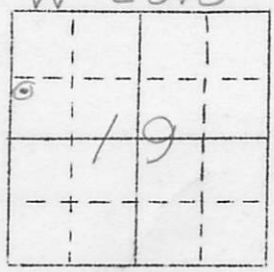
File in Sac Co.

IOWA GEOLOGICAL SURVEY
In Cooperation with U. S. Geological Survey

W-2018

RECORD OF WELL



Location:

Town: Lytton (Sac) (N E / S W); County Calhoun well in E.

NW-SW-NW sec. 19 T. 88 N., R. 34 W. Garfield Twp.

Well name and number Lytton City Well #2

Owner City of Lytton Address

Tenant Address

Contractor Hoeg & Ames 0-971' Address Lincoln
THORPE WELL CO. 971'-1854'

Drillers Homer Rhodes

Drilling dates April 18 1945 - July 18, 1945
OCT. 3, 1955 - MAY 28, 1956

Well data:

Elevations: Drilling curb 1223 feet; Land surface 1223 feet

Determined by W E H hand level

Topographic position Gently rolling upland

Total depth: Reported OLD TD 971 feet, Measured feet
NEW TD 1854'

Drilling method cable tools

Hole and casing data 410' of 10" O.D. casing from 0 - 410'
(Give amount, size, kind, and depth of all casing; type and
80' of 8" casing from 400' - 480'
position of seals and packers; cementing; how finished--perforated pipe, screen,
5½" of 6" casing from 459-971 perforated from 535-
gravel pack, open hole, etc.)
540' and 871' - 971'
383.2' OF 8" CASING 0-383.2'
344.4' OF 6" CASING 383.2' - 727.6'
120.6' OF 6" CASING 1374.6' - 1495'

Original depth to water 74.40 ft. below ~~above~~ pump base Date July 18, 1945
1 ft above ground

Original elevation of water level 1150 ft.; Source of data

Sources of water: Principal Devonian 890-971; Others
Hampton 535-540
ST. PETER, , PRAIRIE DU CHIEN, JORDAN.

Production data: Date July 18 1945

Static depth to water 74.40 Measuring point pump base 1.05 ft above ground

Pumping level 186.25 at 107 g.p.m.

111.85

Specific capacity 1.2 g.p.m. per ft. drawdown; Temperature 57 1/4 °F.

Pump data; Type pump Turbine Column Dia. _____ Length _____

Cylinder or bowls: Dia. _____ Length _____ Suction pipe _____

Power _____ Airline _____

Estimated rate of production: _____ g.p.m. for _____ hrs. a day

Use of water City supply

WATER ANALYSES (in parts per million)

Date sampled	July 14 1945			
Sampled by	D A Barton			
Total solids	1471			
Insoluble matter	9.9			
Alkalinity (Meo)	310.0			
Alkalinity (Phn)	0.0			
pH 7/22/45	7.3			
Fe_2O_3+ Mn_2O_3+Al_2O_3	5.0			
Alkali as sodium	151.7			
Calcium	184.0			
Magnesium	76.7			
Iron (unfiltered)	0.5			
Manganese	0.00			
Nitrate	0.00			
Fluoride	1.8			
Chloride	21.0			
Sulfate	719.5			
Bicarbonate	378.2			
Hardness (ppm)	776			
Hardness (gpg)	45.3			

Remarks _____

Laboratory data: Sample storage location _____

Sample range 0-971 No. spls. 191 No. dupls. & cond. _____

Spls. prepared by Rush Washed range _____ by _____

Driller's log and cond. _____

Insoluble residues: Prepared by _____ Studied by _____ Strip log _____

Microscopic study 0-971 E.S. strip log May 1945 E.S.

Gen. log _____ Correl. by E. Schultz

WATER LEVEL DATA

Measuring point _____

Date	Depth to water	Altitude	Remarks
7-18-45	73.00		107 ppm; 112.25' d.d. W.E.H.

REMARKS

UNITED STATES DEPARTMENT OF THE INTERIOR
Geological Survey
Water Resources Division

Water Quality
(ppm)

Local Well No. 088-34W-19BCB
Aquifer Code(s) C3SJ ØILP
Owner's Name LYTTON CITY #2 (1956)
W Number 02018

Card Q

State: IOWA (19) County: CALHOUN (13) Town: LYTTON, IOWA

Well No. Latitude 42 52 5 N (5–11) Longitude 094 51 23 (12–18) Seq. No. 2 (19) Date M 11 D 12 Y 69 (20–25)

Sampling Depth 1854 (26–29) Type 1 (30) Kx10^6 2000 (31–35) pH 7.2 (36–38) Temp. °F (39–41)

SiO_2 9.6 (42–44) Ca 196. (45–49) Mg 78. (50–53) Na 180. (54–58) K 2.9 (59–61)

Source No.

HCO_3 350 (62–65) CO_3 0 (66–67) SO_4 880. (68–72) Cl 18. (73–78) 3 (79) Q (80)

Card R

Duplicate Columns 1-25 from Card Q

F 1.2 (26–28) NO_3 .4 (29–32) PO_4 (33–35) B (36–38) Al (39–41) Fe 2.9 (42–45)

Mn .05 (46–49) Cu (50–52) Pb (53–54) Zn (55–57)

Solids Determined 1650 (58–63) Calc. (64–69) Hardness Ca,Mg 810 (70–73) Non-Carb. 521 (74–77)

Color (78–79) No. R (80)

Card S

Duplicate Columns 1-25 from Card Q

Br (26–28) I (29–31) Alk. as $CaCO_3$ 289 (32–35) Free CO_2 (36–38) SAR (39–41)

RSC (42–44) ABS (45–47) (48–50)

Alpha (pc/l) (55–57) Beta (pc/l) (58–60) Ra (pc/l) (61–63) U (ug/l) (64–66)

No. S (80)

Recorded by: D. AARONSON

Punched by: _____ Date: _____

Published: _____

088-34W-19 BCB

UNITED STATES DEPARTMENT OF THE INTERIOR
Geological Survey
Water Resources Division

W-2018 (NEW)

Water Quality
(ppm)

Card Q

State: IOWA [16] (1 2) County: CALHOUN [13] (3 4) Town: LYTTON

Well No. Latitude [42 25 25 N] (5–11) Longitude [094 51 23] (12–18) Seq. No. [2] (19) Date M D Y [10 10 56] (20–25)

Sampling Depth [1851] (26–29) Type [1] (30) $Kx10^6$ [1960] (31–35) pH [7.1] (36–38) Temp. °F [ ] (39–41)

SiO_2 [93] (42–44) Ca [185] (45–49) Mg [80] (50–53) Na [175] (54–58) K [25] (59–61)

HCO_3 [346] (62–65) CO_3 [0] (66 67) SO_4 [848] (68–72) Cl [19] (73–78) Source No. [3] (79) [Q] (80)

Card R

Duplicate Columns 1-25 from Card Q

F [1.7] (26–28) NO_3 [LESS THAN .4] (29–32) PO_4 [ ] (33–35) B [ ] (36–38) Al [ ] (39–41) Fe [1.2] (42–45)

Mn [LESS THAN .05] (46–49) Cu [ ] (50–52) Pb [ ] (53 54) Zn [ ] (55–57)

Solids Determined [1670] (58–63) Calc. [ ] (64–69) Hardness Ca,Mg [794] (70–73) Non-Carb. [510] (74–77)

Color [ ] (78 79) No. [R] (80)

Card S

Duplicate Columns 1-25 from Card Q

Br [ ] (26–28) I [ ] (29–31) Alk. as $CaCO_3$ [284] (32–35) Free CO_2 [ ] (36–38) SAR [ ] (39–41)

RSC [ ] (42–44) ABS [ ] (45–47) [ ] (48–50) [ ]

Alpha (pc/l) [ ] (55–57) Beta (pc/l) [ ] (58–60) Ra (pc/l) [ ] (61–63) U (ug/l) [ ] (64–66)

No. [S] (80)

Verified PMJ

Recorded by: D. AARONSON Punched by: Punched FCH Date: ____

Published: ____

088-34W-19BCB.1
DMC

UNITED STATES DEPARTMENT OF THE INTERIOR
Geological Survey
Water Resources Division

W-2018
(OLD)

Water Quality
(ppm)

Card Q

State: IOWA [16] (1 2) County: CALHOUN [13] (3 4) Town: LYTTON

Well No. Latitude 42 25 25 N (5–11) Longitude 094 51 23 (12–18) Seq. No. 1 (19) Date M 07 D 22 Y 45 (20–25)

Sampling Depth 971 (26–29) Type 1 (30) Kx10⁶ (31–35) pH 7.3 (36–38) Temp. °F 57 (39–41)

SiO_2 (42–44) Ca 184 (45–49) Mg 77 (50–53) Na (ALK. / K^+) 152 (54–58) K .C (59–61)

Source No. 3 9 (79–80)

HCO_3 378 (62–65) CO_3 0 (66–67) SO_4 720 (68–72) Cl 210 (73–78)

Card R

Duplicate Columns 1-25 from Card Q

F 1.8 (26–28) NO_3 .0 (29–32) PO_4 (33–35) B (36–38) Al (39–41) Fe .50 (42–45)

Mn .00 (46–49) Cu (50–52) Pb (53–54) Zn (55–57)

Solids Determined 1470 (58–63) Calc. (64–69) Hardness Ca,Mg 776 (70–73) Non-Carb. 466 (74–77)

Color (78–79) No. R (80)

Card S

Duplicate Columns 1-25 from Card Q

Br (26–28) I (29–31) Alk. as $CaCO_3$ 310 (32–35) Free CO_2 (36–38) SAR (39–41)

RSC (42–44) ABS (45–47) (48–50)

Alpha (pc/l) (55–57) Beta (pc/l) (58–60) Ra (pc/l) (61–63) U (ug/l) (64–66)

Verified PMJ

No. S (80)

Recorded by: D. AARONSON

Punched FCH

Punched by: _____ Date: _____

Published: _____

Run partial

IOWA GEOLOGICAL SURVEY
Iowa City, Iowa
WELL OR WATER SAMPLE DATA

Bottle No. G-55

TOWN Lytton COUNTY Calhoun

LOCATION NW SW NW sec. 19 T. 88 N.R. 34 W. Garfield Twp.

OWNER OF WELL Town of Lytton WELL NO. 2

USE OF WATER: City Supply (X); Private-Domestic ( ); Public Dri ing ( ); Live-stock ( ); Industrial ( ); School Supply ( ); Air conditioning ( ); Cooling ( ); _____ ( ).

CONSTRUCTION OF WELL: Drilled (X); Gravel-Pack type ( ); Driven ( ); Dug ( ): Bored ( ); Jetted ( ) _____ ( ).

CONTRACTOR Hoeg & Ames, Lincoln Iowa DATE STARTED Apr. 1945 DATE FINISHED July 1945

CASING OR CURBING DATA: (Show by diagram on opposite side of sheet the kind, length and depth of top and bottom of each size of pipe, the amount of overlaps, position of seals or packers, pipe perforation and screens, etc.)

WELL DATA

Curb Elevation 1223 Ft. Present Depth _____ Ft. Final Depth 971 Ft.

Ground Elevation 1223 Ft. Topographic Position Upland

Static Level (Depth to Water ~~(Above)~~ (Below) Curb) 73.00 Ft. Pumping Level 185.25 Ft.

Amount of Drawdown 112.25 Ft. pumping at 107 g.p.m. in 4 hrs. _____ minutes.

Specific Capacity .95 g.p.m. per ft. drawdown

Type of Pump Turbine Power Gasoline engine

Depth of Bottom of Pump 225 ft. with No ft. of suction pipe.

TEMPERATURE: Air 79 °F.; Water 57½ F., measured after well had pumped 4 hours _____ mins. at 107 g.p.m.; 50 ft. from pump after water had passed through the following pipe 50 feet of 2½ inch fire hose Time 2:30 (~~A.M.~~) (P.M.)

SOURCE OF WATER: Recent (Type and Depth) _____

Glacial Formations (Type) _____ at _____ ft. to _____ ft.

Limestone or Dolomite (Age) Mississippian (535-40) and Devonian at 890 ft. to 971 ft.

Sandstone (Age) _____ at _____ ft. to _____ ft.

Principal Producing Formation _____

REMARKS: Copy to Sylvan Ames and to Mayor C. Ditzel

Sample taken for: Mineral Analysis (X); Sanitary Analysis ( )

Data Collected by W.E. Hale Date July 18, 1945

REPORT Analysis to H. G. Hershey, Iowa Geological Survey, Iowa City

IOWA GEOLOGICAL SURVEY
Iowa City, Iowa
Generalized Well Log
Based on Examination of Drill Cuttings

Name of Well Lytton City Well No. 2 Survey No. W. 2018

Location NW¼ SW¼ NW¼ Sec. 19 T. 88 N., R. 34 W. County Calhoun

Total depth 971 ft. Drilled by Hoeg and Ames Date April to July 1945

Curb elevation 1223 ft. Static level 74.4 ft.; Drawdown 112 ft. at 107 g.p.m.

Casing and hole size record 104 feet of 16-inch O.D. casing 0-104 ft. (temporary); 205 ft. of 12-inch O.D. casing 0-205 ft. (temporary); 410 ft. of 10-inch O.D. casing 0-410 ft; 80 ft. of 8-inch casing 400-480 ft; 512 ft. of 6-inch casing 459-971 ft; perforated from 535 to 540 ft. and from 871 to 971 feet.

Description of Formation	Thickness	Depth in feet From	To
Pleistocene system - glacial till	100	0	100
Pennsylvanian system - mainly gray shales with thin interbedded sandstones	210	100	310
sandstone	45	310	355
shale	10	355	365
sandstone and chert	10	365	375
Mississippian system			
Warsaw formation			
cherty dolomite	20	375	395
sandstone and shale	26½	395	421½
limestone and dolomite	13½	421½	435
Gilmore City formation			
limestone	60	435	495
shale and limestone	35	495	530
Hampton formation			
dolomite	95	530	625
cherty dolomite	58	625	683
Maple Mill formation			
shale	4	683	687
Devonian system (undifferentiated)			
Dolomite with shale breaks encountered at approximately 700, 725, 800-809, 850 and 870 feet	284	687	971

Total depth 971 feet

R-1-B

THORPE WELL COMPANY

2340 SIXTH AVENUE
DES MOINES, IOWA

CALHOUN
FILE UNDER SAC COU

Drilled for Lytton, Iowa at Lytton, Iowa

Well is located ____ miles N-E-S-W and ____ miles N-E-S-W from ____

in the NW-SW¼ - NW¼ Section 19 Township 88N Range 34 W

Drilling started October 3 19 55 Completed May 28 19 56

Well No. ____ Kind of Well ____ Depth 1854 Size hole started ____ in

Finish ____ G. P. M. ____ Static Head 158 Pumping level from surface ____

Water was first encountered at ____ in ____ Approx. Amt. ____ Temp. ____

Remarks Old Well ~~97.0~~ 970' -- recased -- deepened & cemented

(GIVE DETAILS OF PERFORATED PIPE AND SEALS)

RECORD OF PERMANENT PIPE					TEMPORARY PIPE	
SIZE PIPE	AMOUNT OF PIPE	DEPTH TO BOTTOM OF PIPE	DEPTH TO TOP OF PIPE	MAKE OF PIPE	SIZE PIPE	AMOUNT
8"	383-2	383-2	0	Welded		8" & top line of 6" welded one line
6"	344-4	727-6	383'-2	Welded shoes, bottom welded to 8" top		
6"	120-6	1495	1374-6	Steel shoe top & bottom		

Driller Cecil Allen From Surface to ____ feet

Driller Boyd Irwin From ____ feet to ____ feet

Driller ____ From ____ feet to ____ feet

AMOUNT IN FEET	KIND OF SOIL OR FORMATION (BE SPECIFIC)	TOTAL DEPTH FEET
25	Brown lime - some clay	995
5	Shale - gray green little lime	1000
68	Lime & shale	1068
47	Sandy - lime - no cuttings from 1069 to 1095	1125
115	White lime & brown lime - white clay	1230
170	Brown sandy lime - some brown clay	1400
1	Green shale	1401
14	Hard gray brown lime	1415
10	Green shale & brown lime	1425
13	Green shale	1438
5	Brown hard lime	1443
42	Green shale	1485
52	Sand	1537
118	Brown lime - no cutting from 1545 to 1650	1655
30	Sand	1685
90	Brown & gray lime	1775
65	Sandstone white	1840
14	Lime & some shale	1854

Lytton City Well #2 Elevations run by DA Burton - July 14, 1945

Paulin.

Time.	Stn	Reading	T.	Cr	Adj Read.	Cr (1223)	Elevation.
11:34	Cb M5 PHP	1166	78°	0	—	+57	1223
1146	Well	1174		0		+53	1227
1151	Stn	1173		0		+50	1223
1155	Well	1168		0	DAB	+52	1220
1159	Stn	1168		0		+55	1223

Selsi.

1133	Stn	1232		0	—	-9	1223
1146	Well	1213				0	1213
1152	Stn	1206				+17	1223
1155	Well	1206				+17	1223
1200	Stn	1206		0	—	+17	1223

John C. Moore Corporation, Rochester, N. Y. Binder and holes in leaves Patented. FORM 416905

John C. Moore Corporation, Rochester, N. Y. Binder and holes in leaves Patented. FORM 416905

MOORE'S MODERN METHODS

Lytton on Highway 20 Sac Co.

Sec 24 T. 88 R. 35 Mayor Conrad Ditzel

Hoeg & Ames - Homer Rhodes driller.

Boyles - Public Health Engineer.

1st Well = 1150 feet Dep. - caved to 150 feet Dep.

Man Kato Drift - Youngest.

In April - Depth of dr = 450'

Trouble was with caving shale.

Casing was set at 420 feet

drilled to 460 and set liner.

1. How bad did shale cave?

Did they hit any more lyn

2. Cemented pipe into place? No

3. Was casing slotted. No

Nelda Campbell

Sac Co.

John C. Moore Corporation, Rochester, N. Y. Binder and holes in leaves Patented. FORM 416905

MOORE'S MODERN METHODS

Various borings where water encountered, ?
below 420.

Samples to 725' and good circulation.
Forecast to St Peter.

Pump for 8 hours. - if d.d. increase pump longer.

John C. Moore Corporation, Rochester, N. Y. Binder and holes in leaves Patented. FORM 416905

MOORE'S MODERN METHODS

9

Lyttton

Casing

104 - 16" OD. cemented

205 - 12" OD cemented.

410 10" OD Bottom of 10"

80 8" OD. 10' overlap 480 bottom of 8"

open Rent.

to be set. 6" with Tapints 8" 10' and 9" to Bottom.

971' D & Orderly.

little above (water)

535-540 - water - } Water Horizons

880-971 water. - }

225' of Pedalum overage - 3½' column.

Stage ?

April 18, 1945

July 12 1945 -

Bedrock - Oil

Three gone trouble - came back into it again

cement have time until 10 - 8"

John C. Moore Corporation, Rochester, N. Y. Binder and holes in leaves Patented. FORM

MOORE'S MODERN METHODS

10

- Lytton -

July 13-1945

	D/W	
528.	112	Pumping into Mains
530	109.9"	
532	112.4"	
533	114.2"	
535	114 8/8"	
540	112 3"	
544	110 10"	
548	111.00	
719	182	open wide at 7:00 PM

4" pipe. 2½" fire hose. - 100 ft hose.

722	183 8"	
725	184. 1/8"	

Production not determined

Static 75
Pump level 160
85 drawdown

Mayor Conrad Ditzel. — copy —

G.H. Nielsen.
Mining Analysis. Lytton Coop Coy.

SAC
Gen.

Memorandum

By: W. E. Hale

Subject: Development of Ground Water Supply for town of Lytton and Lytton Cooperative Creamery

Date: March 25, 1945

A few weeks ago the 1140-foot well belonging to the town of Lytton caved to a depth of 150 feet. This cut down the water supply from the well to about 10 gallons a minute. A pump was immediately installed on one of the old test wells drilled a few years ago, and about 7 gallons a minute was obtained from this test well. The town has engaged Hoeg & Ames to drill a new well. The creamery is considering drilling a new well if the town does not obtain a suitable water supply in the very near future. Several test holes were drilled by Thorpe a few years ago. Some of the wells were drilled into the Dakota formation, most of the wells were finished in sand and gravel at a depth of about 60 feet.

Mr. Sylvan Ames has requested a report on ground water conditions at Lytton and will appreciate receiving this information at the earliest moment possible. I first learned of the trouble at Lytton when Mr. Dewey Edwards called and asked me to get the location and elevation in the Thorpe test holes. He planned to visit the creamery on Monday, March 26. As I understand it, he is not particularly interested in drilling in this locality, but may act in a consultant capacity in developing a well in the sand and gravel.

WEH

Iowa

State Department of Health

DISTRICT HEALTH SERVICE
NO. 5
Fort Dodge, Iowa

IN REPLYING ADDRESS

WALTER L. BIERRING, M. D.
COMMISSIONER
DES MOINES, IOWA

APR 20 1945

April 19, 1945

Mr. H. G. Hershey,
Associate State Geologist
Geology Annex
Iowa City, Iowa

Dear Mr. Hershey:

Your letter regarding forecast of possibilities of developing a shallow water supply at Sac City received and greatly appreciated. It will probably be sometime before the city officials decide just what steps to take in the improvement of their supply. I was glad of the opportunity to go over the ground with Mr. Hale, since the problem was rather extensive and difficult to explain by letter.

The Hague and Ames Well Drilling Company of Lincoln, Iowa, have moved in to Lytton and perhaps by this time have started drilling on the new well to be located just north and west of the new schoolhouse. I did not have an opportunity to talk with the contractors and therefore do not know if they have the required equipment for the collection of samples during drilling operations. Mr. Conrad Ditzel, mayor, operates a garage on the north side of Highway #20 in town. He is very interested in the development of the well and could be contacted any time you or Mr. Hale happen to go through there.

Drilling operations are underway at Scranton by the Thorpe Well Company and although I have not been down there since they started drilling I believe they should be fairly well along.

Thank you for your past assistance and information on well forecasts throughout the district.

Very truly yours,

DISTRICT HEALTH SERVICE NO. 5

X. P. Boyles

X. P. Boyles
Public Health Engineer

XPB:DES

STATE OF IOWA

IOWA GEOLOGICAL SURVEY

GEOLOGY ANNEX

IOWA CITY

April 6, 1945

Mr. Sylvan Ames
Lincoln, Iowa

Dear Mr. Ames:

In response to your oral request for information on the geology and groundwater conditions in the vicinity of Lytton, we have reviewed the data applicable to the area.

The town of Lytton is located on the gently rolling surface of the Mankato drift in Sec. 24, T. 88 N., R. 35 W., Cedar township. The town had a population of 335 in 1940. The town is served by the Chicago, Milwaukee and St. Paul Railroad. The largest single user of water is the Lytton Cooperative Creamery.

Lytton has obtained its public water supply since 1920 from a well drilled to a depth of 1150 feet. The producing horizon was reported to be a sandstone at a depth of 1065 to 1140 feet. The yield of the well is not known, but was sufficient for the needs of the town. Recently the well caved, apparently bridging at or filling to a depth of 150 feet. About 9 gallons of water per minute are now being pumped and an additional supply of from 7 to 9 gallons per minute is being obtained from a shallow test well drilled in 1941.

General Geology

The youngest drift sheet in Iowa, known as the Mankato drift, forms the surface topography. Other drift sheets occur below the Mankato drift. The drift is composed mostly of clay with lenses and stringers of sand and gravel. Several test wells drilled in the northeast part of town encountered from 10 to 15 feet of sand and gravel at a depth of from 30 to 40 feet. A test hole drilled in the west part of town encountered 25 feet of sand and gravel at the base of the drift. The drift is between 85 and 115 feet thick at Lytton.

The bedrock surface at Lytton is composed of shale and sandstone belonging to the Dakota formation. The Dakota formation is here composed mostly of red to gray shales with thin beds of sandstone occuring in the upper part. A test hole drilled one block south of the town well encountered 9 feet of fine-grained sandstone at a depth of from 104 to 113 feet. Another test well drilled 2 blocks east of the town well encountered 15 feet of sandstone at a depth of 100 feet which is thought to belong in the Dakota formation. A thin bed of sandstone was encountered at a depth of 110 feet in a well drilled for the creamery. The lower part of the Dakota formation is composed of shales with hemitite concretions. These shales may be expected to cave a short time after being drilled. The Dakota formation at Lytton should be about 110 feet thick and extend to a depth of 190 feet.

Underlying the Dakota formation are shales and sandstones of the Cherokee group of the Pennsylvanian system of rocks. This section is about 160 feet thick at Lytton. The upper 110 feet of this section is composed of dark gray to black shales with some coal seams. Two sandstone beds may be expected in the lower 50 feet; the upper bed should be about 15 feet thick, the lower 20 feet thick. These shales may also be expected to cave a short time after being drilled.

The first dolomite that may be expected occurs in the Mississippian rocks underlying the Pennsylvanian shales and sandstones at an approximate depth of 350 feet. The Mississipian section is composed mostly of cherty limestone and dolomite and should extend to a depth of about 690 feet. Near the base of this section a thin sandstone or siltstone bed, known as the English River formation, is usually encountered. In the upper part of the section in the Warsaw formation thin beds of shale can be expected but they should be thin enough so as not to require casing. At the base of the Mississippian section or at the top of the Devonian section a shale occurs which may be as much as 20 feet thick. This shale should stand while drilling but is likely to cave in time. This shale was 25 feet thick at Duncombe and was not cased.

Rocks belonging to the Devonian system underlie the Mississippian rocks. This section should be about 400 feet thick and is composed mostly of dolomite. A few thick beds of shale may be expected. One shale bed occurs at a depth of about 870 feet. Again in the Duncombe well this shale was 25 feet thick and was not cased. However, in a deep well at Sac City, casing was inserted in the well down to a depth of 1204 feet into the Maquoketa formation. The old Lytton town well was cased through the Devonian rocks but it may not have been necessary from the standpoint of caving shale. The lower part of the Devonian section is quite shaley. In the lower 100 feet of the Devonian section in the Sac City deep well much shaley dolomite was encountered. It is not known whether this gave trouble in regard to caving or not. A sand or sandy dolomite is usually encountered at the base of the Devonian system. The Lytton town well was reportedly finished in a sandstone 75 feet thick, at the base of the Devonian system. The thickness of this sandy zone is questionable. Probably not more than 5 feet of sandstone occurs in the vicinity at this depth.

The Maquoketa formation of Ordovician age underlies the Devonian rocks. This formation is composed of cherty dolomite in this locality and should be about 90 feet thick.

The underlying Galena formation, which is composed of dolomite with some chert, should be about 160 feet thick.

The Decorah-Platteville formations lie between the Galena and St. Peter formations. The upper 10 or 15 feet is composed of dolomite. The lower 80 feet is composed mostly of shale and would undoubtedly require a liner.

The St. Peter sandstone should be about 50 feet thick at Lytton and should be encountered at a depth of about 1460 feet.

A tabular forecast of the geologic section to the St. Peter formation that would be encountered in a well drilled at Lytton follows:

Forecast of Geologic Section at Lytton based on a starting elevation of 1219 feet and located near old town well

Formation and description	Thickness	From	To
Pleistocene			
(clay with boulders)	40	0	40
(sand and gravel)	10	40	50
(clay with possibly some sand at base)	30	50	80
Cretaceous			
Dakota (mostly red and gray shales with some thin sandstone beds mostly in top part)	110	80	190
Pennsylvanian			
(shale, gray to dark gray, coal seams)	105	190	295
(sandstone with some shale)	15	295	310
(shale, gray)	15	310	325
(sandstone)	20	325	345
Mississippian			
St. Louis (dolomite, cherty, and sandy)	30	345	375
Warsaw-Keokuk (dolomite and limestone, cherty with thin shale beds)	75	375	450
Gilmore City (limestone, oolitic in part)	110	450	560
Hampton (limestone and dolomite)	30	560	590
(dolomite, cherty)	95	590	685
English River (sandstone, dolomitic)	5	685	690
Devonian			
(shale)	20	690	710
(dolomite and limestone with thin shale beds)	160	710	870
(shale)	15	870	885
(dolomite with much green and some brown shale in lower part, sandy)	235	885	1120
Ordovician			
Maquoketa (dolomite, cherty)	90	1120	1210
Galena (dolomite with some chert in lower part)	160	1210	1370
Decorah-Platteville			
(dolomite)	10	1370	1380
(shale and limestone)	60	1380	1440
(shale)	20	1440	1460
St. Peter (sandstone)	50	1460	1510

Ground-Water Conditions

Water was encountered in the sand and gravels occuring at a depth of from 30 to 40 feet in the northeast part of town. A supply of 10 gallons per minute was all that could be developed from this source. There might be a possibility of developing a number of wells in this shallow sand and gravel and obtaining enough water to supply the town. However, such a shallow supply is subject to droughts. The mineralogical quality of the water should be fair.

The thick sandstones encountered in the Dakota formation in the northwest part of the state are absent at Lytton. In the test hole located 1 block south of the town well, 20 gallons of water per minute were obtained from a 9 foot bed of sandstone in the Dakota formation at a depth of 104 feet. The drawdown at this production rate was 82 feet. The static water level was 29 feet. This particular sandstone bed may be absent at the city well. No thicker sandstone may be expected. It is doubtful if a satisfactory water supply can be developed in the Dakota formation.

The sandstones in the lower part of the Pennsylvanian system may yield some water. However, no water was reported from this horizon in the well drilled for the creamery.

Some water may be expected from the Mississippian formations. The creamery well was finished in this system of rocks at a depth of 531 feet. The static level of the water was 35.3 feet below the drilling curb. With a pump setting of 244 feet, 115 gallons of water per minute were pumped at the end of a 3 hour pumping period. The water was hard but no iron was present. This well was abandoned shortly after being drilled. A farm well located 1/2 mile northwest of Lytton reportedly obtains water from Missippian rocks at a depth of 365 feet. The water appears to have a high iron content and is quite hard. The specific capacity of the well is not known. There is apparently 160 feet of limestone and dolomite of Mississippian age below the depth reached by the creamery well. This would include part of the Gilmore City and the Hampton formations. Some water is usually encountered in both of these formations but probably not enough water for a town supply.

In the rocks of Devonian age the most reliable aquifer occurs at the base of this system of rocks. This is the aquifer apparently developed in the old town well at a depth of between 1065 and 1140 feet. The original static level of the water was between 70 and 100 feet. The original production is not known but as of July 1944 the reported yield was 22 gallons per minutewith an unknown drawdown. The water had a hardness of 729 parts per million calculated as equivalent calcium carbonate, and an iron content of 1.8 parts per million.

One of the Rockwell city wells was finished at an equivalent depth of about 950 feet in Devonian strata. The static water level was reported to be about 200 feet. The yield was 105 gallons per minute but the drawdown is not known. The water from this well was high in iron and fairly hard.

The Maquoketa and Galena formations are potentially water bearing but we have little information on the amount to be expected.

The Saint Peter formation should yield at least 50 gallons of water per minute. The static water level may be expected to be about 100 feet below land surface. The quality of the water should be about the same as that in the old town well.

Summary

The first promising aquifers appear to occur near the base of the Devonian system of rocks. The old town well apparently obtained a good supply of water from this horizon. The water is hard and the iron content exeessive. The iron could be removed by installing a filter.

The St. Peter sandstone should yield 50 gallons of water per minute. The quality of the water however is not likely to be much better than that obtained from the aquifers in the Devonian rocks.

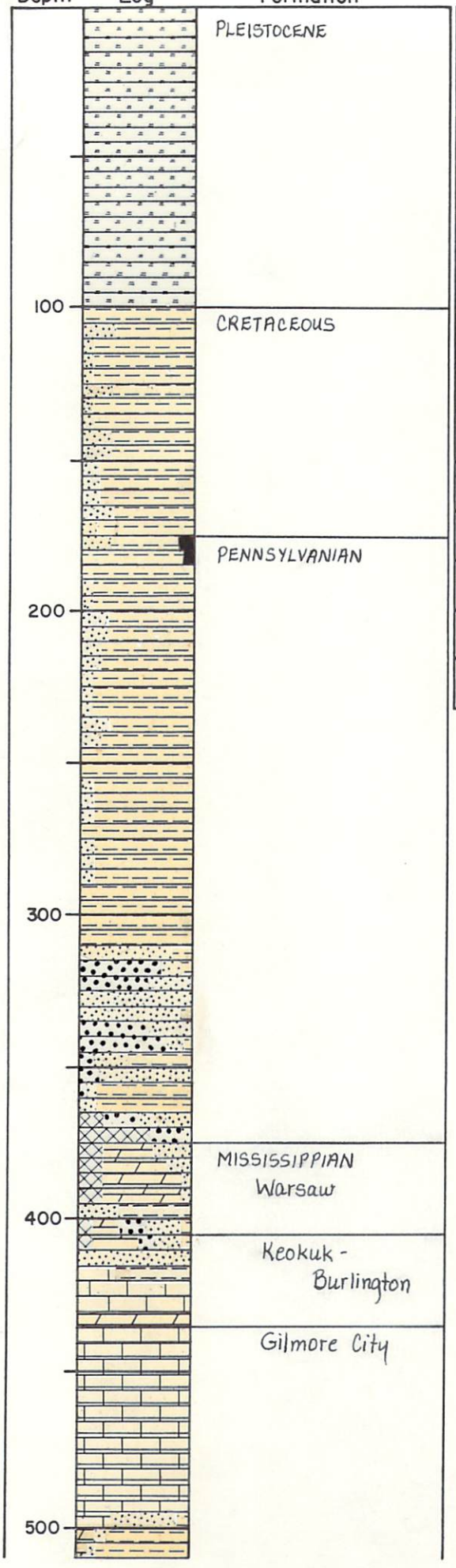
If you drill the well for the town it would be desirable to collect water samples from any aquifers encountered in the Mississippian rocks in which a fair amount of water is encountered. If the well is drilled to the St. Peter sandstone it would be well to collect water samples from the aquifers in the Devonian rocks. Frequent measurement of the water level would be helpful in determining the movement of water from one aquifer to another.

If you have any questions in regard to this discussion or if we can be of further service to you in this matter, please do not hesitate to let us hear from you.

Very truly yours,

William E. Hale

WEH'm

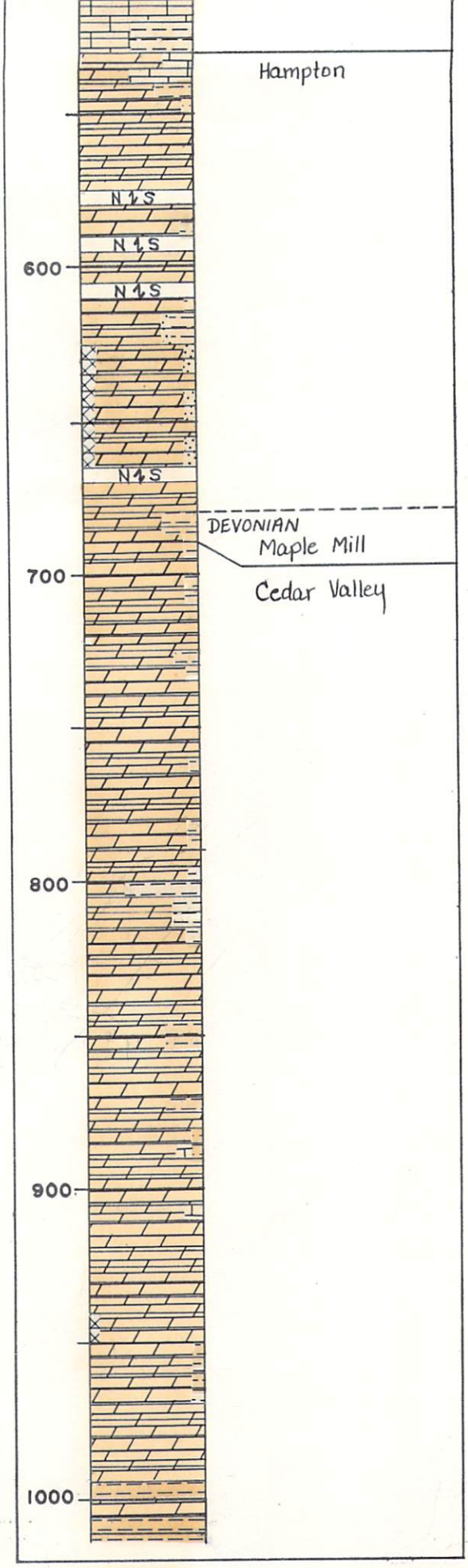


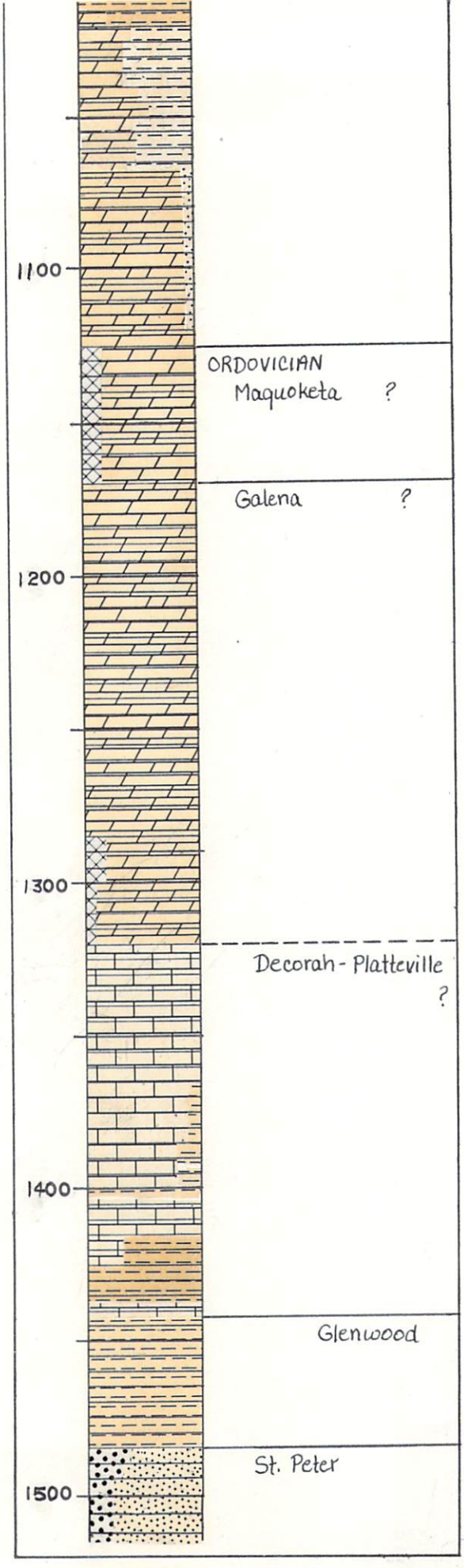
IOWA GEOLOGICAL SURVEY
In Cooperation with
U. S. GEOLOGICAL SURVEY
Iowa City, Iowa

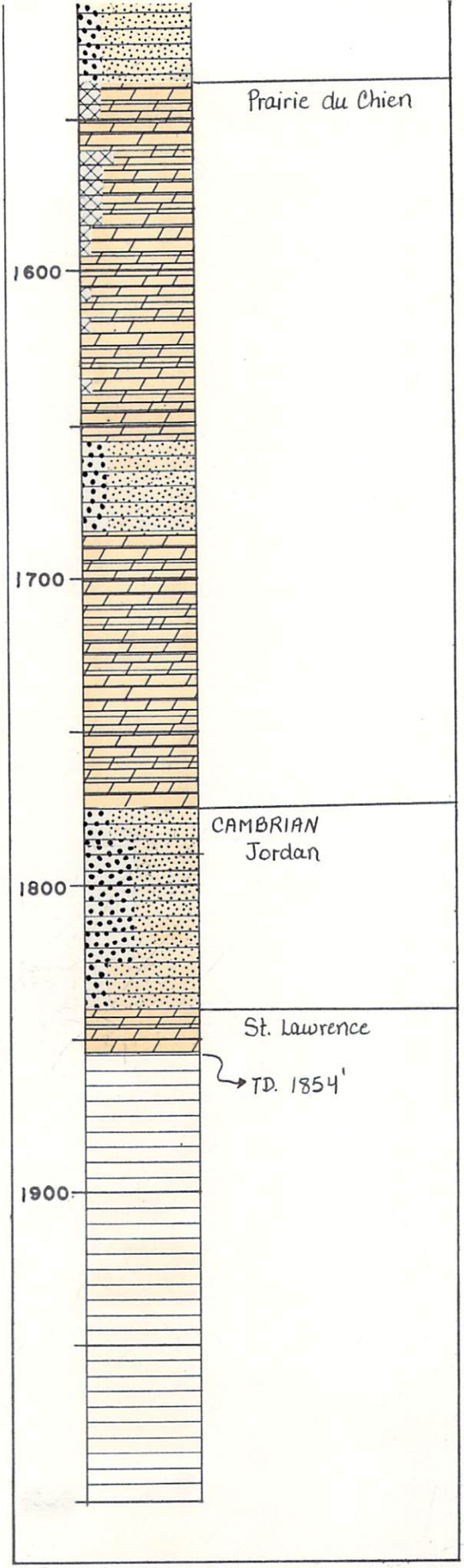
Name: Lytton City Well #2	State: IOWA
Town: Lytton — County: Calhoun	Loc.: NW SW NW
Contractor: Hoeg & Ames — Driller: Homer Rhodes	Sec. 19
Drilling Dates: 4-18-45 to 7-18-45	T. 88 N., R. 34 W.
Casing Record: 410' of 10" O.D. casing: 0-410' 80' of 8" casing: 400-480' 512' of 6" casing: 459-971' perf. 535-540', 871-971'	
S.W.L. 74 G.P.M. 107 D.D. 112	
Remarks: See note at end of log	Elev. 1223'
	T.D. 1854'
Logged By E. Schultz, May 1945	I.G.S. No. W-2018

Explanation of Colors

- Soil
- Loess, Silt or Siltstone
- Drift
- Sand & Gravel
- Shale
- Sandstone
- Limestone
- Dolomite
- Chert
- Gypsum or Anhydrite
- Coal
- N+S No Samples


Hampton
N↯S
N↯S
600
N↯S
N↯S
DEVONIAN
Maple Mill
700
Cedar Valley
800
900
1000


1100
1200
1300
1400
1500
ORDOVICIAN
Maquoketa ?
Galena ?
Decorah - Platteville ?
Glenwood
St. Peter



Note: Well deepened from 971' to 1854' by Thorpe Well Co. from Oct. 3, 1955 to May 28, 1956.
Driller's log has been plotted.
Casing record:
383.2' of 8" casing 0-383.2'
344.4' of 6" casing 383.2'-727.6'
120.6' of 6" casing 1374.6'-1495'
SWL. = 158'