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St. Louis, 7th Jan. 1824
GEN. WM. RECTOR,
Surveyor of U.S. Lands, &-c.

SIR,

I herewith make return to your office of the original field notes of the Western boundary line of the State of Missouri and of the South boundary, together with a map of the same so far as I have been able to complete the said business under my appointment from you of the 22d July, last.

In my letter to you of the 2nd. August, I informed you of my intention to run the west boundary of the State first, and for the following reasons, to wit: that I considered the spirit of my instruction to be directed to the object to be accomplished rather than to the order of doing it, that the south boundary at the west end of it could not be finished until the west boundary should be run, that high waters on the Mississippi and St. Francis rendered it impossible to begin there, that the additional expense to run the west boundary would be only for as much time as it would take to survey the line above that of traveling along the same without surveying it, that by running the west boundary first there would be no more travel to do the whole than to do the south boundary, only that I thought the appropriation sufficient for the whole, provided the west boundary were run first, but that it would not be sufficient otherwise, & that the health of the party, and consequently the success of the expedition would be prompted by the western route.

Under these considerations as soon as I had made the necessary preparation, I proceeded to the mouth of the Kansas river, on the Missouri, & from the middle of the mouth of that river ran a due south line, until I arrived at the point of latitude which agreeably to my observations was 36°30' north, at which point I set a hewn lime stone rock marked as stated in the field book, on the north side Missouri with the date, on the south side, Arkansas on the west, U.S. and on the east lat. 36°30' -I then proceeded with the south boundary eastward on that parallel of lat. To the St. Francis river and I regret that the _____tion of the country and my condition were each as deterred me from proceeding any farther,--There remains therefore yet to be ran a line half a degree farther south, from the St. Francis to the Mississippi a distance of about 30 miles, and the St. Francis to be meandered from one line to the other, through that half degree.

The west boundary with the exception of five or six miles of timber on the Missouri, and some very narrow strips on the creeks which I crossed, rose through a prairie country, 130 miles, to a beautiful stream of the Arkansas, called the Pomme de Terre about 100 yards wide, shallow and rocky, it runs westwards into the Neosho, it is much larger than the Marias de Cygne, (the largest fork of the Osage river which I crossed 61 miles from the Missouri.)

The land between the Osage and the Missouri is generally good, much better than that, south of the Osage. From Pomme de Terre to the south west corner of the State, there is but little prairie. It is chiefly thin Post Oak land that lies well but which is in many places very stony. We found along the west boundary several beds of stone coal, which are particularly noticed in the field book, also ocar one of them on the bed of a creek a single piece of good lead ore, the only one of any sort found in all the route.

The south boundary is almost entirely thro' a wood country chiefly post oak poor and stony, and the greater part extremely hilly. About the head of White river there are pine knobs, the pine is not extensive. Immediately on the rivers are some small spots of good bottom land, but no good up land at all, not even of secondary quality, except a very little in the last 20 miles before I reached the swamp lands which extend from Little Black to the St. Francis.

Generally the country is well watered, particularly the south boundary abounds with excellent springs, and no doubt many places might be found desirable to settle on, which in running a straight line I did not see. After leaving the Missouri until I had run 83 miles on the south boundary to where I crossed white river the second time I saw no inhabitants there a few families were settled once seven years ago when I ran the Osage Indian boundary, there is a very obvious diminution of game.

On the western boundary I fell to with ten lodges of the Osage Indians, by means of the interpreter which I had taken along, I explained to the object of running the line through their country, they made no opposition but

appeared satisfied and treated me with much respect: one of them a son of one of the chief- went on with me to the corner of the state from whence he returned to his hunting party.

In prosecuting the work I was a good deal troubled by the irregularity of the magnetical variation. From the Missouri river I ran at $11^{\circ}8'$ east variation, at 25 miles on the line it was 8 minutes more but immediately began to decrease and in the distance of 36 miles more the variation was no more than 10° east. Not suspecting any such change, I had to correct this distance of 36 miles as stated in the field book. Again the variation increased to $10^{\circ}36'$, as observed at the south west corner of the state. The intermediate observations of the variation are entered in the field book. By measurement the west boundary from the Missouri river to the southwest corner of the state, It is almost to exactness 177 miles. Where there was timber I had the line very plainly marked and at the end of every mile, is taken the course and distance to two trees adjacent, which trees have the number of miles marked on them in regular progression to the corner, from the Missouri, and again from the corner to the St. Francis. In the prairies at the end of each mile except prevented by stone or gravel I caused a mound of sod to be raised 3 feet high and 3 feet broad at the base, except as to the 36 miles which was corrected. I did not raise another set of mounds on the true line particularly as in this distance and at the distance of forty-five miles from the Missouri the line passes over a very remarkable mound-like hill, as is represented on the map, and on the top of which where the line passes, I had a stone set in the earth and a mound of lesser stone made round it, also from this place and from other places intersecting courses are taken to such natural objects as are permanent and striking, and there is a considerable number entered in the field book. The south boundary line crossed the Osage Indian boundary line at the distance of 24 miles, 49 chains; I had placed at the intersection a hewn lime stone as at the corner: at 46 miles the line crossed White river coming from the south-west, at $83\frac{1}{2}$ miles crossed White river again; at $84\frac{3}{4}$ miles again crossed White river, and also again at the end of 86 miles, at $95\frac{3}{4}$ miles cut a bend of White river for the last time, from whence the river bears south-east. At $180\frac{1}{2}$ miles is the river Eleven Points, at 188 miles 69 chains 60 links crossed the fifth principal meridian at a point 28 chains and 50 links south of the corner to townships 21 north and 22 north; at $200\frac{1}{4}$ miles is the Current river; at 104 miles, enters swamp lands of Little Black river, & it continues swamp to the St. Francis river, 232 miles 27 chains and 10 links.

The measured length of the south line _____ of the state is not so much by _____ 8 miles less.

Through such a country it is impossible to measure correctly. I was forced to reduce my chain to 25 links in order to come at something like the horizontal distance across the country; near or quite 100 miles were measured by such a chain, although it were greatly desirable that the lines should be correctly measured. I considered their locality much more important and I regret that I had not a nautical almanac to enable me with more precision to locate the south boundary. I had only the tables in the 5th edition of Bowditches Navigator; In which the declination of the sun and of the principal stars is set only to the nearest minute. I had no table of the sun's diameter and had to measure that with the sextant.

The observations by which the south-west corner was located as well as all the observations taken on the line are entered as taken in the field book. I have now in hand a Nautical Almanac by which I have made the corrections on all the stars by me observed & whose places are given in the Nautical Almanac, and also on all my observations on the sun. The difference is much less than I had any reason to expect. The observations or rather the deduced latitude, from the observations entered in the field book stand as follows,

The mean of 11 observations of the sun taken October 6th	36 27 20 6.
The mean of 15 observations of the sun taken October 7th	36 27 27 7

The following stars taken on the night of October 7th

Fomalbant	36 26 59 4
Rigel	37 27 40 5
Orionis 7th star in Almanac	36 27 02 0
Syrios	36 27 42 5

	218 44 12 7

	36 27 22 2

The mean of all these observations differ only one tenth of a second from the observations by which the corner was fixed.

The 15 observations of the sun on the 7th October, calculated by the tables I then had, and the mean taken was $37^{\circ} 27' 22''$ although by the nautical almanac corrected, it stands as above. From the point where these observations were made, I set back for two minutes and 38 seconds, to wit, 3 miles 3 chains and 16 links. I there set the corner of the state and after running one mile of the south boundary took six observations of the sun on the 18th October by the mean of those observations, as corrected by the nautical almanac, the latitude of the hoe at that place appears to be $36^{\circ} 30' 4''$, at the intersection with the Indian boundary by the mean of 5 observations of the sun on the 22nd October, the latitude appeared to be $36^{\circ} 30' 21\frac{1}{2}''$ at the distance of 83 miles on the line by mean of 5 observations on the sun 8th November the latitude appears to be $36^{\circ} 30' 25\frac{1}{2}''$ at 95 miles, on the night of 11 Nov. observed the following stars, which corrected by the nautical almanac, the latitude is as follows,

Rigel	36 30 14 9
Orionis 7th star in in N. Almanac	36 29 49 8
Syrius	36 30 47 3
Procyon	36 30 16 7

Mean latitude	36 30 17

At 12 miles 18th Nov. by the mean of 11 observations of the sun, by the Nautical Almanac, the deduced latitude, is, $36^{\circ} 30' 16\frac{1}{2}''$, at the meridian 188 miles 69 ch. 60 links, on the 30th Nov. by a mean of 12 observations of the sun deduced latitude by the Nautical Almanac is $36^{\circ} 30' 31''$ &, on the night of the same day by the following stars corrected by Nautical Almanac, observations taken at same place.

Regel	36 30 11 2
Orionis 7th star, in N. Almanac	36 30 7 4
Syrius	36 30 25
Procyon	36 30 20 1

Mean latitude	36 30 15 9

In tracing a parallel of latitude such as I had to do, the various sights that I took to trace the line, being a succession of tangents to the meridian, tended to the south of the true direction, but the decrease of magnetical variation had a much greater counter tendency to the north. I have stated the variation at the corner to be $10^{\circ} 36'$, at the river Eleven Points 100 miles on the line the variation was just 9° east. My pack horses being here broken down and being unwilling to incur so much expense as to purchase more, I determined to leave the Theodolite with such of the hands as staid to take care of the baggage and pack horses and with our clothes in our knapsacks to finish our work, trusting to our hunter for provisions; and with difficulty we made out to get to the St. Francis for we were in a low flat country, abounding with wet slashy places and cypress _____ for nearly 30 miles. I had taken the sextant along intending to take observations on the St. Francis at the end of the line, and if I could do so, to descend the river and finish the other line, but I did neither. We were much exhausted by the weight of our packs and want of food, the weather was cloudy and had been so for several days. The lower line I had reason to suppose was through deeper swamps than those we had passed, and I considered that our safety was concerned in getting out as soon as possible. On the south boundary I made no off set, no correction, and when the difficulties of tracing a parallel of latitude through a country so rough and where the magnetical influence is irregular, are considered, I hope a few seconds deviation from the true locality of the line, will be viewed with indulgence.

Contrary to my expectations the expenses have exceeded the appropriations as you will see by the account herewith rendered, I was mistaken in my estimate of the time it would take and after I had made what I considered the necessary out fit, I was obliged to incur further expenses for a dearbourn to transport the Theodolite, and for a horse after I had finished to enable me to return with my books and instruments. I also supposed that on my return the baggage and horse would sell for half their cost, but unfortunately I lost eight horses, half of that number of our best, that strayed off or were stolen by the Indians, the others broke down for want of food, the Indians for the sake of hunting having burnt nearly the whole country where the south boundary passed. The horses and baggage returned with sold almost for nothing, & our time was protracted by sickness on the lines. Believing that my expenses would not exceed the appropriation, I thought it my duty to do as I have done, and although it has turned out otherwise, I hope that provision will be made to pay me for my personal services by a further appropriation for the balance which is 600 dollars. I imagine that it is not material whether the line that remains be run shortly, for the country through which it passes will perhaps never be inhabited. If however it be deemed important by a reason of the great highway, the Mississippi, I suppose the expense of running it would be seven or eight hundred dollars, for it would take at least a month and a half to do it, the whole being through swamps and cane brakes. Should you deem any of the vouchers insufficient to found the corresponding charge in the account, generally, I can procure such as will be sufficient. The instruments received from you and the watch and books, I have in possession. The boxes in which the instruments were put, have split and cracked by the sun so that it is necessary to have others made. I have therefore not yet returned them but am ready to do so if wanted. I will here observe that one of the levels of the Theodolite is and was when it came to hand entirely useless, the glass not being made full enough with the spirit to show any thing like a bubble.

I am respectfully,
Your obedient st.

JOS. C. BROWN