GROUND
WATER
INVESTIGATIONS
Return to W. E. Code
Colo. State Coll. of Agric.
Ft. Collins
May 22 1944. On way from Ft Collins to Simla, drove 4 miles north from Elizabeth to see J.I. Cummings. He was not at home so talked with son. The Cummings are here in March and son had no data on the 2 4½" Conf wells other than they were 25' deep about 9' to water in each. Both wells in NW 30 7S 64W. and are in creek bottom. South one has Dempster Vc pump in it. Reported cap 1150 gpm, son ran it 5-10 min. The spring said it lowered 2 ft. full pipe 6''-means nothing. Both wells reported poor but in better location. South well must pump past north well to get to land below about 100 acres can be served. 50 ac. on E side, creek can be protected from creek. Ditches on both sides but much grass on west side. About 2 seep in creek.

Beg Sandy at Simla 1 or 2 Sec 11 flowing
May 23

Town of Ramah

Drilled Aug 1932 by H. Adelman

0-44 - common dirt and sand first water very hard but quite a lot of water - shut off by casings

44-53 sand rock

53-59 common -

59-61 blue clay

61-64 " joint

64-75 grey sand rock

75-86 soft "

86-94 hard lime rock

96-115 hard sand rock

115-129 " " " soft water mostly seepage down to bottom of pump

153 " " " soft water

169 hard sand rock 2' wide 5' high extending east from well for basin

This well is south from tank - not on 1st bottom 68 or 50' above river
May 23

Man by name of Smith in Sec 32 30-60 has been here most of his life and said as a kid there was no channel then. Floods occur in summer time. Droughts in 1935, 37, 38. Flooding from snow melt. His well 85 deep water at 30' case out. Coal at 60'. Good water in egg size gravel below coal. Close to water in new well 1/2 mile. Both these wells in broad valley to north. Not on 1st Bottom.

Called on John Kochis. 1/2 mi east of Mathew who recently bought a derelict old rig for $25 and plans to go into business of drilling as a side line.

Found T.V. Hamacher of Mathew drilling domestic well for Glenn Einthart in SE 35 1/2 60 S. About 30' of clay formation then into shale which has limestone in thin shale which are quite hard at numerous points. Expect to finish in sand strata at 90'. Old well had 22 ft. Dempster 6" casing which collapsed 30 ft. sand shift. H. said Perry Davis well in Linda 60' deep 5' gravel at bottom. Fine sand and clay above. This well
is on river "bottom"
H. said he drilled a test hole for Olson about 1 mi. north of
Kewaunee on Kiowa which was no good

May 24

Windmill well 200' s of edge of bottom + RR.
25' deep 20' to water in either coarse sand
or gravel. At N.E. edge Ramah
in N.W. 6 11 S 60 W

Calihan - J. O. Phillips Pre. Farmers
State Bank. Former member legislature with
whom I corresponded several years ago. Believes
in wells possible & economically sound. Will
 lend money on. Bank tested along RR in
NW 2 12, 62. 18' to shall 7' to water.
One hole cased 24" - 50 g.p.m. sand.
Not in river bottom side tributary

Batsick ? SW 35 dug 25' into 5' foot
gravel 20' to water
9.6. Gammon
On west side of sec 21
reported to have 30' of water bearing
gravel at least.

Home
On SW 13 11S 62W 20' S
Shale water at 10 feet and 10'
marble or gravel.

July 16 1933
Big flood came up around
Gammon house.

North of Callahan Creek is quite
 praises - 30' low banks. Gammon
age about 70) born in those parts believe
that motion has not changed channel
much in his remembrance. About 1 sec it
flowing today = normal. Great in
Spring. At summer drought illustration
Drove north 2 mi then 3 miles west
inspecting so called gravel pit on way
which proved good road material. Cross
valley 1/4 ft flowing in channel 2 feet
wide of 20' wide top bank to bank. Flat
land 1/4 mi wide.
May 24

Called on F. S. Kucerik who has only irrigation well about 700 feet deep called. Wanted to call on Mr. Hall just below him but afternoon rain that day made his road impassable. He is reported to have done some testing.

Spent evening with Bill Townley Jr. well driller at Callahan. Has drop tool rig. Has drilled very little on Shady but says there is nothing outside the bottoms — always sand. Only encountered flint hard rock above shale. Sampled iron pyrite flakes. Wants rotary rig 800' 400 lb. pressure. Box 174 Callahan Ph 16 M.

Well 1/4 sec. 19.11 S W

Well 36' deep 42' to water in sand

Man by name of Wofford 1/2

mi west of Ramah said oil exploration Co. drilled holes in 1942 — Kansas City.

Man by name of Weintzin from Utah...
Rain last night, more rain during morning. Did not go out until after lunch. Inspected old well site that the Chamber of Commerce drilled 15 years ago but could see no trace of it. Looked over valley and could see many possibilities of irrigable land. Valley bottom 1/4 to 1/2 mile but stream channel breaks it up a lot. A 160 ac tract could be about largest. Took a look at Geoff plant which is at south edge of bottom. Called on Mr. Culver who contemplated well for 30 acres at south edge of Matheson, Looka. OK.

Another rainstorm at 3:30 so came back to Delhi to talk with David Rice.

Bank erosion along creek is severe.
Big Sandy

May 26

Rained nearly all night - roads a mess. Did not attempt to go out. Called on Bob Lit, Ens. J.C.S. and asked him what about gravel. Said there was none to know of.

May 27. More rain last night and in A.M. Decided to return home via Simon. Did not look at river at Simin but further along looked like 5-10 sec ft. At Simon 3-4 sec ft. East Bijou 4 sec ft. Middle Bijou dry. West Bijou 2 sec ft. Small Stream in Ksown to.
July 4 1944

Left Ft. Collins 10:30 A.M. for Big Sandy and a barbecue at Wells Ranch. At Crow Point (between Beaver & River Bend) found Ollivets at side of highway with broken wheel. Arrived Wells Ranch 3 P.M. Saw Fred Beuch and he seemed in no great rush to determine possibilities of in. well in his place. That it best to let it rest until things eased off. Arranged with Stubbs to check his wells later in week.

Since Rice had no particular work in mind and Carl Parker & Agent Colo. Springs wanted me to look over Black Diamond & decided to go on to Colo. Springs. Stopped at Bill Townley Jr. at Calhan to tell him about Ollivets rigs. Not home so left a note.

July 5

State start with Parker and his labor man Barnes who knew the country and had some means to take ear of east. Drove west from Fountain. Made first stop at
Black Squirrel Cr.

Carl Millions NW cor Sec 16, whom well is 112' deep 100' to water. Next stop at C.W. Finch whom home is at E cinto Sec 3 17S 63 W. Well 80' deep dug to water at 72', 72-75' quiet sand, 75' to 50 small gravel. Interested in an irrigation well in NW Sec 3 18S 63 W whom it is 3 to 18 ft to water. He spoke of a case on the south side of this 1/4 where he opened a shallow hole in the top soil and water boiled up. Tank built and water rose 2 feet. This seems to be region of springs. The Rose ranch of the Rose & Cattle Co. has a reservoir in which we could put water 2 miles away and below Sec 3. Finch said these people would try to stop him drilling an irrigation well. There is a considerable area of flat land in Sec 34 and 3+4 drawn north next to a nephew's place.
in S.E. of 12 17564W along drainage way where it was 30' to water.

Next to Mataka place where I had been a number of years before when Bobbitt put down a well for him. M. built himself a very creditable rig, but a power auger machine buckets, drills etc. was putting down test hole in east side 35'-36'.

Log so far
2-18 sand & clay
18-24 1/2 small gravel
24-24 1/2 clay (looks as if contains talc)
24 1/2-26 1/2 small gravel
26 1/2-27 1/2 clay as above
27 1/2-29 small gravel
29-32 clay
32-34 sand
34-38 clay

Water at 35 feet.

Had drilled a hole 250' east of Bobbitt hole 110' to shale, no good nothing but a wet side of creek.
July 6. Floyd Drummond lives across from store at Ellicott. Did not see him
saw Mr. D who showed me test holes samples & log (see card). Townley's irri-
rig is at site been there a week or more.
Called at Needles. He was working at
Airport. Dr. irrigating meadow.
Called next on Johnson who
but Guayn place - belt broke. Trouble
clant year does not know how much
it is possible to come with plant. 60? re
clant this year.

T.A. Painter next - no one
home. Think he is using well. heard
At F.G. Dobbins in sec 6. D-stated
tractor and after 45 min tried to
mean draw down - float hit flange at 89'
Mean flow in 8" OD pipe submerged in
reservoir 295 gpm. Nust pump speed &
left memos of data. See card
Next to Percy Farmpton in sec 8
13.5 GPM who had put down 48"
causing himself 30' and installed a 3" V.C. second hand from around Eaton. In small patch of alfalfa and

next called on L.V. Grayce who now has acquired an old ranch with 2 wells on it and several ponds, but

irrigates alfalfa in N.E. Sec. 1

T 13 S R 63 W. The wells were used by J.E. Anderson previous owner. One in N.E. Cox has a 4" Cole pump and

west one a 5" H.C. pump. 4 1/8" concrete culvert. G. says he is going to work it all over when emergency is over.

from here drove to Calhan
Big Sandy

July 6. After supper had a short talk with Townley who is still very busy. Called on Mr. Hall in SE 16 11 S 61 W. He has done quite a lot of prospecting with auger and rod and found a gravel depth of 33' max along a drainage from south and several hundred feet from Big Sandy. This would make a depth of well at around 50 feet. Would dam up this drainage for reservoir & for fish. Going north, depth diminished and on north side no good. Took picture across valley with Coffman in Stereo. DS 32. ½ sec.

July 7. At request of Parker called on I.E. Alford 5 miles south of Simla a in SE 23 11 S 60 W. A. would like to irrigate but when he told me that his house well was 182' deep with 12' of water in it I said forget it. When he suggested an alfalfa patch on Big Sandy I said yes. Had
fine looking crested wheat grass and oats. Crops look good up here.

Next called on Higbe who has ponds and subirrigates 40 acres or so in N.E. 2 11 S 60 W. I saw this place with others 15 yrs ago. Was thought of pumping out of ponds. He could improve condition as some water is escaping, but he has a good proportion as it is with no labor. Alfalfa looks OK. This water no doubt is seepage from water penetrating thin beds of sand in channels above. There are many such places where seepage breaks out about Big Sandy bottom and vegetation shows proximity of ground water.

In afternoon called on called on Ernie Richardson in SW 28 10 S 60 W who grows alfalfa by sub.

in along creek 9' to water, 4' to 2' sand. Said that a test hole had been drilled by farm owner and that Winford Griffin FSA in Denne would have data. Took picture of chorizat Simla.
Went back to Reeves who started up pump for me to measure flow. Made 2 meas after 35 min at usual speed 1418 rpm 170 gpm. On speeding up to (rpm? 1600?) pump took air but made meas of 217 gpm. Since pump goes to bottom of well drawdown is about 34 feet. Without the small reservoir he couldn't do anything with this.

At Mathem saw W. Groff and started up pump. At about 35 min meas 770 gpm. At about 1 hrs got 663 gpm and water stood at 38" in well. 38-12.5 = 25.5 drawdown.

From Eugene Lamson Jan 9-1945 at Ft. Collins
Well drilled at house near center Sec. 11

115-61' W - 12' to water
12-47' water sand
47-117' blue shale
117-133' black sand

Next hunted for site of Harlan McLeod well. Found drillers [Obvious men] had unloaded tools & lift. No rig yet. Site is in SW 1 95 58W. Test showed 70' depth.

Measured both wells on Wells Ranch - James Stubble, age. All cards. Found lower pump off controls perhaps set too close. Data logger came up and started pump. Read 30 min. got 621 gpm.

Measured upper pump which was running and got 14+ gpm. Took picture of plant - all gravel.

Saw Mr. D. H. Wells who told me their well put down by themselves on bottoms was only 18' deep. About 2 1/4 C. pump

In. space. This is near center of section 14 10 S 58W
On Wellner place found one and talked with him. There are 4 wells on north side of river 3 about 100' apart just south of RR in SW 7 10 S 58 W and another quite close to creek in NW 18. This latter is too low down to use and is said to be good. The other 3 were put down at same time (1938?) but only center one equipped. Just now today winch are being strung to all 3 and the center one connected. It has Cook turbine 15 hp motor. Something was wrong as it would run only 3 to 5 min. before cutting out. They had been adjusting impeller position and I put it back according to direction. Impeller stuck, started it with wrench - grinding noise. Several trials - with showed 3.71 KW. Water in well got to 38°.
Fan blades on motor very hot, shaft also quite warm. Each time it stopped had to loosen with wrench - grinding noise came from around motor, I thought. No sand. Decided not to run it for fear of broken ball in bearing. Promised logs, Stevenson drilled wells.

July 9

Called on Jess C. Matteson who prospected around on north side of river, 8 or 10 holes, in N.E. 8 95 57 W and drilled 24" well in NW cor. Blank casing sunk first and gravel envelope used but think perhaps gravel too large. Said that it gave max. of 150 gpm and pumped to bottom, 30' deep (see card).

M said R.R. well only has 1 foot of sand in bottom. This is about 300 yards north.
Near center see 13 95 57W. S
saw a windmill just off river bottom (Fraser Ranch) so stop to inquire for said well & sleep in sand. Back up the slope from here in draws are springs.

Noticed water in draw in see 4+9 95 57W.

C.R.I. & P. gets its water for engines from open pit 1 mile west of town. Write to Div. Eng. R.A. Brown, Fairbury Nebr. They had a hard time getting water.

Took picture of valley from U.P. overpass looking towards town at 5 P.M. 6-4 and 10-2.
July 10
City of Limon - 6 20' wells and 1 60' well at SW edge of town. 18' deep 6' t water. Numerous small pipes 7 long driven horizontally thru holes in wall. Pumpen says he does not think any water comes thru bottom. Wells 50' apart. Well adjacent to pumps will stand pull of 175 gpm. Second pump pull on all 3 and at 600 gpm will pump all down to bottom. Water table fluctuates 3 or 4 feet between wet and dry periods. Not in any drainage way and not in Sandy bottom.

CRI & P. R. R. pumps from a 100 x 30' part without curb. This is abt ¼ mi west of city wells and at foot of break of River bottom. NE 19 7 5 56 W.

Photo of wheat field cut in at Lake - V.P. has well here.

Big flood in Sandy May 30 1938 or 39. ¼ mi wide 7 miles east of Limon.
Service Power Co. Denver, Waukesha engines have small pit at edge of bottom SW 25 95 56W. Waukesha engine and turbine pump laid horizontal as a unit. Can pump 4-5 hrs. In 74 ac. Second year. Took Kodachrome picture. On this place there is an old ditch heading, dam on north side still in place. Runs down to reservoir 3 or 4 miles. Water in 1935? (same as Bigon flood) ran into canal. This spring water ran in sandy flu to mouth. Usually some floods but none last year. Suppled me.

Anderson 3" HS Dean Bros pump short hook-up to 5 hp GE motor. Pumps from 3 wells into 4" pipe carried on cable to north side of creek. 40 acre Reservoir. See canal. Notices much reduced flow in summer from start in spring.

Water 1/2 sf in Bigon sandy at Lewis, none E+W
July 11 - 287.5 ft. in Big Sandy from yesterday's rain above. Very light rain at Limon.

Drove towards Mathen and turned south between sec 15 & 16 10S 5E
at 2400. We're at a general level of country 100' to water in "limestone." In NE 15 105' to water. Examined 5C5 test hole locations on Tipton & Calumet. Tipton is in tributary channel with practically no bottoms. Sands in will be gentle with slope of limited extent. Calumet is in larger channel and at his house bottoms 1/4 mile wide which he says is about as wide as it is for 8 or 10 miles downstream. Soil said to be mucky there in bottom than sand as 1/4. For irrigation. Test hole is in bottoms. Ponds near C's house. All once grown on bottoms. Bottoms covered with water in flood of 1921 (Bull's flood).

Bailey well at edge of valley, but is lower than the 90' deep which is a good well for stock. Valley bottom 300' to 100' wide.
Creek bottom in SW 15. 12 S 58 W is about 1,000' wide. In NW 2
13 S 58 W practically no bottoms. In SW 11, at road bridge shales
outcrops with about ½ sec ft water flowing.
In bottoms in SE 13 bottoms ¾ mi wide and all was being irrigated, water
3 ½ sec ft was flowing, road and could not get through. This water must
have been held up between 10 and 2 places.
ate lunch at Hutch where woman
said their well was 42' deep.

Practically no bottoms on west
sides of Sec 10 and 15 13 S 57 W.
Same at east side of Sec 34 but
50' 6 sec ft flowing.

East side Sec 36 11 S 56 W. Valley
200' wide, trickle of water. Side drains
Springy. Well 45' deep in SE 18
11-56. Ponds at south center 16,
40' to water NE 24
NE 31 1/2 S 56 W - bottoms 400' wide
NW 29 1/2 S 56 W - Practically no bottom width. 5 feet deep, muddy water flowing

Sandstone outcrop (conglomerate) in NW 1/4 1/2 S 56 W. The valley here is of considerable top width but the flat bottoms are missing. In the SW 35 - bottoms about 600' wide, swampy and alt. 1 foot clean water flowing

In SE 35 1/2 S 56 W - bottoms 600' wide, 6 feet deep, muddy water

In south center NW 1/4 1/2 S 55 W - bottoms 1/2 mile wide. Channel incised by bridge 200' long, 20 feet deep, muddy water

In SE 35 13 S 55 W - bottoms 600' some water flowing. In SE 35
July 12

There is an auto rain gage at Hugo at city water plant which recorded 1.53" rain after midnight which produced no local run-off in Hardy but about 4 P.M. it started and reached perhaps 700 rec ft. Took photo - cloudy 1 5/16 + 1/4 nick.

Jim Hammond has irrigation well put down by his son who made all the equipment for drilling. Make a 30" outside casing by fastening 2x4s to hoops. It was not able to start engine. Last night rain did something to ignition. Second Town has 6 wells - 3 24', 1 74', 1 12', & 1 6'. They average 30' deep with 12 to 15' of water in ground. Use 2" x 8" point with 3/16" holes out horizontally. Sells water to U.P.
Pumps 225,000 to 500,000 gal/day.
Speeck has 3 wells (12") connected, at SE ridge town 17', deep 40', agent. 4" Swabe pump on top of ground, driven with auto engine. Has about 15 ac. of alfalfa and corn. Used in 1941-42 but not in '43 or '44.

In P.M. drove east. There is a wide flat valley in Sec 19 115 53W. At Clifford the sandy bottom is 1/2 mi wide. Railroad well there.
The Mohan and the Cobb + Hatton plants are just the same as when I saw them in 1929.
At Boyers which is now deserted I found a woman at P.O. who said they were no irrigation wells hereabouts that she knew of. Too sandy.

Drove north to SE 13 15S 53W and found wide valley nearly 1/2 mi. Bridge 350' long and about 15 mi. It flowing. Was at home at nearby farm house and as big storm was approaching hurried back to Boyers. Storm hit me 2 mi south.
July 13 Left for home after talking with Jones, Anderson and (Graham?) city water supt. He also showed me seeped condition back of court house. Street between these lots and court house is on top of ridge which rise slightly to the west. A seep condition here is almost unbelievable. Had some correspondence with owner of lots 6 or 8 months ago.

Return home via Prospect. Out of gas. coupons.
Aug. 8 - J.K. McCall - test of plant
ran 30 min - 5" V.C. pump
10 hp motor - Lift abt 15' + dd
Disch. pipe 6" O.D. riv.
200 revs in 45.8; 46.0 = 4.35 <br> Q = 4.08 x 7.6 = 31.09 gpm
Draw down 12.9' top well casing = water level
Power - meter GE 150 amp K = 7.2
5 revs in 62.0 sec
2.09KW = 2.8 hp 2.41 hp output
Pump speed 582 rpm
40 ac

R M's Lead Pump ran 1st time Aug 1

Depth to water then 15'
36" casing 80' deep 1360 ft
all sand gravel much rough debris
and good quarrying around in clink pit.
15" OD pipe (9.8" ID)
400 revs in 49.2 5.00 - twist 8.03 / - 7.47 / 5
Q = 204 x 7.47 = 1540 gpm
Depth to water 36.1' - start 7 AM
now horn

600 ac opus
drainage

Water sample
Caledon stayed and gave him pump dates and got some data from him which I added under test data. Tried to get to Neville wells and at gate found no water was using crossing road into Neville ranch. 3 1/2 mi south of highway found Mrs. H. Said Xing washed but would have to go around via Matheson. Decided not to. Mrs. H said center well 57' deep and did not know about others. Drew back to Simon.

First stop was at Cullens in NE 16 13.S 52W who said his well 22' deep to clay and did not know how far to shale. Sand and gravel about clay. Did not find out depth to water but probably 10 feet. At Arroya talked with Paul Everett former JD ranch who said he had found shale at 15-16 feet near area around ranch headquarters.
About 6 to 7 water just west of headquarter said high dikes which E said was reservoir of 20 acres for capture of rain off from change to north. Used too in all fields badly. Send E. Benton data.

Along here valley bottoms are 1/2 to 3/4 mile wide and when side drainage come in from north are wide & smooth fields. Trees are not continuous, many groves some stretches of a mile. At Wild Horse Bridge 500' long R.R. well at Anoya.

At Kit Carson met a man living in town whose well is 40' to shale - log - Jess Baldwin.

0-3 soil
3-14 sandy clay
14-17 clay
17-38 sandy clay
34-48 sandy
water at 8'
Baldwin pays R R well 50' deep - 11' of water said.

Aug. 9

F. E. Gettman, lives in Kit Carson.

In 1936 he and his son used tractor wheels as back-casing and sunk 2 wells 30' apart 22' deep.

10' water thru fair gravel (all less than 1") and set 16" casing inside and backfilled with gravel. 2 wells connected to 4" 2nd hand HC pump with capacity 150 - 175 gpm and was given up. Valley bottom 14' wide and G. says that previously man 1'm north dug 16" dia. well about same depth and used tractor pump which gave so much trouble.

Thought it used only 1 yr. Thinks he had more water than Gettman. Wells in center east 1/2 of sec. 24 13S 48W

Kristman told me about Gettman.
Paul Meyers. Lives in NW 1/4 15S 48W
volunteered to be my guide which was
fortunate as he is now owner of lands south
of arena that had been in a promotion
scheme of some Lincoln brother men and
who had installed 2 pumping plants.
Well at his home is 48' deep not to shale
30' to water 18' of water gravel. Hole in
SE 10 is 45' deep 30' to water and
not drilled to shale - good gravel. all
of SE 10 is flat as is much of the land
around it.

* Found remains of old plant foundations
2 wells filled up suspected well under
a block of cement that we could not move
so do not know depth. Reported capacity 600-700
gpm. Put down about 1915 by
Dempster. About 100 acres used for
irrigation and corps did wonderfully
well but I guess it was not a financial
success - changed hands several times
and now Meyers offered $40/acre with
good improvements but $60 was asked
He finally paid $10 for it - good
posture. We then looked at Simka
Creek (Big Spring Cr. on map) and found about 100 gpm flowing. Ponds along it afford fishing. Also infested with deer flies. Small water last ½ miles where it empties into Big Benkey. M
days when he was a youngster only one
cottonwood existed now there is a large
grove. Cattle ate off new growth but
when fenced trees had a chance.

Drove north to Geo Closson who is
about 85 years old but has full faculties.
He and his sons dug a row of 7 wells
30' apart in 1911. Deepest was about
46'-36' to water in gravel. East
well poorest only 4' of gravel. These
wells in NE 428 on high ground east
of Evanka Cr. First had an H.C. pump
but too big and lost prime frequently
then got Humphry rotary which
was rope driven bi-weekly. Rope,
tension kept with iron bells. One day
something went wrong just as they had
finished greasing pump and visb
balls were thrown about in an
alarming manner and they gave up
the project as a bad job. They
used plow 2 or 3 years and bad
18 acres in alfalfa.

Mr. Clossen now lives with
the Fick family. Mr. Fick
said well at house was 31' deep to
shale 17' to water from 17 to 27
sand with included adobe balls
last 4 feet good course gravel. He
said these adobe balls were very
comon and were found in one of his
wells in SW 20 where it was
14' to water and 45' to shale, sand
and gravel. Said Gettman found
clay balls too.

Clossen was very much interested
in and still thinks it unfortunate that
a project ed irrigation district in 1910
did not go through. They proposed carry
flood water out at Wild Horse and storing
it in lakes NW of Kit Carson for 10,000
acres. Just on the face of it to me the
looks som. He said to contact D.H. Zick, C. Surveyor at Cheyenne Wells for data. Collins Meyer said to get data on Lincoln Wells from Sheriff Fred Flithch there.

On way back to Kit Carson stopped at the north well site in SW 31 14-47. Rained only one of 3 wells open - 5' to water 28' deep. This plant was never used Cheyene.

Drove to Aronto to talk to the widows of Collins but she knew very little about the wells her husband put down to prove up on a desert claim.

Rushed me to Mr. Kink in town. His recollection was that there was lots of water but that is rather worthless information. Mr. Kink could add very little except that at about the same time perhaps a year or 2 later (circa 1913) that Collins put down a group of wells on about the (man at bank name is Gelberick)
center of west 1/2 of Sec. 17 15 S 48 W. This was a renting proposition and the renters put in about 18 ac of truck - could not dispose of it and went broke. The other wells at home ranch are on north side of Big Sandy in 5 W 4 15 S 49 W.

Drove south 5 miles then 5 miles west then 1 mile south to look at Rush Cr. Found owner French at top of hill who said his buildings were out of bottom and his well was 30' deep to clay only 1 foot of water. Never had game to shale in creek bottoms - too easy to get ample stock supply at 10 feet. Valley 1/4 to 1/2 mile wide. Subject to big floods that overflow banks. At highway bridge (US 287) on N/E 40 17/5 48 W. Concrete bridge, 400-500 ft long. Bottoms 1/4 mi wide. Not a living stream here.
Aug 10. Called at courthouse and talked hour or more with assessor Immen. Said no more plants in operation this year in county, that Wessel had quit at Brandon. Drove straight east from north edge of Eads. Found large body of flat land with good looking crops in Sec 13 2½ 48W and 18 19 in 185 47W extending both north and south. Stopt at Wm. in NW 18 who said his well was 70' to shale 50' to water in clay + magnesia. Said well in SE 13 35' to water. High tower in SW 6 78 'deep 75' to water in sand + gravel. Mile north of here 65' to water. In SW See 8 about 80' to water. Crossed Rush Ch. in NW 7 185 46W short bridge - narrow valley here. In NW cor. SW' + see 8 passed up migration well which I
Found out about static and consulted Mrs. Kergos (ill with heart attack) who said they put down well in about 1936 and used it 3 years to establish 26 acres of alfalfa and was used each year incl. 1945 for garden. Well is between 30 & 40 ft. deep. Shale? 2 1/2" casing put down with bucket gravel outsides 8' to water. Pumped 1/2" pipe full. 4" H.C. pump, able to get overall of 26 ac. by flooding. So must have been at least 550 gpm. Found a young man in NE Sec 6 who said well there was 20' deep. When I mentioned old Iran well I had seen on former trip he told me it was only 1/2 mile south in SW 5 so I went back to look at it. Only a pit now with core still standing. Young man said it was last used about 18 years ago and dug by Campbell 25 years ago.

In SE 30 17S 46W woman said well was 40' deep to shale & about...
20' to water. Not sure about gravel but a seam of clay was punctured. The young men said water table has been 2' higher of late years. They seem to think the Lodi Reservoir in Dec. 25 was the cause. Worked at Res which was dry but said to be water in it during winter. Covers maybe 15 ac. off channel. Built 30 yrs or more ago and used for in when there is water available. Leaks? Saw quite a body of flat land below it in 30 incl some alf in full bloom - should be seed. Men by name of Hudson now owns it but is tied up for Texas this A.M. In N.E. of 24, 175-47W men said could get water on his land from 15 to 20' inground. In S.E. 1/4 shale outcrop 100 gpm flowing in Rush Co.
The creek is in steep trough but there are adjacent flat areas some very sandy.

In west center of 20 17S 46W woman said well dug with post hole auger (many老乡 in that part) 40' deep 15' to water. Took water sample. Some stretches along this tributary look pretty good but some are much too sandy. Going east cross rough sand hills. North side of Lee 36 17-46 is flat but rough and looks worthless. But north side of 31-17-45 is all in Big sandy bottoms and looks better but may be too sandy. In NW 31 talked to one man with O.H. Ambrosier. He said that on his place (another owner) in 1914, 3 irrigation wells had been put down, one at house one several hundred yards west and one 200' east. East one best - cap about 240 gpm - 2 1/2" Wilo pump 24' deep 8' to water.
East well used n saw alf and it with other wells on 11 ac of canteloupes. No developed market for cant and one year finished that. A said there were other patches of cant under wells both north and south all suffered same fate. He told me of the first hole drilling by Gulf Ref Co (Explain to) in 1933 or 34 that they drilled 101' to shale near NW cor see 36 18-46 and only 1' water in hole. To me this is questionable also that shale was at 12' at east edge of sand and that the drillers had to quit at 40' a few hundred feet farther east because of gravel and water. He said that the big ditch was dug in 1911 and that water went down to lakes but
never used for irrigation. Dam washed out 1923.

Tourn well #3 at Eads drilled 100' west of plant in 1939
- 83' sand
  83-84' clay
  84-88' cldy gravel
  88-92' clay
  92-94 1/2' coarse sand
  94 1/2-98' clay and fine sand
  98-101 1/2' hard clay
  101 1/2-103' coarse sand
  103-107' clay
  107-120' coarse sand and gravel
  120' shale

Shale east side of town 65' and at RR well 51/2' side 145' to shale.

At present time pumps are taking air and the town is faced with an immediate increase of water supply. Water level stood at 70' in 1930, 92' in 1939, 97' in 1940 and 105' in 1942.
Aug. 11  Ed Hammer  NW 3  185 46W

House and windmills in NW cor 20' deep 10' to water. Said blast hole had been drilled 8 yrs ago 1/4 mi west of corri 36' deep -10' to water and another at the north 1/4 cor. 52' deep in which first 13' was soil and sand and last 39' in gravel. Also another hole 1/4+ mi. south of corri 27' deep 7' to water. These holes reportedly to shake Took water sample. H. has thought of irrigation well and selected a site about center of north lines of 1/4 and would be able to cover 60 acres. This is not really all in silt- in oldfella lacks funds

John Brown - put in irrigation well about 1939 under rehabilitation program about 40' deep to hard (clay) 19' to water 5" V.C. pump (old) in timber put then 24" casing which he put down with churn bucket, tripod and tractor. He said capacity variously estimated
at from 500 to 800 gpm. Used to start alfalfa for (2?) years. Used only a little
1943 on garden rows in 1944. Well is
on east edge of bottom on which are
1/4 mile 260 wide and look good as to
irrigability but more ambition will be required
to make proper use of plant. B says
pump isn't working right - only draws hom
to pump now when it used to go 2' below - steam
nearly quits then kicks up. Suggested air leak
Well is in NE cor NE 26 185 46W.
No information other than about
15' to water in NW 23 195 46W.
In NE cor 27 will 24' deep to shale
in Gardiner place. Found no one
close until I hit Hard in SE cor Sec 22
205 46W Well 98' deep 60' to water.
Residents prefer to drink rain water run
off from roof.
Crested Big Sandy at about
NE cor Sec 14 205 46W where bottoms
were 3/4 mile wide and 100 gpm flowing
also limestone outcrops few feet high above
water. South for a mile or so outcrops are
25 to 100' thick. Below this in about
Sec 24 creek is dry. Hollow well 15 or 20' to water at ranch house near NW 18. People drink rain water stored in cisterns and it tasted OK.

Drove south to county line then 1/2 mile into Reeves Co. Could not get near Big Sandy. In Sec 9 2T S 45W found a wide cut made which appeared to be an outlet for a land locked drainage.

After arriving Brandon started search for a Mr. Root who has iris plant 1/2 mi north of John Brown near etc. Sec 17, 18 S 46W. Observed no bottoms on Big Sandy along highway. Found Root at Chubington 18' 6 water. Wood pit 15 or 16' after it slipped 14' casing 14 - 38. 14" V.C. pump. Used suction bucket from Brown at Lamar. Gravel (coarse) around casing. Thinks 4' of gravel in bottom.
Stopped because knocked off shale band so not to shake. Pumped down to 29'-500 gpm (his estimate, thinks would yield 2000 gpm???)

Put down in 1937 and used 2 yrs to start 25 ac alfalfa.

Note on Brush - Quit 20-3 yrs ago. One plant had about 12 wells 37' deep 20' to water on clay?

Aug 12 - Drove east and on SW 18, 18S, 48W found a well digger and water witch. Well 84' deep 20' 3' of water in "soap stone" which usually overlies shale. On to Gallatin and stone keeper said only 2 occupants of the so-called "shallow water" ever and one had just left for Eads. This one was in NE 21 18S 50W when it was about 40 ft.
to water. Man by name of Dodson in SE cor SW 4 19 S 50 W said his well 60' deep 54' to water. Poor well engine pumps it dry. To the south west in 17 abt same proportion. Quality bad. Cattle won't drink with in lake. Some water thirs now. Often goes dry. Well in SW cor 27 18 S 58 W -15' to water. Well in NW of 1 19 S is 600' deep and tastes of sulphur can't drink it.

Drove west to Chirington again thence south crossing Sandy on south side of 13 19 S N W on planked dip. Valley here 1 mile wide 40 gpm flowing. Well in NE cor SE 1/4 24 is 25' deep 6' to water passed thru clay into quick sand. Man said well on north center of 13 owned by Welton who had several wells drilled. Could find out his whereabouts.
by undertaking K. to secure garage at H. L. Carson. (K. said well was 25' deep.)

I drove north on the west road out of Brandon to look again at Bumell layout in Sec 24. More at home.

Discovered that sand hills separate the flat land in 21 from Big Sandy. These flat land run a considerable distance east and from 28 north at least into Sec 5 having driven to the canal bridge. It has to merge with Big Sandy bottoms in the next mile. The lower end appears to stop in sand hills but I did not investigate closely.

Well in NW 14 185 45 W 35 to water in swamp store. Found man in center W 1/2 16 who was willing to give out. Found that in about 1918 a irrigation plant installed just over the line 175 yds SW of house. 5 wells 3 4 deep 18 casing 2 1/4 C pump 16 hp Willits engine used on 160 acres.
Thus, 1920 - not since. Sand has filled pump pit and only tops of engine fly wheels show above ground. There were 2 other efforts at well in same 1/4 sec. One of 1 well at other 3 wells and pumped with large cyl. pump. This man recently put down well next to Sec 9 1/4, deep to shale 36' to water practically no gravel - at east edge of good water gravel channel he thinks. Said along in 1918 well in NW 9 had big cyl. pump and 6 acres in sand hills bottomed out 1/4 mile west of NW cor 9.

This man said that water was run thru canal about 6 yrs ago and by used it to irrigate. System was fixed up to sump fish in reservoir. Puts, dry now.

The fact that Sandy is dry at highway and there is running water
3 miles south would indicate a dam below.

Dear Lamar,

Aug 13

Drove east about 9 1/2 miles and then 3 miles north then east to Amity Canal. Man at house just below ditch had been there but short time said well was 40' deep. Well is on slope up from bottom and do not think this man knew much about well. Well is in NE cor Sec 9, T 22 S, R 45 W. While there Carl Alford (P.O. Lamar) drove in. He lives in about NE cor SW 1/4 26 T 21 S, R 45. Said his well about 15' deep to rock. Is interested in an in. well for starting some alfalfa. Has no Dutch water. Runs cattle. Has small well drill. I called him later and got rock specimen from outcrop just below his house but got it off his rock pile, looks like a hard tale to me.

At sipper talked with ditch
rider who had no information on depth to rock. He told me that two ranchers lived above at, and a mile but both newcomers. At first one in NW 20 well at west edge of valley 20' deep - poor water according to wife - men folk not home. No one at home 1 mile north. Between here and Edelman there is no one on bottoms. Bottoms here 1/2 mi wide. Amity canal was missed up east side with a diversion ditch from Sandy to their canal just below sight.

Stopped to talk with men by name of Moss in NW 29 whose well was about 15' deep.

Departed west along south line of 29 with little or no information of value.
<table>
<thead>
<tr>
<th>No.</th>
<th>Layer Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>102 - 0-16 sand 16-20 shale</td>
</tr>
<tr>
<td>B</td>
<td>103 - 0-27 &quot; 27-29 gravel 29 shale</td>
</tr>
<tr>
<td>C</td>
<td>104 - 0-20 &quot; 21-5 shale</td>
</tr>
<tr>
<td>D</td>
<td>105 - 0-18 &quot; 18 &quot;</td>
</tr>
<tr>
<td>E</td>
<td>107 - 0-9 &quot; 9-20 gravel 20-14 clay</td>
</tr>
<tr>
<td>F</td>
<td>108 - 0-10 sandy clay 10-18 gravel 18 shale</td>
</tr>
<tr>
<td>G</td>
<td>109 - 0-6 &quot; 18-40 gravel 40- shale</td>
</tr>
<tr>
<td>H</td>
<td>110 - 0-18 &quot; 18-26 clay 26-31 sandy clay</td>
</tr>
<tr>
<td>I</td>
<td>111 - 0-9 silt 9-33 sand 33-89 gravel-shale</td>
</tr>
<tr>
<td>J</td>
<td>136 - 0-9 fine sand 9-38 sandy clay 38-52 sand-clay 52-38 sand-water 58-61 clay 61-shale</td>
</tr>
<tr>
<td>K</td>
<td>139 - 0-2 silt 2-33 gravel 33 shale</td>
</tr>
<tr>
<td>L</td>
<td>140 - 0-6 sand 6-46 water gravel 46-50 clay</td>
</tr>
<tr>
<td>M</td>
<td>141 - 0-10 sand 10-56 water gravel 56-60 clay 60-shale</td>
</tr>
<tr>
<td>N</td>
<td>142 - 0-9 sand 9-54 water 54 shale</td>
</tr>
<tr>
<td>O</td>
<td>19 - 0-30 sand 30-45 gravel 45 shale</td>
</tr>
<tr>
<td>P</td>
<td>14 - 0-14 &quot; 14-24 &quot; shale</td>
</tr>
<tr>
<td>Q</td>
<td>21 - 0-4 &quot; 4-21 &quot;</td>
</tr>
<tr>
<td>R</td>
<td>22 - 0-8 &quot; 8</td>
</tr>
<tr>
<td>S</td>
<td>18 - 0-33 &quot; 33-59 water gravel 59 shale</td>
</tr>
</tbody>
</table>
E.17 0-10 sand 10-62 gravel
62-78 sandy clay
78-98 gravel
98 = shale clay

State in this area Nebraska

Gulf Research & Development Co

E.A. Eckhardt - Vice-Pres.
P.O. Drawer 2038
Pittsburg 30, Pa

This company worked with Oilman in about 1938

Mr. Holm of W.G. Co recommended an article: Cretaceous Stratigraphy
pub. in about 1932.

Also mentioned John H. Wilson

Also mentioned John H. Wilson

Also mentioned John H. Wilson
In afternoon drove east to about 5 1/4 cor sec 17 22 8 45 W where man had drilled himself a well 30' deep 24' 6' water in gravel. This is on west slope of valley - gentle slope bottoms 1/2 mile wide and is at about the corner where sandy escarpment meets Arkansas and is the end of the line. This man considering drilling an in. well himself and discussed the matter with him.

Cheyenne Wells
From Clark filed.
Kit Carson M. Dist 1908
Division in Sec 22 14 50 W
Res. 19, E 7, 30 14 5 48 W also Sec 24 to west. Area 1400 acres. Cap. 1, 500,000,000 cu ft. Cap. ditch 1600 sec. ft.
Drainage area 575 sq miles.
At Eda's got water sample from Paul Meyers well. From Knutsen found that Welu tests went to 25'. Did not think it shale.

Prove to Hugo.

Aug. 16

At court house looked up old filings on iris projects. The one that was built on South side of Sandy with heading couple miles below fenon was called Big Sandy Ditch & Reservoir was first filled on in 1899. There was an amended filing in 1908 and I would guess construction followed that. The diversion dam part of which still stands was in Sec. 26 9S 56W and a ditch 1 mile and 770' long 100' wide with a cap. of 1600 sec. ft. connected it with a Reservoir of 302,000,000 cu ft.

Dam height 23', in Sec 2
There was a proposed project the Buffalo Basin Res. & Irrigation system also. Filing 1910 and proposed location was in Sec. 34 T5S 53W with a ditch of 2,000 Sect. caps and an reservoir in Sec. 29, 14S, 53W in Rush Co. with a capacity of 2,100,000,000 cft. Proposed to irrigate 20,000 acres of land S.E. of Res.

Test at Tim Hammond well

After running 2.5 min. mean water in 6" ID pipe not quite full - 250 revs. in 53.5 sec. = 4.67 k/s = 4.28 ft/s

Q = 78 x 4.38 = 342 gpm

and lift was 25.1 ft pump base. Engine ran out of gas before another test could be made.

Gerald the run home on Friday. says 160 acres ready about 400 acres could be covered. Plans to put down 2nd well
At Simon found Anderson pump operating and est 300 g.p.m which was reasonable check with depth max. in pipe. Finished day with 3 max. at Prospect.

Apr. 12 1945

Conversation with Harold Burrell who was under age when his father was developing the Brandon farm.

Two plants were installed in about 1913 using VC pumps. Later he changed these to HE pumps and used siphons from the outlying wells. Later a 3rd plant was put in consisting finally of 16 wells. The main well was 60' dia. and about 39' deep 18' to water. Other wells were 48' 30' to 10' of metal casing. This was called the north plant. A ditch ran between all these wells and in between the plants there were several conventional type windmills. The Burrells abandoned the project 1933 largely because
of managing dairy but the wind blown sand from the nearby hills was serious to vegetation. Also the machinery was a headache to keep going. Old Benwell evidently was a man who liked to experiment with pumps and systems.

Totten in Sec. 28 had a conventional type windmill connected by chain drive to a cycl. pump.

---

Note on Benwell's Place on Horse Cr.

Sec. 18 195 56W. Well about 18' deep. 12' to water. Water in fair gravel. Experimented with several pumps. Had 60 ac. of cherry orchard which was destroyed by hail but 1904 + 1910. B also had some 30 ac. of crops in

Sec 31 185 56W
Jun. 16 1945

Went to Denver at request of Dave Rice (enlisted in Navy today) to meet county planning boards of Elbert and El Paso counties to discuss a plan for these counties for participation in State groundwater survey to be made in cooperation with USGS as a result of a bill passed by last legislature. See folder for discussions.

Winfred Griffin who is now in bank at Calhan gave me recollected data on test hole on Virgil Richardson place near 6 cente section 28 10S 60W.

0-10 soil

10-37 gravel, clean, coarse

37 shale

With E.L. Ballard-conservationist drove to Matteson to meet Al. Smullin Mgr. of Western Ranches Inc when Mateka was drilling test holes. Wes on 4th test hole which must be in NW
Dec 22 10 S SW. Depth? good
good gravel on dump. Mateka gone. 3rd hole
about 5-00' north - shallow - good gravel showing.
Advised testing 1/2 mile north. First 2 holes
were about 1/2 mile farther west. 8th was
400? deep other 2 3 deep - did not see
any good gravel.

Noted 1 or 2 sec. ft flow in Big
Sand at Simla. Did not notice any at
Matheson. Channel is approx some width
at both places - about 100 feet.

Noted small flows (3-5 sec. ft) in
all 3 branches at Bigjon. Light rain all
day Jan. 15

Found that there was a auto rain gage
at Simla (Weather Bu. Hyd. Div.) The
Station was reported to have been moved
from Keitch to Simla in 1942. (See Postmaster
for more information, Mooreland)
<table>
<thead>
<tr>
<th>Month</th>
<th>1942</th>
<th>1943</th>
<th>1944</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan.</td>
<td>0.50</td>
<td>0.60</td>
<td></td>
</tr>
<tr>
<td>Feb.</td>
<td>0.20</td>
<td>0.30</td>
<td></td>
</tr>
<tr>
<td>Mar.</td>
<td>45</td>
<td>1.15</td>
<td></td>
</tr>
<tr>
<td>Apr.</td>
<td>78</td>
<td>3.93</td>
<td></td>
</tr>
<tr>
<td>May</td>
<td>2.3</td>
<td>3.5</td>
<td></td>
</tr>
<tr>
<td>Jun.</td>
<td>7.23</td>
<td>4.13</td>
<td>0.75</td>
</tr>
<tr>
<td>Jul.</td>
<td>2.43</td>
<td>3.3</td>
<td>0.3</td>
</tr>
<tr>
<td>Aug.</td>
<td>2.40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sept.</td>
<td>2.95</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oct.</td>
<td>1.10</td>
<td>1.54</td>
<td>0.05</td>
</tr>
<tr>
<td>Nov.</td>
<td>0.38</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dec.</td>
<td></td>
<td>2.2</td>
<td></td>
</tr>
</tbody>
</table>

Totals not checked

* July 11 10:55 P - 1:45 A - 1.33" (Hail, 75" in 12 min)  
  12 2:15 P - 2:45 P - 1.58" (1" in 30 min)
July 17 1945

Limon - from REA

April 1 - Oct 30

nm. Grothe 3733 KWhr in 1944
From Jun 24 to Oct 30

7 1/2 hp Stubbs (ino. 1st) 9921 KWhr May 24 Oct 30
10 hp Stubbs (ino. 2nd) 6883 "
Anderson 5718 "

Left H. Collins 9 41/2 AM stopping at Beckham & Prospect recorders
Ken Mc Call - irrigated 7 1/2 ac. alf
once in 1944. Can't irrigate effectively with present plant, too small. Plans
another well this fall

Says Mc Leod not operating his plant
this year. Thinks he irrigated 56 ac
spends 5 or 6 time

Water flowing 1/2 sec. 11 at Bridge
near Mc Calls. He says creek-always wet
here for about 1/4 mile. Construction
in valley floor?

Heavy rains at Sat and Sunday
were from River Bend east. Creek
flowing full width at Limon (Anderson)
Sat. we but gone by 9 A.M Sun. No flood at McCalla.
McCall cutting wild hay. Cut 57 tons 1944

Anderson: - Added info. His first effort was by digging trench to shale (7') opposite present plant and put pump on north side. First flood washed out plant site. Present plant has about 400' of drain tile connected to north well. Wells holding up OK. to now but thinks one that well is producing less because of perks at least water is pouring thru perks today. North well not being pumped down maybe because of clogged stream.

Meter demand: GE 10 amp
D-7 meter 220V. (K = 2.47)
20revs in 41.0 + 41.4 sec.
4.2 Kwh
Talked with druggist Houtz on town council. Days in dry summer wells cannot meet demand. Another supply needed. Correspondence with Mosher of Longmont (came to see me last fall) that he did not show up. Now in touch with a Kansas driller. Told him about U.S. S Survey.

Talked with James Purching who knew personally of the Big Handy Ditch. Required much questioning to get a little information. Said that a small ditch and reservoir were built in 1893 by A.K. Clark, in about 1894 or 1895. This was taken over by Tom Lawrence and enlarged to present size. In about 1894-95 dam washout and although repaired by a "district" enterprise was not used as the diversion dam was washed out. Land was irrigated from 1895.
to 1905, possibly 1088 acres of alfalfa.

Says 17' to shale at bridge in Limon.

July 18 -

Ira Wills. He started up plant for me. 2 6\" casings put down himself 22' deep at foot of slope onto crack bottom. 3' to water wells 22' deep last 6' in good gravel, not on shale. 2" Gould 1/2 C pump Ford engine V belt. May pump 140 gpm. Has had 44 acres under in. Failed to ask him what he did last year but he had a garden. Done this year.

Drove across creek to Heffelfine.

No one around. 14 acres of alf.

Poor stand. Irrigated with conjunction 24 to 36\" apart.

Called at SCS office. Met
Ballard + Case
Drove to Calhan. Stopped at Bank met Griffin.

Called at Anthony Enrich, saw correspondence re. a flume. Found he had built a flume over a drainageway 7' deep, 12'' cotton board 10'' side boards but grade off high in center (later Gardner told me center grade was for earth dike). Enrich well is in N.E. 22. Billed about March 1945. 2 4'' casing 44' deep, 7' water all gravel, a few white boulders near bottom. Peersless pump tractor driven. Found pumping in garden. Wait irrigate but 3/4 acre. Water comes thru pipe high up. Draw-down to about 43'. About 250' of 6'' pipe discharge up a 8' slope. Q with meter pipe less than full 150 revs in 420, 40.4, 41.2 =

27-9 P.M.
Wants system well. Left plane
Drove across creek (6' wide with a little water running) to Mike Hlatski who was pumping well drilled by Mateka last month. 24" well 41' deep to shale, 11' to water. Peerless pump. Was pumping 4" pipe discharge 0.1 less than full and water was drawn down to 36'. Tractor driven.

Previously a well was drilled about 300' south about same depth but produced less water. Test holes with indicated shale closer to surface. Will irrigate 1 ac. this year. Thinking of reservoir. Best area to irrigate close at hand. Situation does not look very favorable. N.E. 23 1st land

Erich - more. Test hole drilled within 100' N & hit shale at lesser depths. One 300' N and another NW both hit.
reddish material of no account E. planning on a reservoir. Has done some land leveling with an Evansman loaned by S.C.S. but much more needs to be done.

I found that Amullin of Western Ranches has been shifted to Celis Springs. Now a man at C.S. Howard Torrance is mgr. He was out today but called I called at 11:30 and 4:45 did not see him. No first hand info on test holes except that several new wells drilled with no good findings.
July 19. At Hugo called on J.E. Stiffling, Plainsman editor who told me of a report prepared abt 1937 on water supply for valley but as this was paper issue day had no time to go into it. Referred me to C. Clarks office but they could not locate their copy. Said copy in Denver but where? State Eng. Rec. Bu. Army?
Tiny flow in creek. S. said shale close (few feet) at old dam.

Looked at channel at Clifford about 100' wide. At Hugo it is 75-100' wide.

At Kit Carson about 300' wide.

Wild Horse C. 3' west and 2' north of Kit Carson is about 8' wide and 6' deep. Bridge 20' long. Flood very infrequent. At KC out of the road dips into it at RR Xing
2 floods of large properties in 18 yrs.

Dan Collins not at home. Talked
with Frank Jelinek at Bank. Know
nothing definite of proposed gold
water project in which Chatfield
is interested (see news item Dunn Pat
of July 18). Father's name Char E. Collins

Drove north 8 miles then east 4
miles past Gettman's place (see map) then
 east 1 mi then south to Aurora. Then 2 miles
then south of 11 mi then west to highway.

Saw much flat land north of Aurora and
south where Big Spring Rd. joins Big Sandy.
It seems that Big Spr. Rd. is called
Eureka at town end. At

At Cads saw Harry Rechtold who is
still drilling on town well. Is down about
1,000' in what he thinks is Dakota but
badly broken up. No good water yet. Has
logs of 5 oil wells in region.

Called on Mr. Simms again for data on
Chivering project. Found Chivering Canal
Co. articles of incorporation March 6, 1909.

1908 stock increased to 30,000. R.S. McGath water comm. at Lamar road
over phone that there was no bonded indebtedness that Coll Apys put up the
money and was replaced by sale of desert claim + homesteads. At Immig-
suggestion called on abstractor Henry Floods + Hal King - old times. King
said construction on ditch 1907 by Mayhew, Wood + Wood. Reservoir east
1909. Water in reservoir diverted to reservoir for 15 years but none to ditch. Cross
connection never completed. Water in reservoir served as a game preserve and was
used for irrigation.

Drove east. Rush Cr. in a V
channel with maybe 1 scft flowing
no normal flood channel. Highway
bridge is 140-150' long. Big sandy
last flood channel 180' wide. Dry
Highway bridge 300' long.
Talked with McGrath on phone. Said records on Big Sandy at Amity Crossing now in hands of Ben of Rick Russell. We might have older records.

July 20. Found a geophysical outfit was located at Lamar but they were working around Wylie. The Western Geo. Co. had left some time ago and had not returned for a period, but not few now.

Drove east to Big Sandy. Normal flood channel 60' wide. Dry. Steel bridge 150' long.

At McGrath's suggestion stopped at Caddo dam to see army guys re. Amity Xing. Found Army makes measurements for B.R. but U.S.G.S. computes and has published since 1942 (also state)
1944
June 24 - Called at State Planning Commission office Denver to inquire about report on Coster's work in Kit Carson Co. Mrs. Saxton, chief clerk, said she knew of no written report. She called in a Mr. M.C. Laughtlin. Together we looked over the map file, and then went to the basement vault. There we found 2 of Coster's work maps, and I was permitted to remove them. Mr. Laughtlin is to furnish Coster's Calif. address so that I can write to him.

June 25
From a gas station man in Limon got general location of some irrigation wells in S.E. Washington Co. At Flagler called at Gains farm bust found that both he and Kocker were both at an R.F.A. meeting in Pueblo. G. is President and K. sec.-tire of the Kit Carson Assn. which is formed but not functioning. Many have paid their $10 membership dues. A report...
and plan has been prepared by the Denver Engineering Co. Three contracts recommended A, B & C. They have tried for loan approved on one but have been denied. Working on county wide A B & C ($100,000) loan now. J. Bishop county agent agent showed me map & report, 1,180 customers per mile. R. A. engineer by name of Cadwalader has made assertion that they should be 20,000 acres susceptible to pumping. All the letters from Bishop & Burlington. Called at S.C.S. office, met C. Dombly who gave me J.W. Pralle's name as only one irrigating from a well. Hopkinton due back tomorrow.
Jan. 26 - Hopperston not back. Called on Earl & Floyd Powell who had planned a trip to look at crops south and invited me to go with them. Barley ready to harvest and wheat in about a week of hot dry weather. Drove south on 51 then west to look at test hole site.

East to SW cor 12 T 11 S R 43 W where drillie was unsuccessful in 3 tries to get beyond 85' which was estimated as about water level. Is there circulation in limestone cavities? Land looks O.K. Then N & E to west 1/4 cor 36 T 10 S R 43 W. Here K. Wilcox drillie at Burlington put down test with bucket 215' deep 5' to water. Tops O.K.

Another hole put down 5 center SW 36 but drillie reports questioned.

Drove N & E to J.W. Pralle whose well was drilled July 1941 - FSA rehab loan. By Chas. Surprise, Watkina Kans. Standard
rotary 32" hole 16" casing  80' 2" water
80-96 clean, small gravel
96-99 clay
99-107 clean, small gravel
107-115 clay + sand
115-123 gravel
123-126 clay
126-137 sand + gravel
137-150 clay, gravel
150 lime stone

Has used his pump each year on about 1 ac. Potatoes last 2 years. S.C.S. has built him a 2-ac-ft reservoir and he is getting about 3 ac now ready. Cook turbine tractor driven. Q'?: 6" pipe ¾ full. Drawdown?: Soil sandy loam - crusty. Some. Well is located near bottom of draw and does not contain much level land except by long ditch.

Drive east into Kansas to look at a ppg plant of men by name of Parish about 55 miles east of line and 70 5 miles...

120 gpm in 46.1, 45.2, 45.2, 45.5

Pipe is about 125' long to break of valley slope and water runs in open ditch to east to more than 40 acre. Half of the lands near pump have been irrigated.
Burlington City Well - Kelly Well Log

0 - 50 - clay
50 - 63 - cemented sand + limestone
63 - 93 - soft sand
93 - 130 - many narrow shales
sand + clay etc
130 - 192 - hard sand rock
192 - 238 - rock; clay + sand
238 - 278 - clay
278 - 293 - shale
293 - 341 - sand-clay
341 - 346 - true shale

The above well recommended cap. 150 gpm is not used. The well from which the town gets its supply is dug 238 deep and furnishes about 800 gpm 182' to water. A new well was drilled fall 1945 and is 300' deep but no pump. Tested 140 gpm from 200' (178 to water)
June 27. Called on Nappanee and talked over the problems of well irrigation.

Met [illegible] who was working here for a few days. Stationed at Trinidad, need to be at CCC camp Buckley.

Spent remainder of day driving to Gray'sville wells and inspecting adobe buildings at Expt Farm.

Called on well driller K. Wilcox N.E. 4 town in P.M. Not home.

June 28. On way back to Collins stopped at Donal and found Earl Bigelow had just started his pumps. Has well 64' deep 54' to water. 10' of gravel near bottom 18' casing. Old American turbine Centra engine.

Drilled by Packer in 1944. Est. 50 to 75 gpm. 5 acres potatoes in 1946.

Previously had well 90 feet deep 40' to water 10' fine gravel, but long ditch to same land too much for small flow.

SW cor NE 42 T9S R 48W

Called on Keeler near 4R EQ at Flagler.
July 30, 1946 - Big Sandy

With Thad McLaughlin whom I found with M. E. Newton test hole contractor. We were drilling 2nd hole on line thru grade plant west of Matheson. Deep channel is south of highway. Underlying formation is ceramic and was identified by change in drilling rates and small fragments of shale. Finally and not certain by stuff stuck to rock bit drillers was using.

July 31 - Big Sandy

Hunted for Denver Pump today that I saw on highway last night. Found it at Elserworths west of Stults west plant. Miller & drillers said he would start well about Aug. 2. Spent rest of day with McLaughlin moving to a section 3 1/2 miles west of Dimla. Started on top of terrace 30' above valley. Encountered what was that to be soft sandstone - lost circulation. Dawson formation here not easy to identify.
Aug. 1 Republican

Drove to Flagler thence north
South H Republican day. Well in co sec.
11 30' or so above C. Bottom was supposed to
have water at about 70 feet.

Found Carl Numme in SE 4 22 T55 R51 W
who had started yesterday 3 P.M. to drill in well.
Had a rig 100' near Hastings Neb. equipped with
about 40" bucket auger with reamer for 48".
Was in clay to about 30' when the ground was
hit. This is approx. water table. Well is on slope
of terrace. Has several signs of blank casing which
is proposed to sink with 8" section bucket.

Numme has an operating well SW of 22
which was in place when he got it. Drilled about 19%0
5' cone. cmt. to water at 36' feet. 24"
pipe casing to 56'. Est. Q 350 gpm. with
drawdown to near bottom. V.C. pump, shaft
home made of pipe. Tractor engine. Pumps into
small reservoir. TRI. to crop 90 ac. Nearly
all corn this year some alfalfa. Does not devote
proper attention to his irrigation. Has
another well abt. 8 miles east. See card
(See bottom next page)
Aug 1

Had conversation with Ely White, a well driller, staying at hotel in Flagler. Home in Kit Carson. Has rotary rig and prefers drilling stock and domestic wells but talks of getting a reversed rotary for irrigation wells if his brother joins him. Appears to me to have exaggerated ideas on irrigation well possibilities. Had a oil expl. blast hole on west side of sec. 33, T55 S R51N flowed 117' deep. Territory south of Flagler very poor for stock wells.

Had job of reworking silent town well which had an underground chamber which he filled in with gravel. Is relative of Gettman and it was he who put down wells on that place north of Kit Carson.

From Munns dr. to Loonis Bros who have 2 in. wells. Talked with water men in field. Did not leak well. Evidently south well is good. Good gran. below rock stratum. No use has been made of wells. Water witches.
Aug 2

Route: - East to Stilwell then north to Cope leaving for home about 4:15 P.M. via 61 to Otis home about 8:30 P.M.

North took Republican 3 miles east of Flagler - stop to talk with rancher. Evidence is shallow to bed rock - pools of water in channel. Sub-irrigated alfalfa.

Land & Republican dry north of Stilwell. Some moisture showing at Republican. Man by name of Alker sunk well some years ago 15' deep but to stake in NW cor 15-8-49. 10' to water. Said pumped 6" pipe full and under pressure at start but that later Q fell off. Said that pipes were sound holes in steel bands and became plugged. Plans to have new well drilled right soon. Told him about Mumme. Thinks good well can be found on property just west which he formerly owned and had prospected. I talked against a pipe line to top of knoll. Has C.T. son planning to come to Aggies next year.
Aug. 2

Stopped at B. R. Rapp, not at home but wife sent for him. He said on well. Has 1/4 mi of 4" hard water main water pipe. 3" long pump on wagon and pumps into one line using part of water from well. Remainder used by flooding. Brown spots in alf suspected as being caused by not getting water down deep enough. Ground very hard. Dug into one place near end of run and dug dirt at 18" but further up was wet at 18" had shovel only to dig with. Recommended longer time for it. Flowing under trowel down. Some pockets when water collects. Mr. Wiant with us and had well drilled this year adjoining on north.

Rapp accompanied me west. Introduced me to J. Hartzman whom we found in a field 1/2 mi east of his home. H. had local well drilled put down well in 1926. Put well down but has never made any good use of well.
Rapso then went with me to see Lloyd McIrwain who has rented out his land and Judge crops haven't need water when needed. (see card)
Return to Ft Collins.

Aug 17 - Drove from Limon to Flagler thence South to Limon. This time found both brothers at home. They drilled both their wells. The first one in NW 32 in 1937 was stopped on rock and so pumped. Then they drilled small hole thru which increased flow so they enlarged it. Used for about 5 years. Got too busy with wheat not used since. Plan to use both next year. Met E.V. Holman here who has improved well 1 mi. east. Carl Mannin had a second well augured to water at 35' new location farther east. Previous well produced 6" pipe 1/3 full. Was having trouble pulling casing as bored some 24' and was ready to set the P.M. without blanket outside. To be bailed down.

Located Hurtyman & McIrwain well
Drew Ray's well and sprinkler running so went in to take a look. 8" dike pipe flowing nearly full. Took picture of sprinkler in action.

On thru Coze to find Mead. He has good well drilled by himself. He's 2nd year. Has spotty corn. Thinks week identified at college as Bohia responsible. More land drilling needed. He told me about Romino. Said Cecil 3 miles drilled 2 wells neither of any account. 50' deep 25' to water. Melleman was using his pump for testing.

Aug 15: South from Yuma.
At Aliso east center of 301 25
2S 4S W man had well drilled last year 130' deep 122' to water.
Except just south of Yuma this is all sand hill country to the Chiricahua. Saw lane of trees
which appeared to be thining as enquired depth to water in SE 25 35 47 W
18 to 20' to water.

Ponds of water at Arickaree. Turned in to talk with Ray Smith in SE 14 45 48 W. He has putting up had on bottom. Very close to water and grass sub irrigated. He said flood of 1935 wiped out an old well about mile west of highway. Water comes to surface on his land about 3 miles above highway.

At Joes talked with mailman and found where Parker Darling & Ronke were. 115' about to water at Joes.

Parker not home, Boys showed me plant. Had tried old horiz. steam engine and oil fired boiler. Boys said could not keep steam up using tractor on 2 ac potatoes. Have in them only once.

Saw Darling plant running so drove in to look. At house talk with cousin - a young man who is recently
out of army and plans to pay attention to irrigation. 15 ac. alfalfa and 12 ac. corn. Corn is suffering for water. Plans to prepare 10-12 ac. more for next year. Darling came in late and talked a few minutes with him. He is real man. Has dairy herd.

Talked with Mrs. K.E. Idler who has cafe in Kirt. Not very good information but well in sec. 28 was not very good. Should have asked Darling about it, I found.

Romke not home. By looks of little ditch very small Q. Maybe 150 g.p.m. 4 or 5 acres of corn seems all that crop being in. Also trees & grass around house.

Stopped at Odilia to talk with garage man also man 2 ½ mi. west 208' to water thru her. Had started north and was overtaken by man who
had noticed "Mr. Eyr" in car who was
all enthusiastic about buying some
100/pc land and putting down irrigation
well. I talked against it. He mentioned
that another man (GI) was all for it.
He did not tell me his name but GI's
name is Max Peterson. Said lots
land is 15 1/2 E of Idalina. Very
smooth level land ideal for irrigation
between Kirt & Idalina.

Aug. 16 Called on county agent
L. J. McMullen who is very new. He suggested
going in touch with Bill Evans FSA agent
and he came over to office. Had not seen Evans
for some time. We decided to drive to Hake
when one of his clients had recently completed
a plant - Sphere. Fine looking plant
Cat Diesel 36 hp driving thru gear head.
Gears ratio 1:1 and will change to higher
ratio as pump is not up to speed recommended
CP now about 500 gpm
Drove east to look at Wentus well.
Drillers (Richards) rig still here and
is trying to pull casing. The well is all in fine sand and is 80 good. The sand however is reportedly not much different than the Ashmane well. Richards drills about a 35" hole with a home made bit on about 3" pipe pump down local mud with a centrifugal pump. Has no rotating table and twists pipe by hand. Drills pilot hole first. Drills 5" cased hole for water supply. Had looking rig. Spent several weeks on Ashmane well the delay being very expensive in crop damage. Yenta will try another hole if he can recover casing.

Richards (did not meet him) drilled well on his place east of her but never has pumped it. Has a hook-up with Worthington.

Left Wray about 2 P.M. for home stopping to pick up depth to water at Edley, Yuma and Otis - on map.
Trip to Republican Drainage
Holyoke south.

Oct 6 1947

Fleming: Stopt at power plant & talked with 5 men who were slightly informed. Said well at plant was 101' deep with 9' of water. Cyl. pumps. Used to cover peaks. North well with turbine carries main load. Well is 300' deep 168' to water. One said well along Frenchman 1/4 mi. south was 35' deep, 5' of water. Perched water table? No sea difference in land surface. Data not congruous. One said well in place he lived to own 5 1/2 mi. west & 1/2 mi. north of P.R.R. was 200' to water. Hard rock above water.

Dailly: Man at elevator said about 180 to 200' to water in town. 6 miles north 180'.

Wapum: Casual information at power house by young operator & another visitor 180' deep 150' to water.
Oct. 7 Holyoke. Called on County Agent Geo. Robins who gave some information on the in. wells etc. of the. Advised calling on Guy Poe first which I did. His nephew Gerhardt was there who is on the Rio Pozo Colton place. Both helped with information. Next to Colglazier who had Campfield put down two wells in SW 33 but could not give me log. Visitor from Idaho then sells Green sprinkler equipment which he thinks better than Stout. Several large installations near Colwell Idaho OK all crops except lettuce. Back to Holyoke at noon to talk to Garland—gone to Denver. Hegenbotham would not be back in bank until 2:15. Talked with his farm manager Peach—a little information. Drove to State line, then north then 2 west then south then went then north back to pavement at Holyoke. Very bad luck finding people home regular sales day at Holyoke. Heard of migration well in sand hills 2 miles west of state line. Depth to water data on map.
Oct. 8. Called on Garland at Cheygarage. He searched for but could not find log of his migration well (place sold to Fulcher). Called on Robie again. Told me about Kennie. Drove east on Ruby first dropped south then east to Stati line. Man by name of Percy Travis in Dec. 20 7N 42W has had land surveyed (56ac) for migration and a test hole put down by Canfield. May do something within a year.

Drove south on road 2 mi. west of State line to E.H. Kennie who had Canfield put down well in May this year. K. not home. Talked with Mrs. K. K. has done some leveling. Land fairly smooth, but one can see some undulations which would cause trouble. Had trouble in corn and did not use pump much this year. Had carriag which he used but has disposed of this. Has a small scraper (2yd?) power operated from crawler, a 10x30 land plane and a ditcher. He said.

Drove south. Several areas a square mile or so in extent of flat land. One near Alvion quite large. Stopt 1/2 mi. S. of Alvion. Several lakes that Alvion and land. Several 1/2 mi. south long. of Laird. No in well activity. At Way told with Ray FSA as McMillen notin. We came in shot.
time later. Had to go to Sterling tomorrow so could not be with me. Said Schmase had a sprinkler now. But of R.C. drilling test holes now at Republican dam site. Wanted me to make a stop on my return. Wanted me to call on G. D. Silvires in Dec 9 2 S 46 W ad. sprinkler but it's too far west from lovely 51

Oct 9. At McMillan segment called on (Roy?) Donovan in SE 22 1 N 44 W. He was playing with idea of irrigating 60 ac. from well - raising hogs. 180' to water. Advised against it. Also called at Harper place Dec 7 2 S 43 W but no one at home. Im problem but not from well. On Wolf Ck.

Schmase at Hall. cutting and spreading redding. says he could hardly keep up watering his 35 ac. alfalfa. Land not in shape sturdy. Took 28 days for irrigation. 4 crops. got alf. Decided he needed sprinkler system. First tilted
with Farm Imp. Co. on Mont equipment
but got disgusted with treatment or terms
as learned to Ames who let him have
240 ft 2" steel header and 500 ft 4" type C
aluminum fruit pipe on credit $5 paid
freight of $0. Bot girden & one
pump 4" for $155. He mounted this on
back of tractor and drives with V belts. This
cost about $200. This much pipe (not enough)
will cost him $695 but as he is now an agent he
will get 15% disv. on much as sales.
likes it better than rotating sprinklers. Has
trouble with weeds clogging holes. Is making
screens.

Called on Yenter who has new well which
was used about a week this summer on corn.
Good equipment (new card) Cassing was pulled
from old well and smaller basket,
small turbins (Worthington) installed. Used
on 1 acre, garden. Can take care of more

at Burlington Albert Brown new
Co. Agent gets Stratton. Called on Powell
who was out. Mrs. P. said brother had gone
to Collins to see me with last hail
samples. Spent evening at Powells
Oct 10 Burlington. Called at Brown's office 8 a.m. but found he had left early for trip into country. Left about 9:15 with Earl Powell to visit K.G. Wilcox who was drilling No. 4 test hole in SW 12, 19 S 43 W about 600' N of SW cor. Was down about 135' in very hard formation and making little or no progress. Fine gravel was visible from above looked very good. Went at about 78'. No. 3 hole about 400' south was abandoned when it lost circulation in lime stone. Casing from well & pump (Winthrop) in Kansas. Casing is special welded blanket on 20' lengths 3/4" thick except 1 piece which is 1/4" for bottom. Recommended a bottom be welded on. Wilcox is to cut pieces with torch. Could not get any well casing in Denver.
Wilcox has good line made rotary for stock wells. Drills 6" holes, 3" dull pipe H.C. pump. He thinks a plan to get larger tuntable and a Deve (H. Morgan) pump to make rig over to reverse rotary for 30" holes. Looked on drillings.

#3 test hole in SW 5 11-42. Nothing good in sight. Drum out into field to see blasting operation in tell wheat stubble. Blade 11 feet long being pulled 4" under surface. Breaks soil and leaves stubble standing upright. Looked at

Kershner proposed test well site in NW 25 10-43. Nice level looking land.

Back in B, again called at SCS office and met conservationist Tremmel then to Brown office again to find him in.

Floyd Powell returned from H. Collins & Boulder shortly after 3 P.M. I looked over samples of #1, #2, and #3. #1 should be a good producer. #3 has some good gravel but not as much as desirable. Another hole to be put down 1800' north.

Left at 4:30 and stopped the night at Limon.
Aug. 24, 1948

Powell No. 1

Test of pump Wintreoth 12-3 stage

Pump speed 1584 rpm Air gage 47 1/2

(Air line length 160' below pump base)

Lift = 160 - 47 1/2 + 1/2 = 112'

Disch pipe 8.0" ID

Current meter 300 revs in 49.6 + 49.4 = 6.06% =

606 x .925 + 0.05 = 555

Q = 141 x 5.55 = 783 gpm

Static 77'

Lowered impeller - Sp 1558 + 1560

Drawdown 160 - 40 1/2 = 119 1/2 + 1/2

Meter 300 revs in 40.9, 40.5 = 7.36 R/sec

6.8 + 1/4 = Q = 141 x 68.6 = 968 gpm

Speed 1770

Drawdown 160 - 22 = 138 + 1/2 = 138 1/2

Meter 350 revs in 37.6, 37.5 = 9.33 R/sec

= 863 + 0.5 = 868 ft/sec

Q = 141 x 8.68 = 1224 gpm

Static level gage reads 80 = 80'

Drillers report 77' from 0.5 = abt 78' from pump base

Bowl

Pump rating 1300 gpm 137 1/2 1750 rpm

30" drill hole = 18" ? 16" casing
<table>
<thead>
<tr>
<th>Sto</th>
<th>Depth</th>
<th>Max.</th>
<th>Reds</th>
<th>Sec</th>
<th>P/S</th>
<th>Val.</th>
<th>Mean</th>
<th>Vel</th>
<th>Q</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0.79</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.52</td>
</tr>
<tr>
<td></td>
<td></td>
<td>.16</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.84</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>50</td>
<td>42.6</td>
<td>1.17</td>
<td>1.13</td>
<td></td>
<td></td>
<td>.134</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>.26</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.12</td>
</tr>
<tr>
<td>0.5</td>
<td>.89</td>
<td>40</td>
<td>47.5</td>
<td>1.16</td>
<td>1.12</td>
<td>1.24</td>
<td></td>
<td></td>
<td>.291</td>
</tr>
<tr>
<td></td>
<td>.37</td>
<td>70</td>
<td>47.4</td>
<td>1.48</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.358</td>
</tr>
<tr>
<td></td>
<td>.38</td>
<td>70</td>
<td>46.0</td>
<td>1.52</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.516</td>
</tr>
<tr>
<td>0.9</td>
<td>.94</td>
<td>60</td>
<td>45.2</td>
<td>1.33</td>
<td>1.42</td>
<td>1.36</td>
<td>1.36</td>
<td>1.36</td>
<td>.543</td>
</tr>
<tr>
<td></td>
<td>.38</td>
<td>70</td>
<td>45.4</td>
<td>1.54</td>
<td>1.43</td>
<td>1.37</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.3</td>
<td>.99</td>
<td>60</td>
<td>45.5</td>
<td>1.32</td>
<td>1.43</td>
<td>1.37</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>.40</td>
<td>70</td>
<td>45.4</td>
<td>1.54</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.7</td>
<td>1.03</td>
<td>60</td>
<td>47.4</td>
<td>1.26</td>
<td>1.41</td>
<td>1.35</td>
<td>1.36</td>
<td>1.36</td>
<td>.512</td>
</tr>
<tr>
<td></td>
<td>.41</td>
<td>70</td>
<td>45.6</td>
<td>1.56</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.9</td>
<td>1.01</td>
<td>60</td>
<td>38.0</td>
<td>1.05</td>
<td>1.19</td>
<td>1.15</td>
<td>1.15</td>
<td>1.15</td>
<td>.155</td>
</tr>
<tr>
<td></td>
<td>.18</td>
<td>60</td>
<td>45.2</td>
<td>1.33</td>
<td>1.43</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.12</td>
<td>0.60</td>
<td>.17</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.58</td>
</tr>
</tbody>
</table>

\[ \frac{2}{2.6} = 0.9 \]

1172 gpm

Drawdown tester caught in well at abt 120'
Static level Aug. 24 113.6' from pump base
Kirschmer No. 2 Western Land Roller pump
2 stage #12 160` Cyle. C4 gage welded, welded flanges. Abt. 5` suction. Hercules Diesel 18` x 2 gage 6` casing 7/4` slot perfor

0-42 clay 138-142 mag. rock + gravel
42-47 sandy clay 142-146 gravel
47-49 conglomerate hard 146-148 clay
49-51 magn. rock 148-155 mag. rock
51-54 sand clay 155-157 1/2 sandy clay + strips of gravel
54-60 mag. rock + gravel 157 1/2-158 1/2 sand rock, hard
60-70 mag. rock 158 1/2-160 sandy clay
70-74 ` ` hard 160-165 1/2 sand rock hard
74-78 ` ` + gravel 165 1/2-170 gravel - loose
78-81 1/2 conglomerate hard 170-172 sand rock
84 1/2-88 gravel, coarse 172-180 sand + gravel, loose
88-105 mag. rock 180-182 sandy clay - gravel
105-110 sand 182-204 gravel - loose
110-115 ` ` 204-220 yellow clay
112-115 ` ` + clay 220-225 gravel
115-129 ` ` + gravel 225-249 clay + gravel streak
129-133 lime stone hard 249-241 sand + gravel
133-137 mag. rock + gravel 241-246 yellow clay
137-138 lime stone hard 246-256 sand + gravel
138-138 lime stone hard 256-261 big gravel - good
138-138 lime stone hard 261-262 Shale
Kirschmer No. 1 W.L.R. pump 3 stages 12"
160' col. 10' suction, M+M gasoline (propane) eng. 16"lago casing 3/8' louver perfs
30' drill hole

0 - 35  soil
35 - 40  mag., rock
40 - 56  gravel
56 - 75  sandstone - soft
75 - 82  gravel, coarse
82 - 84  conglomerate, soft
84 - 91  sandy clay, gravel
91 - 97  gravel, coarse
97 - 102  sand, rock
102 - 110  sand, gravel
110 - 114  rock, soft
114 - 117  gravel
117 - 125  conglomerate, soft
125 - 128  sand, rock, clay
128 - 129  clay, gravel
129 - 138  gravel, coarse
138 - 140  clay, gravel
140 - 145  conglomerate, soft
145 - 146  sand, gravel
146 - 148  white clay, gravel
148 - 154  conglomerate, soft
154 - 156  gravel
156 - 160  rock, hard
160 - 163  gravel
163 - 168  mag., rock
168 - 193  gravel + fine sand
193 - 200  clay

Static level 90'
E.S. Bennett Burlington Rt. 3

NW 4 Sec 30 T55 R44 W. at foot of escarpment. Aug 26 1941

24" Casing 36 ft. perf 36" drill hole

0-21 clay
21-31 rock gravel
31-37 mag. rock
37-43 clay
43-53½ gravel coarse
53½-58 mag. rock soft
58-60 clay
60-63 gravel
63-64 sand rock
64-65 gravel
65- shale

Water table 23'

Colorado pump. Disch 8 1/6" ID

Meter 200 revs in 52.6, 53.2, 53.8 52.4
= 3.7 revs/sec = 3.54 ft/sec

Q = 144 x 3.54 = 510 gpm

Water level 44.0' from top of casing at 1.2' above G.S. Drawdown obt. 20'

after 7 hrs pg. Well completed r

pump installed 3 days ago
Aug 26

McDonald: NW cor NE^4 3 6S 45W
Irrigation well just being started by H. Wilson. Expect to finish tomorrow. First hole showed all gravel to 101' to 102'. Drill bit was at 30' and gravel coming up coarse and excellent. Static water table 15'. Site is at edge but in river valley. 36" drill hole 18" gal. casing. Envelope gravel for all wells W. has drilled is hauled from Denver. Size all less than 1". Costs $1.50/T. at Denver.
Wichita wheat
MEMO.

Several new wells in Beaver Cr.

1. A. Trim 5 E 6 S. of Last Chance
2. T. Lowton 4 E 2 N.

G. H. Ambrosier
Chirington
Lotham Drain  
May 22, 1944  G.H. 62  3$\frac{1}{2}$ spilling

\[
\begin{array}{c}
10 \times 12 \frac{1}{2} \\
\times 3 \\
\hline
30 \text{ whp} \\
60 \text{ hp} \\
45 \quad 50 \quad ¥ 1.00
\end{array}
\]

\[2 \frac{1}{2} \text{ ac}\]

12) 2.67 \[\begin{array}{c}
24 \\
\end{array}\]

Water Hotel at Flagler
Callens Hotel at St. Augustine
Commercial Hotel at Wayville
Hotel West at Burlington
Stevens Motel