 |  |
|                  | N 30      | W 4.35 | sand beaches.  |

N 4<sup>b</sup>47'

N 70 W 4.53

W 5. 7 Thermometer at 8<sup>b</sup> p.m. 44° extremes 40°-51° made this day 15 miles 308 perches.

} 1804  
} November

Sunday 18<sup>th</sup> Thermometer in air 32° in river water 52° serene — calm, — river rises a little.

Set out at 7.20

Continued

W 7.23 rate per log 7½ perches.

S 20 W 7.34

S 80 W 7.49 lost 3' by the rapid, at 7.41 an Island and passage round to the right, the old channel shut up by a sand bar; the whole river runs through the narrow channel of about 70 feet wide.

N 10 E 8. 2

N 15 W 8. 6

N 40 W 8.20

S 80 W 8.23

S 35 W 8.27

S 10 W 8.40

N 80 W 8.48

S 25 W 8.51

S 45 E 9. 2

S 9. 7 'Cache la Tulipe' (Tulipe's hiding place).

Breakfast 10.11

Continued

S 10.22 rate per log 7½ perches.

W 10.34

N 20 E 10.40

N 15 W 10.44

1804 }  
November }

N 40 W 10.52'

N 10 W 11. 7

W 11.13

S 25 W 11.20 lost 3' by a rapid.

S 60 W 11.25

N 80 W 11.30

N 50 W 11.41 landed to observe,  $\odot$  ap: mer:  
dble: alt: 74 1' 25'' In: er: +13'.  
50'' latitude found 33° 17' 33''.

Dinner 1.33

S 75 W 1.46 rate per log 7½ perches.

N 1.55

N 30 E 2. 9

N 2.14 Bay Morau — a large inlet on the  
right, which swells into a consider-  
able lake during an inundation.

N 80 W 2.26

South 2.43

S 45 W 2.46 large pine trees.

S 65 W 2.56

S 15 W 3.10

S 50 W 3.27 lost 14'.

S 75 W 4.19 hill on the left called ('Cote de  
hachis').

S 55 W 4.30

S 85 W 4.32

N 30 W 4.34

N 4.39

N 35 W 4.41

N 60 W 4.44

S 30 W 4.52

S 70 W 4.57

N 70 W 5.00

N 40 W 5.02



N 5<sup>h</sup>05' encamped Thermometer at 8<sup>h</sup> { 1804  
 p.m. 57° in air, cloudy. made this } November  
 day 18 miles 75 perches.

Monday 19. Thermometer in air 54° in river wa-  
 ter 54° cloudy, calm, river at a  
 stand.

Set off at 6.56

Continued

N 7.00 rate per log 7½ perches.

N 60 W 7.15

N 35 W 7.18

S 15 W 7.23

S 70 W 7.24

N 70 W 7.26 Bayu de Hachis on the left.

N 30 W 7.31

N 70 W 7.40

N 52 W 7.49

N 7.52 points of high land touch the  
 river at various places — the val-  
 ley about a league broad on each  
 side.

N 70 E 7.58

N 47 E 8.17

N 8.25

W 8.26

S 55 W 8.37

N 80 W 8.40

N 50 W 8.45

N 50 E 8.52

N 30 E 8.53

Breakfast 10. 6

N 30 E 10.15

N 30 W 10.28

S 25 W 10.42

|                    |           |                                  |
|--------------------|-----------|----------------------------------|
| 1804<br>November } |           | W <sub>10</sub> <sup>b</sup> 44' |
|                    | N 58      | W <sub>10</sub> .46              |
|                    | N 15      | W <sub>10</sub> .53              |
|                    | N 40      | W <sub>11</sub> .08              |
|                    |           | W <sub>11</sub> .10              |
|                    | S 25      | W <sub>11</sub> .26              |
|                    | S 10      | E 11.29                          |
|                    | S 35      | E 11.34                          |
|                    | S 50      | W <sub>11</sub> .38              |
|                    |           | W <sub>11</sub> .48              |
|                    | N 20      | W <sub>11</sub> .53              |
|                    | N 60      | W <sub>11</sub> .58              |
|                    | N 40      | W <sub>12</sub> . 4              |
|                    | N 80      | W <sub>12</sub> . 8              |
|                    | S 60      | W <sub>12</sub> .16              |
|                    | S 40      | W <sub>12</sub> .22              |
|                    | S 55      | W <sub>12</sub> .32              |
|                    | S 45      | W 1. 4 lost 20'.                 |
|                    | N 65      | W 1.11                           |
|                    | N         | 1.30                             |
|                    | Dinner    | 3.24 cloudy.                     |
|                    | Continued |                                  |
|                    | N         | 3.29                             |
|                    | N 50      | W 3.33                           |
|                    |           | W 3.36                           |
|                    | S 55      | W 3.44                           |
|                    | N 70      | W 3.45                           |
|                    | N         | 3.47                             |
|                    | N 55      | W 4.00                           |
|                    | N         | 4. 7                             |
|                    | N 60      | W 4.15                           |
|                    | N 20      | W 4.20                           |
|                    | N 25      | E 4.30                           |
|                    | N 80      | W 4.34                           |

S 80 W 4<sup>h</sup>42' { 1804  
 N 35 W 4.45 Cabane Champignole. { November

N 60 W 4.52 rain.

N 10 W 4.55 encamped, Thermometer at 8<sup>h</sup>  
 p.m. made this day 18 miles 120  
 perches.

Tuesday 20<sup>th</sup> Thermometer in air 59° in river water  
 54° cloudy, calm.

Set off at 6.48

North 6.56 rate per log 7½ perches.

West 6.58

S 40 W 7.4

S 60 W 7.17

N 55 W 7.30

N 20 W 7.39 a deep creek on the left called  
 Chemin couvert.

N 7.48

N 50 W 7.52

S 75 W 7.56

S 10 W 8.4

S 75 W 8.13 a rapid, and gravel beach, water  
 40 yards wide.

N 60 W 8.20

N 20 W 8.37 a narrow passage to the left 60  
 feet wide a small narrow Island.

N 45 W 8.44

N 25 W 8.50

N 25 E 9.4

N 30 W 9.20 lost 10'.

N 55 W 9.32

Breakfast 10.50

S 80 W 11.7 rate per log 7½ perches.

N 75 W 11.14

N 45 W 11.23

|                    |      |                      |  |
|--------------------|------|----------------------|--|
| 1804<br>November } | S 80 | W <sup>11</sup> .27' |  |
|                    | S 35 | W <sup>11</sup> .29  |  |
|                    | S 28 | W <sup>11</sup> .39  |  |
|                    | S 58 | W <sup>11</sup> .48  | saw an alligator / they seldom go farther north in this river.   |
|                    | S 30 | W <sup>11</sup> .53  | Timber— birch, maple, holly &c.  |
|                    | S 75 | W <sup>12</sup> . 2  | cloudy and uncertain, did not go ashore to observe.  |
|                    | N 60 | W <sup>12</sup> . 4  |  |
|                    | N 20 | W <sup>12</sup> .15  |  |
|                    | N 25 | E 12.22              |  |
|                    | S 75 | E 12.32              |  |
|                    | N 40 | E 12.36              |  |
|                    | N 10 | W <sup>12</sup> .50  |  |
|                    |      | W <sup>12</sup> .54  |  |
|                    | S 80 | W 1. 4               |  |
| Dinner             |      | 3.00                 | Thermometer 62°  |
|                    | N 10 | E 3.16               | ferruginous earth.   |
|                    | N 45 | W 3.18               |  |
|                    | S 50 | W 3.31               |  |
|                    |      | W 3.36               |  |
|                    | N    | 3.38                 |  |
|                    | N 50 | E 3.44               |  |
|                    | N    | 3.50                 |  |
|                    | N 45 | W 3.56               |  |
|                    | N 75 | W 4.00               |  |
|                    | S 70 | W 4.10               |  |
|                    | S 50 | W 4.32               | lost 7'.   |
|                    | S 85 | W 5. 3               | at 4.54 a hill of pines on the left; at 5 <sup>h</sup> an island; we passed through a small channel to the right. made this day 18 miles 308 perches, thermometer at 8 <sup>h</sup> p.m. 54° extremes 59°-62°. |

Wednesday 21<sup>st</sup> Thermometer in air 43°, in river water 54°, fog, calm. { 1804  
November

Set off at 7<sup>h</sup> 3'.

Course continued.

S 85 W 7.15 rate per log 7 perches.

N 35 W 7.17 Fin's hill a cliff 100 feet perpendicular.

N 7.44 lost 6' by a rapid.

N 25 W 7.52

N 10 W 7.57

N 25 E 8.19

N 35 W 8.29

W 8.32

S 8.35

S 40 E 8.43

S 55 W 8.53 river 80 to 90 yards wide.

S 85 W 9. 5

Breakfast 10.12 'Cote à Ross' (Ross' hill or camp).

N 10 E 10.20

N 45 W 10.26

S 75 W 10.32

N 45 W 10.35

N 15 W 10.47

N 45 E 10.55

S 45 E 11.11

N 45 W 11.20

N 10 W 11.26

N 35 E 11.34

N 11.46 landed to observe ☉ ap: mer:  
dble: alt: 72° 14' 48" In: er: +13'.  
51" Latitude found 33° 29' 29".

Dinner 1.30

N 55 W 1.39 rate 7 perches.

1804 }  
November }

|        |   |
|--------|---|
| S 80 W | 1 <sup>b</sup> .45'   |
| N 75 W | 1.51  |
| N 60 W | 1.55  |
| N 85 W | 1.59  |
| S 45 W | 2. 2  |
| S      | 2. 4  |
| S 40 E | 2.12  |
| S      | 2.15  |
| S 40 W | 2.25  |
| N 80 W | 2.33  |
| S 80 W | 2.47 lost 8'.   |
| West   | 2.52 a creek to the left.   |
| N 10 W | 2.57  |
| N 75 W | 3.22 lost 7' thermometer 72°.   |
| N 15 E | 3.33  |
| N 55 E | 3.35  |
| N 80 E | 3.46  |
| N 45 W | 3.51  |
| S 82 W | 4. 3  |
| N 60 W | 4. 9  |
| N 52 W | 4.14  |
| N 70 W | 4.20 'Pointe-Coupée' (a cut off) old channel in a continuation with this course, the boat channel to the right. |
| N 50 E | 4.24  |
| N 68 E | 4.28  |
| N 35 E | 4.33  |
| N 58 E | 4.40  |
| N      | 4.43  |
| N 43 W | 4.48  |
| N 15 W | 4.51  |
| N 30 E | 5.00  |
| N      | 5. 5  |

N 45 W 5<sup>h</sup> 9' encamped on the right: made 18 miles 36 perches: thermometer at 8 p.m. 58° extremes 43°-72° { 1804  
November.

Thursday 22<sup>d</sup>. Thermometer in air 40° in river water 53° light clouds — calm. set off at 7.6.

S 62 W 7.15 rate per log 6½ perches.

W 7.20

N 53 W 7.36

N 32 E 7.42

N 7.51

N 45 W 7.58

N 20 W 8. 2

N 20 E 8. 9

N 25 W 8.12

N 55 W 8.18

W 8.31

N 45 W 8.33

N 20 W 8.41

N 40 W 8.45

N 8.53

N 45 W 8.58

Breakfast. 10. 7

S 80 W 10.16

N 85 W 10.21

S 70 W 10.25

S 10.33 at 10.28 the Cadaux or Cadodoquis path crosses the river leading to the Arcansas.

W 10.48 at 10.43 'Ecor à Fabri' (Fabri's cliffs) 80 to 100 feet high lead said to be buried on the ridge by Fabri in the direction of the french and spanish line.

|                    |      |                       |  |
|--------------------|------|-----------------------|--|
| 1804<br>November } | N 60 | W 10 <sup>h</sup> 52' |  |
|                    | N 40 | W 10.55               |  |
|                    | N    | 10.59                 |  |
|                    | N 45 | E 11. 8               | lost 7' — 40 yards wide.   |
|                    | S 80 | E 10.20               |  |
|                    | N 45 | E 11.21               |  |
|                    | N    | 11.23                 |  |
|                    | N 30 | W 11.25               |  |
|                    | N 70 | W 11.31               |  |
|                    | N 25 | W 11.33               |  |
|                    | N    | 11.36                 |  |
|                    | N 65 | E 11.41               |  |
|                    | N 20 | E 11.43               |  |
|                    | N 10 | W 11.45               |  |
|                    | N 45 | W 11.56               | cloudy, no observation.  |
|                    | N 75 | W 12. 2               |  |
|                    | S 85 | W 12.17               | lost 8'. at 12.15 'petit ecor à Fabri'<br>(small cliff of Fabri) |
|                    | N 45 | W 12.20               |  |
|                    | N 10 | W 12.26               |  |
|                    | N 30 | W 12.31               |  |
| Dinner             |      | 2.34                  |  |
| N                  |      | 2.37                  |  |
|                    | E    | 2.44                  |  |
| S                  |      | 2.45                  | a rapid.   |
| S 45               | E    | 2.47                  |  |
|                    | E    | 2.50                  |  |
| N 40               | W    | 2.58                  |  |
| N 15               | W    | 3. 8                  |  |
| N 45               | W    | 3.10                  |  |
|                    | W    | 3.13                  | river 30 yards wide only here, enclosed by bars &c.              |
| S 45               | W    | 3.16                  |  |
| S 15               | E    | 3.20                  |  |



S 45 W 3<sup>b</sup>23'

W 3.27

S 70 W 3.28

N 75 W 3.31

N 20 W 3.34

N 26 E 3.56 lost 9'.

N 60 E 4. 6

N 20 E 4. 8

N 5 W 4.11

N 50 W 4.15

W 4.18 rapids.

S 50 W 4.25 d°

N 60 W 4.53 lost 18' strong rapids and shoals.

N 10 E 5.00 encamped made this day 14 miles  
317 perches thermometer at 8  
p.m. 54 extremes 40° 68°.Friday 23<sup>d</sup> Thermometer in air 48° in river water 54°  
light clouds — calm : river on the  
fall.

Set off at 7. 4

N 15 W 7. 8 rate per log 6 perches.

W 7.11

N 55 W 7.13

N 25 W 7.15

N 10 W 7.34 lost 5'. rapids.

N 45 E 7.39

N 7.43

N 60 W 7.47

W 7.53

S 45 W 8. 2 lost 2'. rapids.

W 8. 5

N 60 W 8. 8

N 20 W 8.26 lost 2' on rapids.

N 45 W 8.28 lost 1'.

{ 1804  
November

|                  |           |                    |   |
|------------------|-----------|--------------------|---|
| 1804<br>November | S 45 W    | 8 <sup>h</sup> 35' |   |
|                  | Breakfast | 9.54               | Drunkards Islands.  |
|                  | N 45 W    | 10. 1              |   |
|                  | N 15 E    | 10. 5              |   |
|                  | N 25 E    | 10.12              |   |
|                  | N 45 E    | 10.17              |   |
|                  | N 45 W    | 10.25              | lost 5'.  |
|                  | S         | 10.37              | lost 5'.  |
|                  | N 45 W    | 10.54              | lost 5'.  |
|                  | N 85 W    | 11. 0              |   |
|                  | N 45 W    | 11. 5              |   |
|                  | N 10 E    | 11. 9              | 'Cote á Sofrion' (Sofrion's hill).  |
|                  | N 15 W    | 11.15              | banks from 9 to 12 feet high;<br>yellowish clay.  |
|                  | N 65 W    | 11.20              | lost 4'.  |
|                  | N 45 W    | 11.43              | Landed to observe ☉ ap : dñle:<br>mer : alt 70° 59' 13" In : er + 14'<br>8" Latitude found 33° 41' 35". |
|                  | Dinner    | 1.43               |   |
|                  | N 45 E    | 1.51               | 'Pointe-Coupée,' old channel to<br>the east.  |
|                  | N         | 1.54               | lost 2'.  |
|                  |           | W                  | 1.56  |
|                  | S 70 W    | 1.58               |   |
|                  | N 45 W    | 2. 6               |   |
|                  | Lost      | 2.20               | stop to cut willows.  |
|                  | N 45 E    | 2.22               |   |
|                  | N 15 W    | 2.30               |   |
|                  | N 30 W    | 2.43               |   |
|                  | N 10 E    | 2.50               |   |
|                  | N 35 E    | 2.56               |   |
|                  | N 60 E    | 3. 7               |   |
|                  | N         | 3. 9               |   |
|                  | N 45 W    | 3.12               | Thermometer 72°.  |

N 80 W 3<sup>h</sup>17'  
 S 75 W 3.24  
 S 35 W 3.37 lost 6'.  
 S 3.40  
 S 45 W 3.45  
     W 3.51  
 N 50 W 4. 2  
 N 50 E 4. 5  
     E 4.13  
 N 25 E 4.17  
 N 4.30 lost 2'.  
 N 45 E 4.33  
 N 4.38  
 N 75 W 4.46 rapids.  
 N 20 W 5.00  
 N 5. 5 Encamped. Made 13 miles 28

{ 1804  
 { November

perches thermometer at 8<sup>h</sup> p.m.  
 54°.

Saturday 24<sup>th</sup> Thermometer in air 48° in river water  
 54° light clouds — calm — river at  
 a stand.

Set off at 6.56

N 10 W 7. 4 rate per log 6 perches.  
 S 45 W 7. 8 Iron ore — black sand 'Auges  
 d'Arclon' (Arclon's troughs).  
 N 25 W 7.36 lost 22'.  
 N 60 E 7.53 river in general 80 Yards wide.  
 N 25 E 8. 3  
 N 70 E 8. 6  
 S 50 E 8.22 lost 3' — rocky bottom — strong  
 rapid.  
 N 40 E 8.30  
 N 8.39  
 Breakfast 9.49

1804 }  
November }

N 35 W 10<sup>h</sup> 0' }  
N 10. 3 }  
N 40 E 10.56 lost 30' long and strong rapids.  
N 70 E 11.20 lost 18' ditto.  
E 11.27 }  
S 45 E 11.30 }  
S 15 E 11.39 lost 2'.  
S 45 E 11.48 lost 3'. a deserted corn patch.  
N 15 E 12. 8 cloudy, no observation.  
N 41 W 12.18 osiers or hoop willows.  
N 65 W 12.25 }  
W 12.34 Bayu Tallien on the left.  
N 60 W 1. 0 lost 5' on a rapid.  
N 55 W 1.14 Forks of the Washita and Little-  
Missouri, the latter coming in from  
the left in the direction of the last  
course.

Dinner 3.10  
N 20 W 3.20  
N 30 E 3.25 lost 3'.  
N 3.33 lost 5'.  
N 40 W 3.37  
N 60 W 3.41 lost 3'.  
N 45 W 3.46 lost 2'.  
N 20 W 3.51 lost 4' Petit-Washita on the left,  
runs into the Little Missouri.  
N 70 E 3.58 lost 1'.  
N 45 E 4.18 lost 9'.  
E 4.22 'Belle ance.'  
N 35 E 4.25  
N 30 W 4.47 lost 15'.  
N 25 E 4.54  
N 60 E 4.56  
S 85 E 5. 7 lost 5'.

N 60 E 5<sup>h</sup>13' encamped — thermometer at 8<sup>h</sup> { 1804  
 p.m. 59°. { November  
 made 11 miles 152 perches.

Sunday 25<sup>th</sup> confined all day to camp by the bad state of the weather, raining great part of the day. Extremes of the thermometer 54° to 70° and at 8<sup>h</sup> p.m. 62°

Monday 26<sup>th</sup> Thermometer in air 50° in river water 57° — clear — calm — river risen 3½ inches during the night.

Set off at 7. 7

N 40 E 7.52 lost 30' rate per log 6½ perches.

N 8. 5 white maple.

N 45 W 8.13 lost 2'.

N 20 W 8.25 Bear's head camp.

N 60 W 8.30

N 80 W 8.38 cane land.

S 35 W 8.42

S 75 W 8.47

W 8.58 lost 2'.

N 30 W 9.11

N 35 E 9.15

Breakfast 10. 8

E 10.15 lost 8'.\*

N 10.20

W 10.24

N 40 W 10.39 lost 6'.

N 10.50

N 80 E 10.53 lost 1'.

N 11.03

N 45 W 11.24 lost 2' — 'Petite-Cote' — an Island.

N 11.27

N 22 E 11.33

1804 } N 73 E 11.41'  
 November } N 35 E 11.46  
 N 85 E 11.50 landed to observe — ☉ ap: mer:  
 dble: alt: 69° 23' 52" In: er:  
 + 13' 38" Latitude found 33°  
 54' 6".5.

Dinner 1.47

Continued

N 85 E 1.50

N 38 E 1.57 lost 4'.

N 20 E 2. 3

N 85 W 2.15

N 70 W 2.20

N 45 W 2.29 many Islands.

N 25 W 2.52 lost 16'.

N 70 E 3. 0

N 25 W 3.15 lost 9'.

N 65 W 3.28

N 50 W 3.33 at 3.31 'Bayu de Cypre' on the  
 left. birch and osier.

N 3.40

E 3.46 lost 5'.

N 30 E 3.15 lost 4'.

N 55 E 4.40 lost 38'. cut away some logs.

N 20 W 4.47

N 75 W 4.52

S 65 W 4.55

S 5. 1 Encamped — Thermometer at 8  
 p.m. 62° — extremes 50° — 68° made  
 12 miles 21 perches.

Tuesday 27<sup>th</sup> Thermometer in air 54° — in river water  
 58° — cloudy — river risen above  
 a foot.

Set off at 7. 1

S 80 W 7<sup>h</sup>11' rate per log 6½ perches.

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N 70 W 7.17

N 45 W 7.21

N 10 W 7.33

N 20 E 7.38 rapids commence.

N 80 E 7.46 lost 6'.

N 40 E 7.55

N 30 W 8. 0

N 70 W 8. 9 lost 7' Piraugue à Gallien.

S 70 W 8.15 lost 3' left the rapids.

N 50 W 8.20

N 8.33

N 30 W 8.48

Breakfast 9.51 river rises 1½ inch during the hour.

W 9.55

S 30 W 10.10

W 10.13

N 45 W 10.17

N 10 W 10.30

N 45 W 10.32

S 70 W 10.36

S 30 W 10.40 lost 2'.

N 70 W 10.48

N 40 W 10.52

N 10.54

N 45 E 11.12

N 25 E 11.29 lost 8' a large Island to the left.

N 40 E 11.30

N 11.35

N 45 E 11.42

N 25 E 11.46

N 11.52 cloudy — no observation.

N 36 W 12.04 at 12<sup>h</sup> 'Cache à Maçon' and bayu

1804 }  
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on the right: about  $1\frac{1}{2}$  mile N.N.W. explored the banks of a creek in search of a coal mine and found only some fragments of carbonated wood; river risen 4 inches in 2 hours.

Dinner 2<sup>h</sup> 15'

N 60 W 3. 0 rate per log  $6\frac{1}{2}$  perches.  
W 3.25 lost 17'.

N 45 W 3.34  
N 3.40

N 45 W 4. 0 lost 6' river 150 yards wide.  
N 70 W 4. 9  
W 4.23 lost 7'.

N 70 W 4.32 lost 6'.  
N 45 W 4.49  
N 85 W 4.52  
N 70 W 5. 0 encamped thermometer @ 8<sup>h</sup> p:m.  
66° extremes 54° - 71° made this day 13 miles 39 perches.

Wednesday 28<sup>th</sup> Thermometer in air 68° — in river water 60° — river fallen 4 inches in the night — cloudy — calm.

Set off at 7. 5

S 65 W 7.13 rate per log  $6\frac{1}{2}$  perches.  
S 80 W 7.22  
S 65 W 7.29 'Ecor aux poux de bois.'  
N 60 W 7.37  
N 7.42

N 35 E 8.16 lost 22'.  
N 50 E 8.30  
N 30 E 8.39  
8.54 lost 10'.  
N 8.57



Breakfast 10<sup>h</sup> 3' beautiful pine woods on the right. { 1804  
 N 10.32 lost 14' — Bayu de l'eau froide on { November  
 the right, no cypress to be seen  
 about this creek on the margin of  
 the river.

W10.36

S 45 W10.42 lost 3'.

N 75 W10.46

N 45 W10.49

N 11.11 lost 11'.

N 40 W11.15 lost 2'.

N 11.25 lost 5'.

N 75 W11.30

S 70 W11.46 lost 7'.

S 40 W11.58

N 75 W12. 2 cloudy no observation.

N 45 W12. 7

N 25 W12.20

N 40 W12.30

N 25 W12.57 lost 3'.

Dinner 3. 9

S 70 W 3.22 lost 4'.

N 70 W 3.25

N 40 W 3.42 lost 5'.

N 80 W 3.44

S 45 W 3.54 lost 3'.

W 4. 1

N 40 W 4.21 lost 7 — at 4.7 Grand glaise (Big  
 salt lick) on the left 2 miles dis-  
 tant Bayu de Cypre opposite in  
 the interior.

N 4.25

N 45 E 4.28

N 55 E 4.31

|  |      |   |                    |   |
|--|------|---|--------------------|---|
| 1804<br>November }   |      | E | 4 <sup>h</sup> 34' | — river 170 y <sup>ds</sup> wide.   |
|  | S 75 | E | 4.44               |   |
|  |      | E | 4.54               |   |
|  | N 45 | E | 4.58               |   |
|  | N 10 | E | 5. 4               |   |
|  | N 20 | W | 5. 8               | Encamped. made 12 miles 255 perches. thermometer at 8 <sup>h</sup> p.m. 73° — extremes 68°—78°. |
| Thursday 29 <sup>th</sup> Thermometer in air 72° in river water 62° — cloudy — wind south — rain ; remained in camp untill after dinner. |      |   |                    |   |
| Got off at   |      |   | 1.27               |   |
|  | N 85 | W | 1.34               | rate per log 7 perches Saline Bayu ; about half a league north a salt spring.                   |
|  | N 65 | W | 1.58               | lost 5'.  |
|  | N 35 | W | 2.12               |   |
|  | N 70 | W | 2.25               |   |
|  | N 40 | W | 2.37               |   |
|  | N 5  | W | 2.50               |   |
|  | N 45 | W | 3.18               | lost 11'. at 3 <sup>h</sup> 'Ecor à chicots.'   |
|  | N    |   | 3.33               | lost 3'.  |
|  | N 80 | E | 3.45               |   |
|  | S 60 | E | 3.46               |   |
|  | S 30 | E | 3.57               |   |
|  | S 45 | E | 4. 2               | rapids.   |
|  | S 85 | E | 4. 8               |   |
|  | N 70 | E | 4.18               | lost 3'.  |
|  | N 30 | E | 4.22               | lost 2'.  |
|  | N 60 | W | 4.31               | lost 6' rapids.   |
|  | N 30 | E | 4.37               |   |
|  | N 40 | E | 4.42               |   |
|  | N 70 | E | 4.49               |   |

N 5<sup>h</sup> 0' Encamped made 8 miles 2 perches. { 1804  
 thermometer at 8<sup>h</sup> p.m. 52° ex- { November  
 tremes 52°-76°.

Friday 30<sup>th</sup> Thermometer in air 38° in river wat: 60°  
 — clear — calm — river risen 19  
 inches since last evening.

Set off at 7. 7

N 7.22 rate per log 6 perches.

N 80 W 7.25

S 45 W 7.30

S 30 W 7.46 lost 10' rapids.

S 60 W 7.49

N 75 W 7.53 lost 2'.

N 55 W 8.19 lost 6'.

N 15 W 8.26 lost 3'.

Breakfast 9.45

N 10 W 10.18 lost 6'.

N 10.27 'Fourche des Cadaux' on the left  
 100 yards wide — a hill 300 feet  
 high.

N 20 E 10.32

S 85 E 10.40

N 70 E 11. 5 lost 6'.

N 40 W 11.45 lost 21'. landed to observe, ☉ Ap:  
 mer: dble: alt: 67° 25' 30'' In:  
 er: + 13' 42'' latitude found 34°  
 11' 37'' —

Dinner 2. 0

N 15 E 2.15

N 50 E 2.18 'Bayu de Roches' on the left  
 (rocky Creek).

E 2.34

N 65 E 2.40

N 35 E 2.44 Encamped — Thermometer at 3<sup>h</sup>

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57° went to visit a saline. made  
7 miles 28 perches.

December 1<sup>st</sup>

Saturday Thermometer in air 32° — river water 54°  
— clear — calm — river fallen 18  
inches during the night.

Set off at 7<sup>h</sup> 5' 'Isle de roches' (rocky island)  $\frac{3}{4}$   
mile long on the right.

N 35 E 7.23 lost 10' — rate per log 6 perches.

N 75 E 7.31 lost 5'.

S 70 E 7.42 lost 6'.

N 65 E 7.52

N 45 E 8. 0

N 32 E 8.10

N 15 E 8.34 lost 13'.

Breakfast 10.12

N 55 E 10.18

S 80 E 11.10 lost 20'.

N 15 E 11.25 lost 11'.

N 10 W 12. 5 lost 35' on the rapids: no obser-  
vation.

N 45 E 12.15 'Bayu de l'isle de Mellon' on  
the right.

E 12.27

Dinner 2.29

E 2.44

S 45 E 2.53 lost 4'.

N 45 E 2.56

N 3.36 lost 11' at 3<sup>h</sup> 30' a saline distant  
2 miles to the left, and Isle de  
mellon on the right.

N 10 W 4.37 lost 38' encamped — made 7 miles  
148 perches — Thermometer at 8<sup>h</sup>  
p.m. 35° extremes 32° — 58°.

Sunday 2<sup>d</sup> Thermometer in air 30° in river water 50° { 1804  
 clear — calm — river fallen 4 inch. } December

Set off at 7<sup>h</sup>35'

N 10 W 7.44 rate per log 3 perches rapids commence.

N 45 E 7.50

N 75 E 7.55

S 30 E 8. 4

S 80 E 8.13

N 40 E 8.29

S 80 E 8.32

N 55 E 8.37

N 42 E 8.40 rapids end.

Breakfast 10.7

N 42 E 10.35 rate per log 5 perches.

N 28 E 10.51

N 15 E 10.58

N 8 W 11. 0

N 12 W 11.12

N 10 W 11.43 lost 15' rate per log 3 perches.

N 20 E 11.46 rate per log 5 perches.

Dinner 2. 3

N 20 E 2.30 at 2<sup>h</sup>19' slate quarry on the left and a Creek.

N 55 E 2.23 'Isle de Chevreuil' (Deer island).

N 40 E 2.39 lost 3' — Free stone and blue slate to the left.

N 5 W 3.11 strong rapids rate per log 3 perches — Bayu de prairie de Champignole on the left.

N 32 E 3.28 Thermometer 59° —

N 45 E 3.46

S 85 E 3.51 lost 11', rate per log 5½ perches.

N 53 E 4. 7 Encamped:— made 6 miles 118

1804 }  
December }

perches—Thermometer at 8<sup>h</sup> p.m.  
38° extremes 30°–59°.

Monday 3<sup>d</sup> Thermometer in air 38° in river water 48°  
— clear — calm — river fallen 8  
inches.

set off at 7<sup>h</sup>12'

N 35 W 7.20 rate per log 5 perches.

N 20 W 7.31

N 10 E 8. 4 lost 8'.

N 30 W 8.26 'Bayu de l'eau froide' on the left.

N 30 E 8.45 lost 3'.

breakfast 9.50

S 70 E 10. 8 rapid; rate 3 perches:

N 75 E 10.20

N 10.40

N 10 E 11. 4 lost 18'. rate per log 6 perches.

S 15 E 11.28 rapids 3 perches per log.

E 11.40 rate per log 5 perches, landed to  
observe ☉ ap: mer: db̄le alt: 66°  
12' 00" In: er: + 13' 48".5 lati-  
tude found 34° 21' 25".5.

Dinner 1.45

N 35 E 2. 6 rate per log 3 perches.

N 2.15 rate per log 5 perches.

N 25 E 2.42 lost 22'.

N 60 E 2.48 rate per log 3 perches.

N 40 E 2.53

N 10 W 3. 8 lost 5' rate per log 5 perches.

N 20 E 3.13

E 3.28 lost 13'.

N 45 E 3.32

N 80 E 3.35 rate per log 3 perches.

N 45 E 3.45 rate per log 4 perches.

N 4. 1 at 3.57 rock promontory, hard

flint, on the right with masses in the river. } 1804  
 } December

N 30 W 4<sup>h</sup>18' arrived at the 'Chuttes' passed over and encamped.  
 river 200 yards wide.  
 made 7 miles 218 perches —  
 Thermometer at 8<sup>h</sup> p.m. 44° extremes 38°-59°

Tuesday 4<sup>th</sup> Thermometer in air 36° in river water 48° clear — calm — river fallen 2 inches.

set off at 7.21

N 45 W 7.34 rate per log 4 perches.

N 25 W 8.15 at 8<sup>h</sup> passed a ledge of hard free stone rocks — rocky bottom, high rocky hill in front covered by pines a fine situation 350 feet high.

N 60 W 8.25

W 8.33

Breakfast 9.59

W 10. 9 rate per log 2 perches.

N 45 W 10.12 rate per log 4 perches.

N 20 W 10.15

N 20 E 10.24 at 10.20 bald hill on the left — arrive at the rapids.

N 50 E 1/2 mile: a very violent rapid. landed to observe ☉ ap: mer: dble alt: 65° 47' 4" In: er: + 13' 44" latitude found 34° 25' 48".

Dinner 1.45 rocky pine hill 300 feet high on the right.

N 20 W 1.52 rate 5 perches.

N 60 W 1.55

1804 }  
December }

N 85 W 2<sup>h</sup> 3' rate per log 6 perches : hills of blue slate (or shistus) to the left.

S 80 W 2.17

N 40 W 72 perches — violent rapid, long detention.

S 80 W 112 perches — encamped — 'Bayu de la Saline' on the right, made 4 miles 164 perches — Thermometer at 8<sup>h</sup> p.m. 36° extremes 36° — 50°.

Wednesday 5<sup>th</sup> Thermometer in air 23° in river water 47° — serene — calm — river fallen 2 inches.

Set off at 7.25

S 70 W 8. 2 lost 25' — rocky hills on both sides — rate per log 5 perches.

S 55 W 30 perches — a violent rapid or cascade 4½ feet fall in 80 yards.

Breakfast 10.57

S 70 W 11.15 rate per log 6 perches.

W 11.20

N 50 W 11.29

N 40 W 144 perches, a strong rapid. — rocky hills on the right — high freshes 25 feet perpendicular above the present level of the river, at the end of this reach on the right a creek, called 'Fourche a Tigre' (Tiger Creek) good land upon this Creek.

Set off at 1.45

S 80 W 1.55 rate per log 4 perches.

Dinner 3.50

W 3.55



{ 1804  
December

N 70 W 4.<sup>b</sup>23' rate per log 3 perches.

N 45 W  $\frac{1}{4}$  mile.

Set off at 4.54

N 45 W 4.59 rate per log 3 perches.

S 45 W 5. 1 Encamped made only 3 miles  
128 perches. Thermometer at 8<sup>h</sup>  
p.m. 38° extremes 23°-56°

Thursday 6<sup>th</sup> Thermometer in air 45° in river water  
48° cloudy—wind S.W. light—  
river fallen 2 inches.

Set off at 7.40

S 45 W 7.52 rate 4 perches.

S 30 W 8. 7 hills to the left, good land to the  
right.

S 55 W 8.20 lost 4'.

N 80 W 8.37 lost 12'.

N 30 W 8.52 lost 2'.

Breakfast

N 20 W  $\frac{1}{2}$  a Mile : a great rapid, very pre-  
cipitous : 3 hours in getting over.

Set off at 1. 8

S 75 W 1.16 rate per log 5 perches, arrived at  
Ellis' camp a little below the  
'Fourche a Calfat', encamped  
made 2 miles and 32 perches,  
thermometer at 8<sup>h</sup> p.m. 56° ex-  
tremes 45°-67°.

S 25 W the course up the river, Calfat's  
mouth  $\frac{1}{2}$  a mile upon the left.

AT ELLIS CAMP.

Friday 7<sup>th</sup> Thermometer in air 38° in river water 47°  
cloudy, wind N.W. river risen 4

1804 }  
December }

inches. Took the Sun's ap: mer: dble alt:  $64^{\circ} 59' 47''$  In: er: +  $14' 5''$ . latitude found  $34^{\circ} 27' 31''$  Thermometer at  $3^h$  p.m.  $50^{\circ}$  at  $8^h$  p.m.  $24^{\circ}$

Saturday  $8^{th}$  At Ellis' Camp. Thermometer before sunrise  $10^{\circ}$  — river water  $43^{\circ}$  — very serene — light wind N.W. river risen 4 inches. Took the Sun's meridian ap: dble alt  $64^{\circ} 46' 58''$  In: er: +  $14' 19''$  latitude found  $34^{\circ} 27' 27''$  being a difference of  $4''$  from the result of yesterday: if we should not make any more observations here for the latitude it may be considered as fixed at  $34^{\circ} 27' 29''$ . Thermometer at  $3^h$  p.m.  $47^{\circ}$  at  $8^h$   $26^{\circ}$

## HOT SPRINGS.

Having determined to ascertain the latitude and longitude of this place with all due care and attention, the following series of observations was instituted for the latitude, using alternately the face of the Circle of reflection to the east and to the west, and reading off the angle from the three arms of the Index; but finding the Index error lyable to change daily, I found it preferable to calculate each days latitude independently by itself, to that of taking the means of several days altitudes, more especially as we were approaching the Solstice; but I have preserved the results of the same face of the Instrument as one series, and taken the mean of the two series for the true Latitude.

## Face of the Circle to the East.

{ 1804  
December

|                                     |   |           |  |                     |                        |
|-------------------------------------|---|-----------|--|---------------------|------------------------|
| Decr. 15 <sup>th</sup> : Ap : mer : | dbl̄e alt : ☉ lower limb.               |           | 1 <sup>st</sup> Index 63-35'- 0''  | In : er : +15'-48'' | Latitude               |
|                                     |   |           | 2 <sup>d</sup> D <sup>o</sup> 63-34 -30                                  | . . . . .           | 16 -13                 |
|                                     |   |           | Means 63-34 -45  | . . . . .           | 16 - 0.5 -34°30 -56.78 |
|                                     |   |           | 3 <sup>d</sup> Index under the handle could<br>not apply the Microscope. |                     |                        |
| 17 <sup>th</sup> . . . . .          | 1 <sup>st</sup> Index 63-25 -10         | . . . . . | 15 -48   |                     |                        |
|                                     | 2 <sup>d</sup> D <sup>o</sup> 63-24 -40 | . . . . . | 16 -13   |                     |                        |
|                                     | Means 63-24 -55                         | . . . . . | 16 - 0.5   | 34-30 -58.2         |                        |
| 25 <sup>th</sup> . . . . .          | 1 <sup>st</sup> Index 63-23 -50         | . . . . . | 15 -26.6   |                     |                        |
|                                     | 2 <sup>d</sup> D <sup>o</sup> 20        | . . . . . | 15 -51.6   |                     |                        |
|                                     | Means 63-23 -35                         | . . . . . | 15 -39.1   | 34-30 -58.75        |                        |
| 27 . . . . .                        | 1 <sup>st</sup> Index 63-34 -50         | . . . . . | 13 -33.6   |                     |                        |
|                                     | 2 <sup>d</sup> D <sup>o</sup> 20        | . . . . . | 14 - 3.6   |                     |                        |
|                                     | Means 63-34 -35                         | . . . . . | 13 -48.6   | 34-30 -54           |                        |
|                                     | Mean Latitude of the above              |           |  |                     | 34-30 -56.94           |

## Face of the Circle to the West.

|                                   |  |           |                                   |                       |                     |
|-----------------------------------|--|-----------|-----------------------------------|-----------------------|---------------------|
| 16 <sup>th</sup> Ap : mer : dbl̄e | alt : ☉ lower limb                                       |           | 1 <sup>st</sup> Index 64° 1'-20'' | In : er : -16'-11.2'' |                     |
|                                   |  |           | 2 <sup>d</sup> D <sup>o</sup> 37  | 42.2                  |                     |
|                                   |  |           | 3 <sup>d</sup> D <sup>o</sup> 20  | 12.2                  |                     |
|                                   |  |           | Means 64- 1 -26                   | . . . . .             | 16 -21.9 -34°31 - 4 |
| 24 <sup>th</sup> . . . . .        | 1 <sup>st</sup> Index 63-51 -50                          | . . . . . | 15 -41.4                          |                       |                     |
|                                   | 2 <sup>d</sup> D <sup>o</sup> 52 -20                     | . . . . . | 16 -13.4                          |                       |                     |
|                                   | 3 <sup>d</sup> D <sup>o</sup> 51 -50                     | . . . . . | 15 -48.4                          |                       |                     |
|                                   | Means 63-52 - 0  | . . . . . | 15 -54.4                          | -34-31 - 0            |                     |
| 26 <sup>th</sup> . . . . .        | 1 <sup>st</sup> Index 63-58 -30                          | . . . . . | 15 -28.5                          |                       |                     |
|                                   | 2 <sup>d</sup> D <sup>o</sup> 59 -00                     | . . . . . | 15 -48.5                          |                       |                     |
|                                   | 3 <sup>d</sup> D <sup>o</sup> 58 -32                     | . . . . . | 15 -28.5                          |                       |                     |
|                                   | Means 63-58 -41  | . . . . . | 15 -35.2                          | -34-31 - 4.2          |                     |
|                                   | Mean Lat. from ye 2d series . . . . .                    |           |                                   |                       | 34-31 - 2.75        |
|                                   | Mean D <sup>o</sup> from ye 1 <sup>st</sup> do . . . . . |           |                                   |                       | 34-30 -56.94        |
|                                   | Cabin at the hot springs true Latitude . . . . .         |           |                                   |                       | 34-30 -59.82        |

Note the Index error was every day taken from a double contact of the Sun with his image immediately after the observation : When the error was additive

1804 } it was found by subtracting the  $\odot$  diameter from the  
 December } greater contact and when subtractive the lesser contact was subtracted from the diameter, but in practice the greater or lesser contact was added to the ap : dble alt : to save trouble, as explained in the beginning.

Courses taken from the hill west of the hot springs on the 13<sup>th</sup> of December 1804 with computed distances.

1<sup>st</sup> Station.

- N 54 E  $\frac{1}{2}$  mile to the Cabin.
- S 61 E 6 miles to the river Camp.
- S 36 E 6 d<sup>o</sup> to the mouth of Hot spring fork.
- S 18 E 6 do to the mouth of Luke fork (west side of the river Washita.
- S 10 W 9 do .. to .. do of Mont-cerne (west side) —
- S 16 $\frac{1}{2}$  W 11 do to the top of Mont-cerne.
- S 76 W 1 $\frac{1}{2}$  mile to the Source of the Hot spring creek.
- S 76 E 3 miles to a hill in the fork of Calfat creek.
- N 32 E Course of the ridge looking back.
- S 60 W to 2<sup>d</sup> station being about a mile in a direct line making a Cord to the arched form of the ridge. — Courses from 2<sup>d</sup> Station.
- S 11 W to Mount-Cerne.
- N 64 W to the passage of the river between the hills about 12 miles distant.
- S 3 W to the mouth of Bayu-Mont-cerne:  $\frac{1}{2}$  mile S.E. a great rapid or Cascade below the mouth of Bayu Mont cerne.

- S 48 E to the mouth of Hot-spring creek.
- S 72 E to the River Camp.
- N 50 miles, ridge of hills of the Arcansa.
- S.E. 50 miles a level of great extent, supposed to be the prairies of the Red-river.

{ 1804  
December

Sunday 16 Took the Sun's magnetic azimuth before and after noon with the same altitude.

A.m. at 9<sup>h</sup>- 50'-19" ☉ lower limb db̄le alt: 47° 30'.

p.m. time missed mag : az : S 42° 20' E  
d. S 25° 40' W  
difference 16-40  
Var. E 1/2 dif-8- 20

Correction for change of declination. + . . 7"

Equal altitudes ☉ ap: db̄le alt: 54° 27' In: er: + 15' 46".

|   |        |
|---|--------|
| Contact upper limb at 10 <sup>h</sup> 18'-59" | } A.M. |
| Center 21 -56                                 |        |
| lower limb 24 -59                             |        |
| lower limb at 1-42 -12                        | } P.M. |
| Center 1-45 -15                               |        |
| upper limb 1-48 -12                           |        |

Took the following distances of the ☉'s east limb from α Arietis.

|    | Times       | Distances   | Times       | Distances   | Times       | Distances   |
|----|-------------|-------------|-------------|-------------|-------------|-------------|
|    | 10h 31' 50" | 55° 38' 20" | 10h 39' 11" | 55° 41' 20" | 10h 47' 12" | 55° 44' 50" |
| At | 10 33 57    | 55 39 10    | 10 41 53    | 55 42 40    | 10 50 12    | 55 45 55    |
|    | 10 36 46    | 55 40 10    | 10 44 49    | 55 43 45    | 10 53 48    | 55 47 20    |

Index error  
- 16' 16"

The above may be commodiously divided into 3 Sets or otherwise at the pleasure of the calculator.

1804  
DecemberMonday 17<sup>th</sup>

## Equal Altitudes

|  |                        |   |
|--|------------------------|---|
| ☉ ap: dble alt: 45° 49'.               | ☉ " In: err: + 15' 48" | } Magnetic az: S 44° 30' E<br>with the Sun's lower limb<br>A.M. |
| Upper limb at 9 <sup>h</sup> 44'.56''½ | } A.M.                 |   |
| Center 9.47.12                         |                        | } P.M.  |
| Lower limb 9.49.30                     |                        |   |
| Lower limb 2.27.57½                    |                        |   |
| Center 2.30.13                         |                        |   |
| Upper limb 2.32.31                     |                        |   |

These equal altitudes together with those of the preceding day will correct the watch and ascertain her rate of going, from which the apparent times of the Lunar distances will be precisely known.

Sunday 23

## Equal Altitudes

☉ ap: dble alt: 43° 42' 25'' In: err: + 15' 27''.

|                                      |  |
|--------------------------------------|--|
| Upper limb at 10 <sup>h</sup> 8' 2'' | } A.M. Watch supposed<br>to have gained 45'. |
| Center 10.10.13                      |  |
| Lower limb 10.12.25                  |  |

The contacts P.M. lost by the intervention of clouds.

Altitudes of the Sun's lower limb with Magnet:  
azim:

At 10<sup>h</sup> 24' 12'' Alt: 46° 31' 5'' Azim: S 43° E.  
10.28.57 47.35.40 S 42 E.

Ind: err: + 15.27.

Monday 24<sup>th</sup>

## Equal Altitudes

|   |                       |
|---|-----------------------|
| ☉ ap: dble alt: 43° 32' 47''            | Ind: err: + 15' 41''6 |
| Upper limb at 10 <sup>h</sup> 12' 33½'' | } A. M.               |
| Center 10 14 43                         |                       |
| Lower limb 10 16 55                     |                       |

Clouds intervened in the afternoon

Wednesday 26<sup>th</sup>

Set the watch back one hour to correspond nearly with the present time, no alteration being made in minutes & seconds.

## Equal Altitudes

|                   |                         |             |           |   |                  |
|-------------------|-------------------------|-------------|-----------|---|------------------|
| ☉ ap : dble alt : | 32°43'.25"              | Ind : err : | + 15' 27" | } | 1804<br>December |
| Upper limb at     | 8 <sup>h</sup> 40 . 5½" | }           | A.M.      |   |                  |
| Center            | 8 .41 .56½"             |             |           |   |                  |
| Lower limb        | 8 .43 .45               |             |           |   |                  |

Clouds intervened in the afternoon.

The last observations having been made when the Sun was barely clear of the vapor of the hot springs, I give the preference to the following observation made for the Correction of the Chronometer & for ascertaining the magnetic variation.

At 9<sup>h</sup> 6' 50" ap : dble alt : ☉ low<sup>r</sup> limb 39° 16' 40"  
Magnet : azim : S 49° E Ind : err : + 15'.27".

## Lunar observations

on the astronomical 25<sup>th</sup> Decem<sup>r</sup> took the following distances of the ☉ and ☾'s limbs

| Times                     | Distances | Dble alt ☉ low <sup>r</sup> limb by Dor. Hunter |
|---------------------------|-----------|---|
| At 22 <sup>h</sup> 5'.29" | 58°14'.0" | In : er : -15' 27"                              |
| 22. 8 . 5                 | 58.13 .0  |   |
| 22.11 .10                 | 58.12 .0  | . . . . . 53°57'.30" Ind : err : -1'22".5       |
| 22.19 . 0                 | 58.10 .0  | . . . . . 55.27 .10                             |
| 22.22 . 5                 | 58. 9 .0  |   |
| 22.25 . 0                 | 58. 8 .0  |   |
| 22.39 . 7                 | 58. 4 .0  |   |
| 22.42 . 0                 | 58. 3 .0  |   |
| 22.44 .35                 | 58. 2 .0  | . . . . . 59.12 .10                             |
| 22.48 .40                 | 58. 1 .0  | . . . . . 59.43 .15                             |
| 22.54 .37                 | 57.59 .0  | . . . . . 60.25 .20                             |
| 22.57 .47                 | 57.58 .0  | . . . . . 60.46 .20                             |

## Survey of the hot-spring Hill.

1<sup>st</sup> Station or place of Commencement on the west bank of the Creek opposite to the first or highest mass of Calcareous matter ; Courses taken at this Station : N 40° E up the Valley adjoining the hot-spring hill ; and N 15° W the course of the Creek upwards : Thence

1804 }  
December }

S 20° E 18 perches to the bank of the Creek on the same side.

At 8 per : opposite to the middle of the Natural hot-bed over the Creek, a small hot-spring at its commencement. At 14 per : a hot-spring N° 3 opposite side of the Creek.

S 25 W 14 per : to the hot-spring N° 4 six feet to the left in the side of the bank of the Creek. At 2 per : hot-spring N° 1 opposite side of the Creek : at 12 per : hot-spring N° 2. over the Creek distant 4 perches.

S 3 E 34 per : nearly parallel to the Creek.

At 7 per : the Center of the Cabin on the right hand, and spring N° 5 in the gravel over the Creek : at 20 per : several small springs over the Creek : at 22 per : the lowest hot-spring N° 6. — All the forgoing Courses have been nearly parallel to the Creek, the continuation of which is S 13° E.

S 42 E 20 per : immediately cross the Creek, and at 4 per : the lowest calcareous mass.

N 60 E 106 per : At 60 per : the valley on the right distant 20 per :

S 66 E 30 per : to the Valley base of the hill : at 20 p. yellowish schistus.

N 60 E 60 per : N.E. corner of the base of the hill.

N 23 E 174 per : — 60 per : to the left the ridge is parallel to the Course.

N 16 E 70 per : to a rocky ridge perpendicular to the course and precipice looking



down into a branch of the Cafat run-  
ning to the right; the Creek above  
winds into the direction of the last  
course, the ridge to the left divides  
the Cafat from the hot-spring Creek.

{ 1804  
December

N 44 W 30 per

S 84 W 72 per : to the top of a high ridge very  
narrow, connected with the hot-spring  
hill.

S 45 W 60 per : descending the Valley : The top  
of the hill west of the Camp is in the  
direction of the course : at right angles  
on the left at the end of the course  
 $\frac{1}{4}$  mile distant is a gap or low place  
in the ridge contiguous to the hot-  
spring hill.

S 31 W 80 per : down the valley — veins of the  
flinty rock nearly in the direction of  
the course and fissures at right an-  
gles: Flint and hard siliceous stone  
above, Schistus at the base — and  
from thence to the place of begin-  
ning nearly in the course of the Val-  
ley.

Courses and distances from Hot-spring Camp to  
the river Camp, commencing at the Cabin — Thence

S 15° E 788 per : — to the 1<sup>st</sup> Knoll 122 p. — to  
the 1<sup>st</sup> branch 162 p. to the 2<sup>d</sup> branch  
282 p. — to 3<sup>d</sup> d° 322 p. — to 4<sup>th</sup> d°  
502 p. — to crossing of hot-spring  
creek 614 per : and at the end of the  
course a branch.

N 80 E 70 per : to the top of a ridge.

- 1804 } S 69 E 184 per : to the 2<sup>d</sup> branch.  
 December } S 25 E 160 per :  
 S 68 E 80 p. to the Big lick.  
 N 55 E 200 p. to the 2<sup>d</sup> lick — at 160 p. 3<sup>d</sup>  
 branch.  
 N 82 E 534 p. to the 5<sup>th</sup> branch — at 168 p. the  
 4<sup>th</sup> branch.  
 S 84 E 122 p. to the main Calfat — at 56 p. cross  
 the last branch. the course of the  
 Calfat is S 38° E.  
 S 74 E 178 p. to the 3<sup>d</sup> lick.  
 S 54 E 304 p. to the river Camp. — at 94 p. a  
 — branch.

1805 } 2620 perches, equal to 8 miles 60 perches.  
 January } Saturday 5<sup>th</sup> At Ellis' Camp.

Equal Altitudes.

ap: dble Alt: 43° 18' 30".

|               |                        |                  |
|---------------|------------------------|------------------|
| Upper limb at | 9 <sup>h</sup> 43' 10" | } A.M. Ind: err: |
| Center        | 9. 45. 12              |                  |
| Lower limb    | 9. 47. 19              |                  |
| Lower limb at | 2. 59. 22              | } P.M. Ind: err: |
| Center        | 3. 1. 27               |                  |
| Upper limb    | 3. 3. 33               |                  |

As the same instrument was to be used for various purposes on the same day, the Index set for equal altitudes could not be screwed up until the afternoon observation, and as the Index error was liable to change in the course of the day particularly when used much in the sun-shine, it is accordingly noted in the last example; the slight error it might occasion, would not materially affect the result.

Took the following alt: and azim: to ascertain the magnetic variation:

At 10<sup>h</sup> 3' 42" a.m. ☉ ap: dble alt: low: limb

47° 21' 10'' Magnet : Azim : S 46° Ind : err : + 13' 15'' } 1805  
 { January

At noon the ap: dble alt : ☉ low: limb was 65° 8' 40'' Ind : err : + 13' 9''.

Lat: deduced 34° 27' 28''.8 which is within 0''.2 of the mean of the former two observations.

Distances taken between the ☉ and ☽ limbs

At 2<sup>h</sup> 22' 45'' Distance 54° 1' 0'' Ind : err : + 13' 5''  
 2. 25. 50 . . . 54. 2. 0  
 2. 28. 45 . . . 54. 3. 0

Distances taken of the ☽'s west limb from Aldebaran

At 7<sup>h</sup> 1'. 56'' Distance 84° 52'. 0'' In : er : + 13' 5'' Alt : dble ☽'s low: limb  
 64° 17' 30''  
 7. 4. 0                      84. 51. 0                      In : er : — 1. 20  
 7. 6. 6                      84. 50. 0                      by D<sup>r</sup> Hunter

January 14<sup>th</sup> Monday. At a point which we passed in ascending Nov: 14<sup>th</sup> — N 40° E 5<sup>h</sup> 6'. observed an Eclipse of the Moon.

At 12<sup>h</sup> 40' p: watch. Beginning of the Eclipse — uncertain.

13.37                      Beginning of total darkness  
 — good observation.

Took the following altitudes of the Sun to correct the Chronometer and ascertain the apparent time of the Eclipse.

15<sup>th</sup> Tuesday

At a point on the river bank which corresponds to the Courses and distances of our voyage upwards viz Nov: 14<sup>th</sup> N 10° W 8<sup>h</sup> 8½'; took the Sun's alt. viz at 10<sup>h</sup> 56' 24''. ap: dble alt low: limb 66° 36' 45'' Ind : err : + 12' 20''.

Thursday 17<sup>th</sup>

At the Post of Washita, the same station where

1805 } we observed on our way up, Took the Sun's altitude  
 January } viz:

At  $8^h 53' 7''$  ap: dble alt:  $\odot$  low. limb  $36^\circ 44' 45''$   
 In: er: +  $12' 30''$ .

From the above observations the apparent time of  
 the Eclipse may be found & the whole refered to the  
 Meridian of the Post of the Washita.



The Riverside Press : Cambridge









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