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REPORT OF A RESURVEY  
of  
TEXAS AND PACIFIC RAILWAY LANDS  
in the  
80-MILE RESERVATION

MADE IN 1930-31 FOR KLOH, RUMSEY & ASPAMS

Preamble. - The lands covered by the resurvey are those lands originally surveyed by Jacob Kuechler, in 1878-79, for the Texas and Pacific Railway Company in what is known as the 80-Mile Reservation. This reservation is a strip 80 miles wide with its north line on the 32nd parallel of latitude (the South Boundary of New Mexico) and extending from approximately the Southeast corner of New Mexico to the Rio Grande. The lands surveyed by Kuechler and appropriated by the Railroad Company out of its reservation and on the basis of Kuechler's survey lie in the present counties of Reeves, Jeff Davis, Culberson, Hudspeth and El Paso. Prior to Kuechler's survey the Texas-New Mexico boundary had been surveyed and monumented, by Clark in 1859, and several location lines for the Texas and Pacific Railroad had been run; the H. & G. N. RR surveys along the Pecos River and numerous Spanish and Mexican grants along the the Rio Grande had been surveyed or, at least, existed of record. Otherwise this was virgin territory, unsurveyed, except for a few preemption claims, notably around the Salt Lakes and at Eagle Spring. Two, or more, stage routes crossed the country but there was no railroad west of Weatherford.

The Original Survey. - Jacob Kuechler was employed by the Texas and Pacific Railroad Company to survey, file certificates and return field notes on lands in the 80-Mile Reservation under the Railroad's grant from the State of Texas. His authorization and instructions are given in the two letters quoted in full below:

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Marshall, Texas  
August 31, 1878

Hon. Jacob Kuechler  
Austin, Texas

Dear Sir:

You are hereby appointed Principal Land Surveyor of the Texas & Pacific Railway Company, and acknowledgement is hereby made that you are legally entitled to act as such, you having qualified by making the necessary oath and filing proper bond.

Your jurisdiction will be limited to the district of Country within that portion of the land reservation of this Company situated between the river Pecos and the Rio Grande. Your general instructions are contained in another letter of even date furnished you this day.

Very respectfully yours,

sgd. Wm. H. Abrams

Land Com'r "

Marshall Texas  
August 31, 1878

Hon. Jacob Kuechler  
Principal Surveyor, T & P RY.  
Marshall, Texas

Dear Sir:

You are hereby instructed to organize a surveying party of ten men, and to proceed at the earliest practicable time, to that portion of the land reservation of this Company, between the Pecos and Rio-Grande for the purpose of surveying and appropriating the desirable lands in that Country. The Company still retains some 2600 unlocated land certificates, which it is important should be located as rapidly as possible; say within the next seven or eight months; if the work cannot progress with that degree of rapidity, I desire that proper files be made, that will secure the lands to the Company and afford the necessary time to it to perfect the surveys. Relying upon your good judgment and experience in work of this kind, I leave most all matter of minor detail to your discretion, but would suggest that you make your starting connection with one of the monuments on the boundary line between New Mexico and Texas and further suggest that you commence work near the Pecos and work west.



It is desired that you examine all the reservation west of the Pecos river before your return, providing it is possible so to do within, say one year from this date. You are instructed to locate as many certificates as the examination of the Country may show will be profitable to the Company not exceeding say the number of twenty-five hundred; five hundred certificates will be furnished you today and others on your requisition. It is of the utmost importance to the Company that this work be finished and the field notes of it all deposited in the State Land Office at Austin prior to January 1st, 1880. I would further suggest that you follow up the valleys of the streams and survey the agricultural and other lands, desirable on account of water, timber, etc.

You are hereby directed to make as frequent report to me as circumstances will permit of the progress of your work; especially upon the mineral lands, either coal, iron, copper, silver, gold or salt deposits and will make surveys of all desirable lands of this class, such as will enable the Company to appropriate same at its option. It is probable that to exhaust the large number of certificates, which the Company has remaining, it may be necessary to appropriate a considerable amount of land of value for little else than grazing; this you may do if in your judgment it is advisable. It is desired that the surveys be made as carefully as the time will permit, and if it becomes necessary to do any block work, the exterior corners of the blocks at least be carefully marked and witnessed and connected with prominent and known objects so that their location can at any time be made without difficulty. You will procure from this and the General Land Office such maps and sketches as may be necessary. It is desired that you return me, as circumstances may permit, payrolls of your party properly certified to by yourself. In case of discharge of men or advance on a/c of salaries, take receipts for each month to correspond with rolls, making drafts on me to cover, as per verbal instructions of this date; same instructions as to purchase of supplies.

Yours very respectfully,

sgd. Wm. H. Abrams

Land Com'r "

no 2



Mr. Kuechler took the field in the Fall of 1878, arriving at his starting point (the State line monument on west bank of Pecos River) on October 2nd. He had a party of eleven or twelve men and a military escort of nine or ten men. The lines were run with compass and chain and generally followed the easiest country to traverse, marking the section corners at each mile. Where stone was available rock mounds were built at the corners, usually with one stone marked T.P. with a chisel. Witness bearings were frequently, but not always, taken and recorded. In prairie country, earth mounds were made at corners, usually without witness bearings or other means of preservation. In all, Mr. Kuechler ran considerably more than 1000 miles of line over a briefly described route as follows: from Pecos River up Delaware Creek to the Guadalupe Mountains, thence north to the State line and eastward for several miles; returning to his westward line at the foot of the mountain, he ran south and southeast to San Martine Spring thence on branch lines east and west of Davis Mountains to the south boundary of the 80-mile reservation; returning to San Martine Spring, he ran west and northwest, through the Salt Flat west of Guadalupe Mountains, to Crow Spring on the State line, thence west along the State line to Hueco Mountains, thence southwest to El Paso, thence up the Rio Grande to the State line; returning to El Paso, he ran down river thence eastwardly toward Fort Davis. Mr. Kuechler's lines running east from El Paso apparently got tangled up with the old river surveys, were not permanently marked and seem to have been abandoned by him as he left no record of them that can be clearly followed.

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The field work was completed in March, 1879, and the survey party was disbanded at Fort Concho on April 3, 1879. Three progress reports written by Mr. Kuechler are of interest and are quoted below:

1. "Pine Springs  
Guadalupe Mountains  
October 16, 1878

Dear Sir:

We commenced surveying on the 3rd. inst. and have already taken up the whole Delaware Valley, found good land, excellent pasture and fine springs along the foot of the Guadalupe Mountains. Capt. Letans is stationed here with one Comp. Our cook has resigned today and I paid him off by draft on F. Gross amounting to \$20.20. Please make a deposit with F. Gross & Co. From here I will survey toward Fort Davis and expect to send an Express for my mail.

Very respectfully,

Jacob Kuechler. "

2. "TEXAS & PACIFIC RAILWAY COMPANY  
LAND DEPARTMENT

Marshall, Texas  
November 12, 1878

W. H. Abrams, Esq.  
Land Commissioner, T & P Rwy. Co.  
Marshall, Texas

Dear Sir:

Enclosed herewith, please find Pay Rolls of the Surveying party now in the field, for the months of September and October 1878.

Yours,

Jacob Kuechler,  
Principal Surveyor  
T & P RR Company "

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3.

Fort Davis  
November 20, 1878

W. H. Abrams, Esq.  
Land. Com. T. & P. Rwy. Co.  
Marshall, Texas .

Dear Sir:

I extended the survey to the South Boundary of the 80-mile reservation and find the Head of Toyah Creek within it. The surveyor of Presidio County make some locations on the Head waters of Toyah and returned the resp. field notes to the General Land Office and you may prevent the issuance of patents by filing a protest with the Commissioner of the General Land Office. I have located, up to date, about 720 Land Scrip and have notes for filing about 1000 more. I believe I can dis pose of all your Land Scrip -- about 2300 before the first of January next -- locating and filing this same -- and you may send me as many you think proper to have located. From the Guadalupe Mountains down to the Sierra de los Apaches I passed an excellent pasture country with sufficient water for stock, but poorly timbered. In the mountains I discovered a good many fine springs and found an abundance of timber; oak, juniper, cedar and pine. Our camp is at San Martine Spring, with a part of the men I surveyed South of it, passed Toyah Creek and reached the South Boundary of the Reserve near the Davis Road. Yesterday I arrived here to have a wagon repaired and to buy some supplies and tomorrow we will return to camp and survey up the so-called Salt Creek Valley to Crow Spring and then take course towards El Paso. The next Post Office will be El Paso and I will send for the mail as soon as we are within 30 miles of that place.

Please have paid to my wife, Mrs. Mary Kuechler at Austin, the salary due me for the month of September; I expended here \$378.00 and paid by draft on F. Gross and Company at San Antonio. Please make a deposit with Messrs. Gross and Company for that amount as soon as convenient.

I remain very respectfully yours,

sgd. Jacob Kuechler

Principal Sur. Land, T & P Rwy. Company "



"TEXAS AND PACIFIC RAILWAY COMPANY

Camp below San Elisario, El Paso  
January 18, 1879

Mr. W. H. Abrams, Esq.  
Land Comm. T & P Railway Co.  
Marshall, Texas

Dear Sir:

In accordance with the instructions contained in your communication of the 4th inst. I furnish you hereby with a brief report of work I have done since the 3rd of October ult. We commenced surveying at monument erected on the West bank of Pecos River, by the boundary Com. and followed the South boundary line to the crossing of Delaware Creek. I then surveyed the Valley of Delaware Creek up to the Guadalupe Mts. locating many springs and splendid pasture lands on the East slope of Guadalupe Mts. October 16th we arrived at Pine Springs and camped there until Oct. 24th. During this time I run a line to the boundary of New Mexico and then surveyed East about 15 miles establishing corner at 1900 varas. Grape Spring is situated in New Mexico about half a mile from the line. The monument erected by the Boundary Com. on East side of Guadalupe Mts., I did not find. The Indians probably destroyed it. On Oct. 25th we left Pine Spring taking the old Trail of your surveying party, in the next two camps we had sufficient water, but found horse tanks dry and were compelled to look for Saldito Spring, which we did not find; we then took course for Davis and Pine Spr. road and struck it about noon, being then three days without water. Mr. Dooling with three others started with one wagon and stock to South Delaware for water. November 2nd our teams took the road to Ft. Davis; after traveling six miles we found Saldito Creek; here there was water and excellent pasture. Three days sufficed to locate all the good land, with water, in the Saldito Valley. Nov. 5th our teams and escort followed the Davis road for 12 miles and made a dry camp; the succeeding day we reached the celebrated San Martine Spring, which I located on the 7th. Here we put up camp until the 2nd of Dec. In this period I surveyed down to the South boundary of the reservation, locating the East side of Apache Mts. This land is thickly timbered, well watered and has fine pasture, including the head branches of Toyah Creek with its three forks. "El Perdito", the middle fork, is a strong running stream; the East fork has a large spring which runs for a mile. Close to the road there is a large spring called Seven Springs where at present a detachment of soldiers is stationed. West fork of Toyah Creek has also sufficient water at different parts. I also worked from San Martine Spr. 20 miles East but as the country is level and no chance to establish a corner that can be identified by natural object. I think it improper to spend much time in making corners by stake or stone which only can be found by an actual survey on the ground. Also from San Martine Spr. I surveyed South and located the West side of the Apache Mts. for 12 miles. Discovered two fine springs; this tract of land is closely timbered with Oak and Cedar; the pasture is also very good. Another line I run West crossing a large prairie and a table mountain, but found no water. On 2nd of Dec. we started for the Salt Lake Valley, surveying a large Valley, the course of which is NW and entered the Salt Lake Valley near Maj. Hurt's Pass, on December 6th.

W.H.A.



On the 9th we arrived at a spring West of the Salt Lagoons always following with the line establishing corners and taking up the topography of the country by triangulation; I have bearings of all the prominent Peaks of the Diabolo mountains, and the peaks of that mountain range East of Salt Lakes. We camped at Salt Spring for several days, having there the second snow storm; the first we had at San Martine Spr. On 13th with a heavy frost, our stock suffered very much but still they stood it well. I examined the Salt Lakes carefully. On the 11th I worked ahead, wagons following me the next day; went across the Salt Lakes to the Guadalupe Mts. locating a fine spring; until I reached the South line of New Mexico near Crow Spring on the 17th, I found the increase of variation to be 0 deg 15'. From Crow Spr. I surveyed along the boundary of the New Mexico for 44 miles, found and connected with all the monuments reported by the Boundary Com. except one that is erected on top of a high mountain which I did not cross on account of its highness, avoiding it by an offset. At the monument near the El Paso road Southwest of Alamo, the variation increased to 11 deg. 15' East. On Dec. 25 we had a fierce storm while we were camped in a canyon North of Hueco Mt.; next day we moved camp to Hueco Tanks. On 27th I went back where we had left the line on 25th and brought it to our camp on the 28th. We made for El Paso on the 29th crossing Tuleroso Valley and came into Franklin. On the 30th, the following day, I went to Ysleta to file Certificates and field notes with the surveyor. Jan. 2nd I connected my surveys with the monument recently erected at Franklin by an Astronomer who layed down the true meridian of that place; the variation at this place is 12 deg 15' East. January 3rd we left Franklin surveying up the river to the South boundary line of New Mexico; on the 5th we camped two miles from said line when a severe snow storm set in; no work could be done. The 9th day of Jan., I made my connections with New Mexico line, followed it East for 10 miles and connected with two monuments; one erected on top of a mountain range in the Rio Grande Valley, the other East of Mesillo and El Paso road. I find the South line of New Mexico from Pecos to the Rio Grande about 32 miles shorter than is represented on the map in use in General Land Office. Snow being very deep near the mountains and ground wet, I was compelled to stop for a few days. On 13th inst. we returned to El Paso taking necessary supplies. We left on the 15th going down the Rio Grande Valley. I keep my line as near the old surveys as possible and connect with the same when I have an opportunity. I will continue down this Valley until I reach the South boundary of the 80-mile reservation, obtaining in this way the outlines of the whole reservation. From time to time I will run East as far as I can. From Ft. Quitman I will survey toward Eagle Spring and intend to have camp there for some time, locating the surrounding country and prospecting in the mountains and hope to find the Quick Silver mine about which Mr. Williams communicated to Col. Tom Scott; his letter I found enclosed in your favor of the 6th inst. I heard about this mine when I was recently in Ft. Davis where certain men pretend to the locality of the vein and asked whether any arrangement could be made with the Railroad Company. I think many people know of this mine which I believe is not very far from Eagle Spring. From Ft. Davis I will send an additional report giving account of my next work.

I remain very respectfully  
Your obt. serv.  
Jacob Kuschler  
Prin. Sur. T & P RR Co. "



While not accurate, Mr. Kuechler's work was probably done about as well as it could have been done with the equipment used and the difficulties encountered. Mr. Kuechler did not survey the land section by section or even block by block. His instructions were to run enough lines to explore the country and take up the amount of land called for in the certificates with which he was furnished and to do this in the shortest time that he could. He ran his lines east and west and north and south by his compass and followed section lines. Where rock was available he built rock mounds and where he could not find rock he built earth mounds at each section corner that he passed. When Mr. Kuechler considered that he had run sufficient lines he went to Austin and plotted up his work, showing the corners that he set by round dots and numbers. Through these points he drew parallel lines, taking no account of the curvature of the earth, and constructed his blocks and townships and sections. His original map shows all sections 1900 varas square. After constructing the map, Mr. Kuechler proceeded to write field notes for each section, calling for 1900 varas for each section dimension and for common corners for adjoining sections. These field notes were filed in the General Land Office and became official records.

Considering the difficulties under which Mr. Kuechler worked his work was very good. Owing to the fact that he used a compass, his lines on the ground are not straight parallel lines as shown by his map, but conform roughly to meridians and parallels; so that, so far as direction is concerned, his corners are approximately where they should be. His chaining, however, was not so good; there is a large excess in all his work, so much so that his location of the south boundary of the 80-mile Reservation is some four miles too far south.



McCombs Resurvey. While Mr. Kuechler was still working on his field notes, the discrepancy in his location of the south boundary of the reservation was discovered by other surveyors and a controversy arose as to the correctness of Kuechler's survey. Finally, in 1883, Mr. Paul McCombs was sent into the field to check up Kuechler's work. He was paid by the Railroad Company, but was acting under written instructions of the State Land Board. He retraced Kuechler's lines and measured the distances between his corners, finding them, in practically all cases, considerably in excess of 1900 varas. Following his retracing of the Kuechler lines, McCombs ran out, during the year 1884, a great many other lines, usually following block lines, and erected corners similar to those built by Kuechler. After completing this work he also made a map of the 80 mile Reservation showing the distances that he found between the Kuechler corners, his construction of the blocks and sections on these Kuechler corners and also the additional lines that he ran and the corners that he established together with his construction of the blocks and sections on such corners.

McCombs' map was filed in the General Land Office, but was never recognized as an official record of a resurvey; and while it has been known and used for years, it is not at this time an official record. Neither was McCombs permitted by the General Land Office to return or file any field notes.

The only recognition given the McCombs' work of 1883 and 1884 and the only official use made of it was the interlineation of Kuechler's original field notes to show in red ink the distances as found by McCombs and the calculation, according to such distances, of the excess acreage in the sections based on Kuechler's lines. The Railroad Company was then required to surrender its patents in the strip south of the revised south boundary of the 80 mile Reservation and to apply additional certificates on each of the sections north of that line to cover acreage in excess of 640 acres.



McCombs' report on his first survey in the 80-mile Reservation, made to establish the south boundary thereof, is quoted in full below. Also quoted is a later report by Paul McCombs, dated November 15, 1905, which deals particularly with his resurvey of lands in the vicinity of El Paso but also briefly reviews his earlier work.

"REPORT OF PAUL McCOMBS C. E. SPECIAL SURVEYOR TO ESTABLISH THE SOUTH BOUNDARY OF THE T & P RY. RESERVE WEST OF THE PECOS RIVER.

To His Excellency the Governor of Texas  
Hon. John Ireland  
Chairman, State Land Board

Honored Sir:

In compliance with instructions received from the Commissioner of the General Land Office, a copy whereof is hereto attached, dated September 17, 1883. I have made a survey of the Texas and Pacific Railway Reserve lying west of Pecos River and extending south from the Thirty Second Parallel of Latitude, a distance of eighty miles; a full and complete copy of the field notes of the survey and a plat of the land surveyed is herewith submitted, as part of this report.

I will here state that my work was performed with a "Complete Transit" made by Alce & Company, St. Louis, a new instrument. The measurements were made with a five hundred foot steel ribbon by Young & Sons, Philadelphia. My lines were strictly transit lines run with "fore and rear flags", and dependent on the angles of the horizontal circle for its accuracy, using the needle simply to obtain a "north and south line" to start from. The distances were noted down by three persons to prevent mistakes, viz., the front chainman, the rear chainman and myself, each in a separate book. Where ever the elevation and depression of the land was appreciable I observed its angle with the vertical arc to the transit, noted it in my field book, calculated the allowance to be made and so made it each time.

Upon arriving on the ground and making a preliminary examination, I decided to adopt the old adobe stage stand at Van Horn's Well as the initial point of my survey.

Thus, I began my line to Crow Springs at the NE corner of said old stage stand, near Van Horn's Well in El Paso County, Texas.

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Thence I ran a general course of N.N.E. to a point opposite the Northeast extremity of Carizo Mountains; thence N.N.W. just missing the NE point of the Diabolo Mts. to a point nearby, south of Crow Springs; thence north to intersection of boundary of New Mexico, passing within one hundred and eighty-five feet of the old stage stand at Crow Spring. I there ran a line from Monument No. 17 due east to intersection of my line one thousand and fifty-seven varas.

This monument I found to be north 145,151 varas, west 31,370 varas from corner #2 of my line opposite Van Horn's Well. Monument No. 16 is to the west of this monument and plainly visible.

These monuments were erected by the U.S. Boundary Commission from "adobe" bricks, probably taken from the old stage stand aforesaid. They are in a fair state of preservation.

These monuments being placed in line east and west by the Commission, showed a variation of the magnetic needle to be twelve degrees east ( $12^{\circ} 00' E.$ ). Cloudy weather prevented my taking an observation to determine the variation. At Van Horn Station on the Texas and Pacific Ry., I made an observation of Polaris at its western elongation on Oct. 11, 1883, and found the variation of needle to be  $11 \text{ deg. } 30' E.$  This variation I used in starting from corner #2 opposite Van Horn's Well.

After leaving the stage stand at Van Horn's Well, (where we obtained water from a drain in the hills) the water we had was obtained from the "tule" or "cane brakes"; this water was unpleasantly alkali and saline, impregnated with the gypsum found scattered on the ground in abundance, after passing the point of Carizo Mts.

Upon examination of the Guadalupe Mts. where the 32nd parallel crosses them, I found it to be impracticable to cross them at that point hence returned to a point on my line about twenty miles south of said boundary and ran a line thence to the intersection of 32nd parallel and Delaware Creek, between monuments #22 and #23, one on each bank of the Creek. These monuments were in the last stages of decay and barely recognizable, save by their position and the slabs of stone bearing initials of New Mexico and Texas; they were originally merely mounds of earth, capped with these slabs and denudation has almost demolished them. General direction of this line was E.N.E. Running near Guadalupe Spring, in Guadalupe Pass, at the foot of El Capitan or Guadalupe Peak; near Pine Spring on the East slope and Independence Spring, six miles east of Pine Spring. These springs afford pure fresh water which sinks into the ground within a few feet of its source.

About twenty-two miles east of El Capitan my line crossed Delaware Creek at the old stage stand, a few hundred varas to the west of which was a bold clear spring; the head waters of the Delaware. From this point to the boundary of New Mexico this creek is a beautiful clear running stream, slightly alkali; about half a mile west of the stage stand is a very strong sulphur spring in the Creek bed.



From all the information obtainable the nearest water south of Delaware Creek was some holes on Saldito Creek, about 29 miles S.S.E. from head waters of Delaware.

After completing my line to monument 22 afore said, I returned to corner 24 of my line, about two miles SW from said head waters; thence ran a line about S.S.E. to the Southern boundary of the Texas and Pacific Railway Reservation on the east side of the Apache Mts., the north point of which is known as "Gomez Peak".

Reaching a point that was eight miles or 152,064 varas south of the boundary of New Mexico, I erected three stone monuments about three feet high each, two hundred and fifty feet apart, in a line due east and west; this is the south boundary of the Reserve.

From the first of these monuments, I made a connection with the NW corner of section 32, Twp. 10, Block 56 of surveys made by Jacob Kuechler Esq.

On this line we found water holes at Saldito Creek next at San Martine Spring on the T & P Ry. I could find no water or spring corresponding to San Martine Spring as laid down on the map in the General Land Office. From San Martine Spring to the south boundary east of the Apache Mountains there are signs of water all along in the canyons of this range, though none in the valley near my line.

Returning by the wagon road from my monuments to San Martine Spring, we passed through a small Mexican settlement called Colado; this I located by compass bearings. About three miles further on we passed a large spring known as Phantom Lake; this water is quite warm and slightly alkaline, flows from a cleft in the rocks, widens out into a beautiful clear lake and disappears through another cleft in the rocks about one hundred yards from its source. Part of its water is carried to Colado in ditches.

Returning to San Martine Spring I ran a line to the south boundary west of the Apache Mts. on top of the table land, passing near Antelope Spring, this is the only water on this line save a small pool of standing water found in a hollow rock at edge of table land.

Upon reaching the south boundary, I erected two monuments of stone, one east and west of each other, two thousand feet apart; then continued my line west along said boundary intending to reach Van Horn's Well. At five miles I encountered a series of large deep canyons across which it would have been impracticable to make tape measurements; hence returned to Antelope Spring and ran a line to intersection of the first line of Crow Springs, closing a survey whose perimeter exceeds two hundred miles.

After platting my work on the map, I find that this survey fails to close by about eight hundred varas which I claim is a very moderate error considering the size of the survey and the country over which it had to be made.

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I next returned to Van Horn's Well and ran a line from corner #2 of my first line to the south boundary and erected two substantial rock monuments, due east and west of each other, fifteen hundred and eight feet apart on said south boundary.

Returning to said corner #2, I ran a line to Fort Quitman on the Rio Grande River. In Bass Canyon I noted that local attraction deflected the needle of my transit about four degrees in error. About nine and a half miles west of this Pass my line ran into Eagle Spring, an inexhaustible pool of water in the foot hills to Eagle Mts.; this spring is about four miles S.S.W. from Torbet Station on the G.H. & S.A. Ry. From Eagle Spring my line passed through the old adobe stage stand, about twenty one hundred feet north of the spring. From corner #7 north of stage stand I made a connection with Station #96 of Mr. Kuechler's line, being the NW corner of Section 4, Block 68, Tsp. 9 or SW corner of Section 45, Block 68, Tsp. 8, of his subdivisions.

Thence I continued in a westerly direction through Quitman Canyon or "Calanity Pass" to Fort Quitman, an old abandoned Military Post. Found no water between Eagle Spring and this place.

At this place, on the morning of December 25, 1863, I made an observation on Polaris at its western elongation and determined the variation of the Magnetic Needle to be  $11^{\circ} 55'$  E.

From Quitman my line ran NW to Camp Rice Station on the G.H. & S.A. Ry. At this point decided to follow track of the railroad on account of advantages it offered to measurement, over surrounding country. From this point I measured along the track of the G.H. & S.A. Ry., measuring all the deflections in said road with my transit; at a point about four miles east of El Paso City, my line left the track and running north connected with monument #5 erected by the U.S. Boundary Commission.

This completed my labors in the field, in accordance with instructions received from the Commissioner of the General Land Office.

The only timber in any quantity seen on my trip was on the Guadalupe, the Apache, the Eagle Mountains and thier Canyons.

In order to more clearly show the relative position of prominent objects to my line and to themselves, and to explain whatever discrepancies may exist between my work and that of other parties who have surveyed in that country, I have made a map of my line and said objects as noted by myself.

On this map I have platted in blue the line as surveyed by Mr. A. Q. Wingo, per field notes furnished me by the General Land Office. I have also drawn in red the south boundary as claimed by Glenn and Gano, on their map in the General Land Office. Before drawing comparison with the work of other surveyors, I deem it necessary to introduce a subject that Mr. Pressler, Chief Draftsman in the Gen'l Land Office, informs me has been totally disregarded by the Surveyors in this State, to wit: The necessary calculations and allowance to be made for the convexity of the earth in making large surveys. I will state two well known facts and then show the amount of error attending their disregard.



First. All true east and west lines (Parallels of Latitude) except the equator are curves, when compared with a compass or transit line, because these lines are arcs of Great Circles, whose plane passes through the center of the earth while the parallel is the arc of a small circle whose plane is parallel to the plane of the equator, hence does not pass through the center of the earth.

Second. No two north and south lines (Meridians of Longitude) are parallel because from the equator they converge as they approach the poles.

First. In order to run a true east and west line or curve, it is necessary to establish a north line, at right angles to this run a straight line, this will be an east and west tangent at the point of contact. In order to find points on the curve, which lies north of this tangent, we have the following formula:  $(\frac{2}{3} D^2 \times \text{Nat tang Latd})$  "Two-thirds of the distance of a point on the tangent from the point of contact in miles squared, multiplied by the Natural tangent of the latitude, give the offset in feet due north to a point on said E. & W. curve". Now suppose we start at some point on the 32nd parallel, run our tangent eastward one hundred miles; at the end of this tangent the curve will be 4,165 feet to the north, and the course of our tangent at this point will be S. 89° 06' E.

This is the principle on which the boundary of New Mexico was established by the U. S. Commission and so found on the ground by me, within a small difference due to unavoidable errors in measurement.

Second. A degree of longitude on the 32nd parallel is 58.7 miles, on the (30° 50' 21") south boundary of the Texas and Pacific Ry. Reserve. It is 59.42 miles; hence these two meridians (the 104th and 105th for example) are .72 of a mile or 3,801 feet further apart on the south boundary than on the north boundary. And a line run through the intersection of 104th Mer. and 32nd parallel, and made parallel to the 105th Mer., would have a bearing of N. 00° 31' E.

While I freely admit that this error would be impracticable in a survey of a few sections of land, yet it will be very noticeable in a survey of the magnitude of the one under consideration.

In my map, I have platted the boundary of New Mexico and the south boundary of the Reservation by this formula above given, and on the ground I have located the southern bound. of the Reserve, and erected the monuments, by same formula.

My map will show the parallels to quarter degrees and meridians same, locating the 105th Mer. from the U.S. Commission Report, which shows it to be 00° 05' east of Mon. No. 17 or 9,314 varas.

By inspection of my map and the map of work done by Mr. Kuechler, on file in General Land Office, it will be seen that his location of El Capitan agrees with mine; his location of Stage Stand on Delaware is about one mile west of mine; his location of monuments on Delaware is about one mile west of mine; his location of San Martine Spring three miles west and three miles north of mine. The relative positions of San Martine Spring and Gomez Peak agree with mine; his location of the southern boundary of the Reserve east of Apache Mts. is four and a quarter miles south of mine; his location of Van Horn's Well, Stage Stand and mine differ about one-quarter mile, his being south of mine;



his south boundary at this point is same. His location of Eagle Spring is four miles north and one mile west of mine.

I find it impossible to make the plat of the Rio Grande River on the Land Office Maps at all coincide with my line, so have merely dotted said river on my map wherever it was not actually located by myself in the field. I find the old river some three and a half miles southeast of its location on Land Office Maps.

In regard to Mr. Vingo's survey, it will be noticed that we very nearly agree as to the location of Van Horn's Well.

Comparing with survey made by Mr. Duncan of Dallas, I find his location of San Martine Spr. south of mine about three fourths of a mile. The report of the U. S. and Mexico boundary commission by W. H. Emory in 1857 -- 34 Cong. Ist. Session, Ex. Doc. No. 108, gives the latitude of Eagle Spring by Astronomical Observation to be N. 30° 59' 58" or 73 varas south of the 31st parallel. My map shows it to be about 400 varas south of said parallel. I find Messrs. Glenn and Gano's survey to encroach upon the T & P Ry. Reserve about three and three-quarter miles.

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While it may not come strictly within the duty imposed by the instruction of the State Land Board, yet I deem it proper and in justice to Mr. Jacob Kuechler, whose work it has been my duty to revise, to say; that, from an examination of his work done in the field, and a careful consideration of the inaccuracies pointed out in this report, I do not believe that the errors are such as would knowingly have been made by any surveyor, and while calling attention to the fact of their existence, I assuredly attribute the purest of motives to their originator, a gentleman respected by all who know him.

Again, being the Agent and Appointee of the State of Texas, I must express my sincere thanks to the Commissioner of the Land Department of the Texas and Pacific Ry. Co. for the generous and prompt manner in which he has furnished me all the facilities for making the survey under consideration and for the courteous and gentlemanly treatment I have uniformly received at his hands.

To Mr. Kuechler, for the valuable assistance rendered me in the field, I am under many obligations.

Hoping that I have fulfilled the duty entrusted to me, to the satisfaction of all parties concerned.

I am very respectfully,  
Paul McCombs, C. E.  
Special Surveyor for the State

Austin, Texas  
February 16, 1884"



"Dallas, Texas  
November 15, 1905

Mr. W. H. Abrams  
General Agent  
Dallas, Texas

Dear Sir:

I have the following report to make of the condition of the surveys in the system of Texas and Pacific Railway Company blocks extending from the New Mexico line north of El Paso to Sierra Blanca Station on the Texas and Pacific Railway.

In 1879 the Texas and Pacific Railway Company, under the law, secured Hon. Jacob Kuechler, formerly Commissioner of the G. L. O. to locate their lands in the 80 mile Reservation in El Paso County. In doing this he came through the Quitman mountains to the Rio Grande River and up the river to El Paso City. He camped at the Mexican settlement below El Paso known as "Concordia" and from there connected his work to the old Astronomical Point at the U. S. Post, "Old Fort Bliss". From Concordia he ran a line to Monument 5 of the U. S. Boundary Commission on the south line of New Mexico, and continued on around the west side of the Franklin Mountains, and when he reached his starting point at Concordia he found that his line would not close by nearly a mile; so he abandoned the lines on the west of the mountains and returned to Monument 5 and from there ran east 990 varas and established the NW corner of Section 1 in Block 81, Twp. 1. From there he ran south to the south line of said Block 81, and put in a large rock mound at the SW corner of section 37 in said block 81 and Twp. 1. From there he ran out on the Prairie and drove a small stake for the SE corner of section 11 in Twp. 2 and block 81. From there he ran a meander line to his camp at Concordia, and connected with the Astronomical point at Fort Bliss.

Then when he returned down the river he went to Camp Rice, and from the record of the lines he had run going up the river he established the SW corner of Sec. 33 in Twp. 6, Block 75 by a small stake and rock mound.

In the summer of 1883 I was appointed by the State Land Board of Texas to establish the south line of the 80 Mile Reserve, and report as to its true location with regard to the surveys Kuechler had put in.

In company with Mr. Kuechler I went on the ground and made quite an extensive survey, lasting several months, and returned to Austin and made my report to the Land Board; comprising the field books and a map, all of which are on file in the G.L.O.

While on this trip, Mr. Kuechler went with me and showed me the Monument 5 and also the stake he had placed for the corner of Sec. 1, 990 varas east of the monument. He also came down with me and showed me the large rock mound he had erected on the east slope of the foot-hills of the Franklin Mountains for the SW corner of Sec. 37. We then went out on the prairie and failed to find the stake he had set for the SE corner of Sec. 11; but he gave me the courses of the line he had run from it to Concordia, and I afterwards found the small stake standing in the ground, as he had left it.



When my work for the Land Board was completed, you then employed me to re-survey these lands; and I did so under written instruction of Capt. W. C. Walsh, then Commr. G. L. O. In making the surveys of the blocks above mentioned I reported to Walsh that there was only a small excess of about 7 or 8 varas on these miles, and his instructions were to not alter the field notes of these surveys, but to let the calls still be for 1900 varas, as that was an error allowable by his office.

In conformity with these instructions I commenced at Monument 5 on the South line of New Mexico, and erected corners at the north corners of Sections 1, 2 and 3 in said Township 1, Block 81. I then ran down the east line of Blk. 81 to the corner Kuechler had put in for Sec. 11 in Township 2. I then went back to the Rock Mound that Kuechler had put at SW corner, Sec. 37, Block 81, Tsp. 1; and with the stake I had set up at the SE corner Sec. 10 in Tsp. 2, Blk. 81, I ran a straight line with fore and back sight, S 45 degrees E, about 24 miles, diagonally across the surveys, and erecting a stake at each survey corner as passed, until I came to the SW corner Sec. 45 in Tsp. 3, Blk. 78. From here I turned South and ran 8 miles, allowing the excess, and putting in each corner as I came to it. From here I ran east 8 miles, allowing the excess, to the SW corner Sec. 47 Tsp. 4 Blk. 77, from here I again resumed my SE course, running the diagonals and erecting corners to the SW corner Sec. 31 Tsp. 6 Blk. 74 about 21 miles. From here I ran about 3 miles SW to the stake and rock mound Kuechler had erected for the SW corner Sec. 33 Tsp. 6, Block 75. From here I ran east putting in corners every mile.

These are the only corners in this system of blocks that were put in before the patents were issued and on which patents were allowed.

At the time I made this survey, for many reasons then urgent, it was found practicable to use only small pine stakes one inch wide by two inches wide by three feet long.

During the months of September and October of this year I made a resurvey of the lines above indicated and found a considerable number of these wooden stakes still standing or lying on the ground near where I had placed them. Along side of those standing I drove down an iron pipe about 2" in diameter and 3' long, but I have not yet erected any west of the SW corner of Sec. 17 Tsp. 2 Block 80. We found what I believe to be the original Kuechler rock mound at SW corner 37, but there have been several other mounds erected all around it. It can be identified by running my line backwards, from the iron pipe I have driven in lately and which coincide with the old pine stakes I drove down 20 years ago.

In making this late survey I made a memoranda of the fences as I crossed them, with the names of the owners according to hearsay evidence and I submit herewith a copy of your printed map showing the corners marked with a "K", and also the lines I ran indicated by red mark. The fences I have indicated by blue lines. The only ones that I ran out entirely were the north and south fences of the Carpenter and Finley ranch.

Respectfully submitted,

/s/ Paul McCombs

Surveyor"



Resurvey of 1930-31. Because of the lack of any very definite knowledge of the actual location of these lands, as indicated in the foregoing paragraphs, it was decided in 1930 to undertake an accurate resurvey of the lands in the 80-mile Reservation for the purpose of reestablishing and permanently marking the original corners and of fixing the lines of the surveys definitely in relation to geographically determined points.

Before undertaking the actual work of the resurvey of the lands in the 80-mile Reservation a great deal of preparatory work was done.

First all the files of old maps, field books and other records were carefully searched and everything pertaining to these particular lands was assembled and photostat or typed copies were made of all such records as might be useful in the field. These copies were kept in the field desk in camp, available at all times to the surveyor. Among these records was the original hard copy map (inked in) prepared by Jacob Kuechler in 1879, from which the original field notes were written. This map shows the corners set on the survey and the block and section lines as constructed by Kuechler. It also shows the larger streams, and, in hachures, a very good delineation of the mountains.

Another map, in sections and on a larger scale, which was drawn either by Kuechler himself, or someone working under his direction and with his original data, shows the corners as set with the witness bearings and distances, the calls to stream crossings then existing roads, etc. This map, unfortunately, is incomplete, but was invaluable in the areas that it covers. There was also available the map of Paul McCombs resurvey, made in 1884, showing the Kuechler corners that he found, other corners that he set and his revised construction of the lands which controlled the correction of Kuechler's original field notes heretofore mentioned.

An exhaustive search was made for the field books used by Kuechler on the survey. This search covered the old files at the Dallas office, the old record files of the Texas and Pacific Railway Company at Dallas, the General Land Office, the University of Texas Library, in which a great many of Kuechler's papers and records are preserved and the files of Murray Harris, deceased, at Baird, Texas. The search was fruitless, however.

Several years after completion of the resurvey field work, a copy of Kuechler's field book was found by Paul McCombs and was filed in the General Land Office.

The area covered by the 80-mile Reservation is also covered by the Texas-California arc of primary triangulation of the United States Coast and Geodetic Survey and a number of primary triangulation stations were available. All necessary information in regard to these stations was obtained from the Director of the Survey, and the stations were plotted on the preliminary maps.



During the assembly of information frequent conferences were held at the General Land Office at which were discussed the methods to be used in executing the survey and in constructing the work. The results of these conferences are set out in the two letters quoted below:

"August 14, 1930

Hon. J. H. Walker  
Com'r, G. L. O.  
Austin, Texas

Dear Sir:

Referring to various conversations in your office in regard to the extensive surveys of the Texas and Pacific Ry. lands in Loving County and west of the Pecos River, it is my recollection that the following understanding as to the construction based on our surveys has been reached as between your office, Mr. Paul McCombs and myself.

1. In Loving County and Reeves County, in that portion of the lands patented on Champlin's and Peck's field notes, the northern line of these surveys will coincide with the monumented State line as established by the United States Government. The block and section corners on the State line will be established from Champlin's call for crossing the Pecos River, allowing 1900 varas per mile. From the block corners so established, meridians will be run south to the south line of Tsp. 2. Blks 54 to 57 inclusive. The northeast corner of Sec. 1, Blk 56, Tsp. 3 will tie to the southeast corner of Sec. 45, Blk. 56, Tsp. 2, from which point the northeast corner of Sec. 44, Blk. 56, Tsp. 3 will be established at 1900 varas per mile. At the latter point, a new meridian will be established and run south to the southwest corner of Blk 55, Tsp. 5 to serve as a base line for construction in Tps. 4 and 5, Blks 53, 54 and 55.

2. West of Blk. 57, Jacob Kuechler's lines will be retraced and the construction will be hung on Kuechler's corners wherever such corners can be found and identified. Where two or more such corners are found on a line, they will establish that line between them. Where only one corner was originally set on a north and south line, that line will be established by passing through it a true meridian.

It is my further understanding that when these surveys or portions thereof have been completed and mapped and when the General Land Office is assured of the correctness of such surveys, the General Land Office will approve and recognize our surveys, and upon submission by us of corrected field notes and surrender of the old patents, the General Land Office will issue new patents on such corrected field notes.

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All of the above is written as a memorandum of our various conversations for the purpose of confirmation and record as between ourselves.

I will appreciate it if you will write me, either confirming the above memorandum or else making such corrections as you deem necessary.

Thanking you for the many courtesies extended to Mr. McCombs and myself in securing basic information for these surveys, I am,

Very truly yours,

W. J. Powell  
Consulting Engineer"

"GENERAL LAND OFFICE  
STATE OF TEXAS  
AUSTIN

September 19, 1930

Major W. J. Powell  
502 Republic Bank Bldg.  
Dallas, Texas

Dear Sir:

Referring to your recent letter concerning plan of resurvey of the T. & P. lands in Loving County and West of the Pecos River, I have carefully examined same and am of the opinion that your plan of survey and construction is correct and acceptable to this department.

Very truly yours,

/sgd./ J. H. Walker

Commissioner"



The first field work undertaken was the location of these triangulation stations in the eastern part of the reservation and the erection thereon of either tall masts with flags or the ordinary tripod signals. When a sufficient number of them had been found and marked, the traverse lines were started but as the work proceeded westward the triangulation stations were located and marked well ahead of the traverse work.

All traverses were tied in, directly or indirectly, to the triangulation. The method followed was to run one long main traverse from one triangulation station to the next and then run off of the main traverse any secondary traverses that might be necessary. All traverses were closed, and an accuracy of one in 3000 was maintained. Most of the main traverses closed better than one in 5000.

Since the original lines were run out with a small compass graduated to half degrees, it would have been extremely difficult to follow literally and exactly "in the footsteps of the original surveyor" and any attempt to do so would have resulted in a great number of zigzag short courses. Therefore the traverse lines were run in as long courses as possible and the corners were tied into the traverse lines.

The traverses were started with a known azimuth between two triangulation stations and that azimuth was carried along in the field book until another station was reached. The field azimuths were later converted to true azimuth by computation. Frequent observations on Polaris were made for a check on the work.

The instrument used in the field was a Berger transit No. 1-R with vernier reading to 20". By repeating six times all angles on triangulation and main traverse, very close angular closures were obtained throughout. Distances were measured with 100-vara steel tapes held horizontal with the proper tension. All lines were cleared and brushed out for accurate chaining. All traverses were closed before moving camp and any errors were located and corrected by rechaining.

In the eastern part of the Reservation the triangulation stations are more or less easily accessible and traverse could be run directly to or from some of them by chaining or ordinary line triangulation. Farther west, however, the stations are all located on the highest mountains and it was a day's job full of good hard work to reach a station and occupy it. In these cases a base line (which in the rough country had to be five to ten miles long to get a good triangle) was carefully measured and signals were erected at each end. The next day, the ascent to the station was made, and the angle at the station observed. A signal was then erected over the station and as soon as possible the angles at the two ends of the base line were observed, completing the tie.

A large portion of the 80-mile Reservation has not yet been covered by the Government topographic maps. On most of the traverse lines in this portion, a plane table party followed the transit party and sketched in the more important topographic features along the line. The field work was started in June 1930 and discontinued in September 1931, and included the retracing of all of the lines actually run by Kuechler together with the necessary tie lines to connect with the triangulation system and the running out of about 50 miles of lines forming the boundaries of several large ranches

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on which expensive sheep-proof fence was about to be erected. In all 1075 miles of traverse line were run and all of the original corners set by Kuechler which can now be found were accurately located, permanently marked and their geographic positions determined. The corners so located and marked represent about 75% of the corners originally established by Mr. Kuechler and about 95% of those which he marked with stone mounds.

This work is only the first step in a complete resurvey of the lands. The lines run by Kuechler and the corners set by him represent the skeleton framework on which all surveys in the Reservation must be constructed, and these lines and corners having been accurately located, it was necessary to compute the location of all other corners in the groups of surveys before attempting to locate them on the ground. To set permanent monuments at all block corners of the T. & P. Surveys in the 80-mile Reservation will require the running of another 1000 miles of line.

In plotting up the work the "Grid System for Progressive Maps in the United States" as described in Special Publication No. 59 of the United States Coast and Geodetic Survey was used. In that system the area of the continental United States is divided into zones 9 degrees of longitude in width, each with a central meridian to which the grid lines are parallel and perpendicular, and by use of formulas and tables given in the publication, geographic coordinates and geographic azimuths are readily converted to grid coordinates and grid azimuths, or the reverse. The 105th meridian is the central meridian of Zone E and also approximately bisects the 80-mile Reservation. The use of this system has greatly facilitated the computations and mapping and will result in maps showing, for the first time, these lands in their true geographic position.

The original surveyor's task of constructing the groups of surveys of the lines that he had run on the ground was a simple and easy one. According to his notes, he had set his corners 1900 varas apart and all he had to do was to plot these corners and draw north-south and east-west lines through them. The task of the resurveyor, however, is not so simple. The original corners are not 1900 varas apart, nor are they on true courses; and the curvature of the earth must be taken into consideration. The correct construction involved the solution of a great many triangles and exercise of a great deal of judgment.

Three maps are being prepared, all on the polyconic projection, as follows:

1. A map of the entire reservation on one sheet on a scale of 1" equals 6000 varas.
2. A sectional map on a scale of 1" equals 2000 varas.
3. A detail map of each block on a scale of 1" equals 600 varas.

In addition to the above maps a "line map" of each traverse was made on a scale of 1" equals 200 varas showing all hubs, angles, witness bearings and other details taken in the field.



The field work was done under the direct charge of H. L. George of San Angelo, as Principal Surveyor, with Robt. L. Lowry in charge of a second party for several months; W. W. Browning in charge of triangulation reconnaissance and signal building; and W. L. Powell in charge of the plane table party. R. A. Lindsman as Head Chainman was an invaluable member of the party. During a large part of the time, Paul McCombs, who made the first resurvey of these lands in 1883 and 1884, accompanied the party in the field and rendered great assistance in the identification of corners. The office work was under direct charge of A. E. Willard, as Office Engineer, assisted by E. O. Boshinger, W. L. Powell and W. W. Browning in the drafting and computations. The writer was in general charge of the work throughout.

Respectfully submitted,



W. J. Powell

Licensed Land Surveyor

WJP/KW

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Report by Major W.J. Powell of a  
resurvey of the Texas & Pacific  
Railway Lands in the 80 mile  
Reservation. Made in 1930 and  
1931 for Klott, Rumsey & Abrams.

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