NORTH DAKOTA GEOLOGICAL SURVEY CIRCULAR NO. 78

Summary of the Champlin Refining Elmer Tank #1 Well
Williams County, North Dakota
Well #48, Permit #65

by Sidney B. Anderson
June, 1954


The Champlin Tank well was spudded January 1, 1952 and 13 3/8" casing was set at 586 with 750 sacks of cement. 5,023 feet of 10 1/2" casing was set and 1,120 feet 9 5/8" casing was set. 1,120 of 9 5/8" casing was recovered leaving 5,023 feet of 10 1/2" casing in the hole. The well was plugged and abandoned September 23, 1952.

TESTS

DST #1  4717-61, recovered 4250 feet slightly gas cut salt water.
DST #2  7595-7740, open 1 hr., recovered 7240 feet salt water.
DST #3  8596-8753, open 57 min., recovered 630 feet mud.
DST #4  8740-83, open 1 hr., recovered 90 feet mud.
DST #5  8750-8830, open 5 hrs., recovered 810 feet water cushion slight scum oil, 300 feet gas cut salt water, 1 pint free oil.
DST #6  8830-8930, open 3 hrs., recovered 370 feet slightly gas cut mud.
DST #7  9706-9726, open 5 hrs., recovered 1800 feet water cushion, 640 feet mud.
DST #8  10,043-10,178, open 7 hrs., recovered 135 feet, oil and gas cut mud and 1 pint free oil.
DST #9  10,400-10,458, recovered 1300 feet slightly gas cut salt water.
DST #10 10,560-10,644, recovered 3570 feet salt water.
DST #11 10,680-10,727, recovered 335 feet slightly oil and gas cut mud.
DST #12 10,760-10,879, open 4 hours, recovered 350 feet salt water.
DST #13 11,185-11,220, recovered 2800 feet water cushion, 130 feet mud.
DST #14 11,195-11,310, open 4 hrs., recovered 90 feet slightly gas cut mud, FP 1375, SIP 1400 feet 15 min.
DST #15 11,975-12,103 packer failed.
DST #16 11,967-12,043, packer failed.
DST #17 11,673-11,943 packer failed.
DST #18 98-12,097, recovered 225 feet mud.
DST #19 12,108-12,404 packer failed.
DST #20 12,232 packer failed.

Attempted two DST's 8740-8870 packer failed.
Samples from 7310-7370 contain some sandstone with good flourescence.

FORMATION TOPS

Formation tops adjusted to electric log. Colors determined by rock color chart.
Cretaceous System

Pierre Formation 1555
Niobrara Formation 3637
Greenhorn Formation 4043
Dakota 4714

Jurassic System

Morrison Formation 5130
Sundance Formation 5329
Piper Formation 5935

Triassic System

Spearfish Formation 6193

Mississippian System

Amsden Formation 7010
Big Snowy Group 7195
Kibbey Lime 7698
Charles Formation 7835
Mission Canyon Formation 8578
Lodgepole Formation 8920
Englewood Formation 10,070

Devonian System

Lyleton Formation 10,300
Nisku Formation 10,360
Duperow Formation 10,455
Souris River Formation 10,815
Dawson Bay Formation 11,160
Prairie Evaporites 11,310
Winnipegosis Formation 11,637
Ashern Formation 11,805

Silurian System

Interlake Group 11,903

Total Depth 12,232

1110 Sandstone, lignite, light olive gray, medium green calcareous sandstone and lignite, and some hard tan shale, ironstone.
1120 Lignite sandstone, much lignite some sandstone as above.
1130 Sandstone lignite, much sandstone as above and some lignite.
1150 Sandstone lignite, sandstone and lignite as above and some ironstone fragments.
1160 Siltstone lignite, light olive gray silstone, few medium grained quartz and lignite.
1170 Sandstone, light olive gray, fine to medium grained, shaly sandstone.
1190 Sandstone, lignite, sandstone as above and lignite.
1200 Siltstone, light olive gray, few quartz grains and lignite.
1210 Sandstone, light olive gray and lignite.
1230 Siltstone and lignite as above, little quartz sand.
1340 Lignite and a little siltstone.
1350 Lignite and siltstone, light olive gray.
1360 Lignite and light olive gray, fine to medium sandstone.
1420 Sandstone as above and lignite (mostly sandstone).
1430 Limestone, yellow gray, silty and light gray, fine grained, dense limestone.
1440 Lignite and some yellow gray silty limestone.
Lignite and light olive gray siltstone.
Lignite.
Lignite and siltstone as above.
Sandstone, light olive gray, fine grained, calcareous.
Sandstone, yellow gray, limey, and lignite.
Siltstone, light olive gray, little sandstone and lignite as above.
Sandstone, yellow gray, limey (fine to medium grained) and some lignite.
Limestone, yellow gray, slightly silty and much lignite.
Limestone, yellow gray, silty and some lignite.
Lignite and some yellow gray, silty limestone.
Lignite, little yellow gray limestone and little light gray shale.
Lignite, yellow gray silty limestone and little light gray shale.
Limestone, yellow gray silty and some lignite.
Limestone as above; lignite; light gray shale and coarse subround to angular free quartz.
Shale, lignite and limestone as above and little coarse free quartz.
Limestone, yellow gray as above, few pieces of gray shale, some light gray fine grained limestone and little reddish sandy limestone.
Limestone as above, much light gray, fine grained dense limestone.
Yellow gray limestone and light gray shale.
Limestone, yellow gray, fine grained; little light gray shale and lignite.
Shale, light gray and some yellow gray limestone as above.
Shale as above.
Shale, light olive gray lumpy.
Shale, medium light gray, N6.
Shale, light olive gray, some lumpy.
Shale, medium light gray to olive gray, lumpy.
Shale, light olive gray, lumpy.
Shale as above, a few inoceramus prisms.
Shale as above.
Shale, medium light gray to light olive gray, lumpy.
Shale, light olive gray, lumpy.
Shale, medium light gray and light olive gray lumpy.
Shale as above with inoceramus prisms.
Shale, medium light gray and light olive gray lumpy.
Shale, green gray with some brownish.
Shale, green gray to medium light gray.
Shale as above and little coal (cave?).
Shale, light olive gray to green gray.
Shale as above and coal.
Shale, light olive gray.
Shale as above and coal.
Shale, light olive gray.
Shale, medium light gray.
Shale, light olive gray, slightly silty.
Shale, light gray to light olive gray.
Shale, light gray.
Shale, light gray to medium dark gray.
Shale as above with white specks.
3730  Shale, light gray to dark gray, few white specks.
3820  Shale, much medium light gray, silty.
3960  Shale, medium light gray, some medium light gray, silty.
4000  Shale, medium light gray.
4020  Shale, medium light gray, little dark gray.
4033  Shale, as above to medium dark gray, some with white specks.
4050  Shale as above, with white specks.
4150  Shale, medium light gray and little medium dark gray.
4170  Shale, medium light gray.
4280  Shale as above, little medium dark gray.
4418  Shale, medium light gray.
4460  Shale as above to medium dark gray.
4508  Shale, medium light gray.
4580  Shale as above to medium dark gray.
4630  Shale, medium light gray.
4631  Circ. 30 minutes. Shale, medium dark gray.
4645  Circ. 30 minutes. Shale, mostly medium light gray.
4645  Circ. 45 Minutes. Shale, mostly medium light gray.
4660  Shale, medium light gray.
4678  Circ. 15 minutes. Shale, medium light gray to light brown.
4678  Circ. 30 minutes. Shale, mostly medium light gray to medium dark gray.
4678  Circ. 45 minutes. Shale as above and light brown shale.
4790  Shale, medium dark gray.
4850  Sandstone, little very fine grained, white to light gray; shale as above.
4880  Sandstone, whitish to light gray, fine to medium grained. Shale.
4900  Sandstone and shale as above and some coarse free quartz.
4910  Shale as above, very little sandstone.
4960  Sandstone, whitish to light gray, fine grained, coarse free quartz, much shale as above.
4980  Shale as above and little light gray, fine grained sandstone.
4990  Shale and sandstone as above, much reddish to brownish ironstone.
5020  Shale as above, and very little fine grained sandstone as above.
5060  Sandstone, white, fine grained.
5070  Shale, medium dark gray and very little white to light gray, fine grained sandstone.
5084  Sandstone as above and little shale as above.
5084  Circ. 75 min. Sandstone and shale as above, some pinkish sandstone, fine grained with some coarse round grains.
5103  Sandstone, whitish to light gray, fine grained, little glauconitic; shale as above.
5103  Circ. 30 min. Sandstone, white to medium grained.
5140  Sandstone, white to tan and light gray, fine to medium grained.
5150  Shale, medium dark gray.
5160  Shale, medium dark gray to brownish and little glauconitic fine grain sandstone.
5170  Shale, medium dark gray.
5180  Shale as above and little light gray, fine grained sandstone.
5190  Shale, medium dark gray.
5200  Shale as above, light gray fine to medium grained sandstone.
5260  Shale as above and some light green gray to light gray shale.
5270  Shale as above and little very fine grained light gray sandstone.
5290  Shale as above and some light gray fine grained sandstone.
5300  Shale as above and little light gray, fine grained sandstone.
5320 Shale, medium dark gray to light gray; little fine grained green sandstone (glaucnitic ?) and light gray sandy limestone.
5330 Shale as above, light green to light gray, fine grained sandstone.
5340 Shale, medium dark gray, light gray and green gray.
5370 Shale as above and little light gray, very fine grained sandstone.
5380 Shale as above and some fine grained, light gray sandstone.
5390 Shale, green gray, little medium dark gray and little fine grained, light grained sandstone.
5420 Shale as above and much whitish fine grained sandstone, very calcareous. (amidiscus cretacia 5390-5400).
5430 Shale and sandstone as above with little glauconite in sandstone.
5480 Whitish sandstone and shale as above.
5550 Shale, greenish gray, very little sandstone and little medium dark gray shale.
5600 Shale as above, little medium dark gray and brownish shale.
5620 Shale as above and little light gray, fine grained sandstone.
5770 Shale as above.
5780 Shale as above and little medium to light gray, fine grained sandstone, some with glauconite.
5790 Shale as above, few pieces of reddish shale and little light gray shaly limestone.
5800 Shale as above and few pieces of whitish to light gray, fine grained sandstone, some with glauconite.
5830 Shale, greenish gray to medium dark gray.
5840 Shale as above and few pieces of fine grained, light gray to greenish sandstone.
5850 Shale as above and light brown gray, fine grained to slightly fragmental limestone.
5860 Limestone and shale as above, little brown, very limey sandstone, fine grain.
5900 Limestone, brown fragmental.
5950 Shale, variegated, little limestone as above.
5970 Limestone, yellow gray, fine grained, dense; shale as above.
5980 Limestone as above, some brown gray fragmental to light gray, very fine grained, dense.
6000 Limestone, yellow gray to light gray, fine grained, dense; variegated shale.
6020 Limestone, yellow gray, fine grained, dense and variegated shale.
6030 Limestone as above.
6050 Limestone as above and much pale brown 5YR5/2, fine grained dense.
6060 Limestone, pale brown, fine grained, dense.
6070 Limestone, yellow gray, fine grained, dense.
6080 Reddish shale and limestone as above with red shale staining.
6110 Shale, mostly shale as above, little green shale and limestone as above.
6120 Shale, reddish and greenish, few pieces of white anhydrite.
6130 Shale as above and brown gray limestone, some with white anhydrite inclusions.
6140 Shale and limestone as above.
6150 Shale as above, white granular anhydrite, little brown limestone, with anhydrite inclusions.
6200 Reddish shale, some greenish shale; few pieces of black shale and white anhydrite.
6250 Shale as above, little white anhydrite and reddish very fine grained sandstone.
6330 Shale, dark reddish brown, and greenish; pale reddish brown very fine grained sandstone.
6410 Shale as above, very little sandstone as above.
6440 Much sandstone as above, some coarse round free quartz and shale as above.
6460 Much sandstone as above, very little coarse round free quartz and shale as above.
6480 Much shale as above, some sandstone as above and little free quartz.
6500 Shale and sandstone as above, several salt crystals.
6570 Shale, reddish as above, little greenish shale, very little fine grained, red sandstone, some anhydrite.
6600 Shale as above, some fine grained sandstone as above and round free quartz.
6620 Sandstone, much fine grained reddish as above; shale as above and few round quartz grains.
6640 Shale and sandstone as above, some very limey sandstone and some anhydrite; pale reddish brown siltstone.
6660 Sandstone and shale as above, pale reddish brown siltstone.
6740 Siltstone, sandstone, shale, anhydrite as above; some white anhydrite.
6750 As above and few coarse round quartz grains.
6880 Siltstone, pale reddish brown, very little fine grained sandstone.
6950 Siltstone as above, some very fine grained sandstone and few round free quartz grains.
7040 Sandstone, pale reddish brown, fine grained and little white anhydrite.
7050 Dolomite, whitish to very pale reddish, very fine grained, dense.
7120 Dolomite, white to very pale reddish or very pale reddish purple dolomite as above.
7140 Dolomite as above and some pale red purple calcareous shale.
7170 Shale as above, with some pale red purple fine grained, dense limestone, some dolomite as above.
7210 Shale, pale red purple and pale red purple fine grained dense limestone. (7220 - much moderate red brown waxey shale) and much red brown shale (spearfish cave ?)
7240 Shale as above and very little limestone.
7270 Shale as above and very little limestone, some reddish sandstone, fine grained spearfish cave.
7290 Shale, variegated, mostly reddish and purplish, some yellowish to greenish.
7300 Shale, variegated, mostly purplish and dark gray, some reddish.
7370 Sandstone, medium gray to medium dark gray, fine grained, good fluourescence and much shale as above. Very slight cut with carbon tetrachloride.
7400 Shale as above and very little sandstone.
7430 Shale as above.
7470 Limestone, brown gray, fine grained and shale as above.
Limestone, light to medium gray, fine grained; shale as above.
Shale as above.
Shale as above and little white medium grained sandstone.
Shale as above and reddish fine grained calcitic sandstone.
Shale as above and little light brown, fine grained sandstone.
Little sandstone as above, pale reddish fine grained sandstone, much medium grained round free quartz; shale as above.
Shale as above, very little sandstone.
Shale as above and some reddish fine grained sandstone.
Shale as above and very few pieces of reddish fine grained sandstone. Shale as above.
Limestone, brown gray, fine grained dense and shale as above.
Shale and limestone as above, pinpoint porosity in limestone.
Shale, variegated.
Shale, variegated, gray red very fine grained sandstone.
Shale, variegated, some sandstone as above, little red brown and light gray, fine grained sandstone and little brown gray, fine grained dense limestone.
Sandstone, pale red very fine grained silty, shale as above.
Sandstone, as above.
Sandstone, moderate red orange, fine grained, calcareous.
Sandstone as above and some variegated shale.
Sandstone, moderate red orange to moderate red brown, fine grained; siltstone; variegated shale. Microlog shows salt at 7854-7877.
Sandstone, pale red, silty, very fine grained. Microlog shows salt 7886-8068.
Shale and sandstone as above, white anhydrite.
Siltstone, pale red limey, sandy; little white anhydrite.
Siltstone as above, very little anhydrite. Microlog shows salt 8086-8111, 8126-8134, 8142-8159.
Siltstone as above, white to pink anhydrite.
Siltstone, as above, white anhydrite and medium green anhydritic limestone, few pieces of salt.
Limestone, light gray oolitic, white anhydrite as above, little salt and siltstone as above.
White anhydrite, siltstone, few pieces of salt and oolitic limestone as above.
White anhydrite.
White anhydrite, some medium gray dolomitic fine grained limestone. Microlog shows salt 8198-8254.
White anhydrite; medium gray dolomitic limestone and brownish oolitic limestone.
Limestone, brown, fine grained, little pinpoint porosity and some anhydrite.
Limestone and anhydrite as above; some medium gray limestone, fine grained.
White anhydrite, medium light gray, fine grained, dense, dolomitic limestone. Microlog shows salt 8345-8387.
Anhydrite and limestone as above; little fine grained to fine granular limestone.
Limestone, brown gray, fine grained, dense; some anhydrite.
8470 Limestone, brown gray, fine grained, dense, some medium light gray, fine grained, dense, little pinpoint porosity; some red shale and some anhydrite.
8490 Much red shale, some brown gray and medium light gray limestone, white anhydrite.
8500 Shale as above and few salt crystals.
8530 Limestone, brown gray to pale yellow brown, some pinpoint porosity, few pieces white anhydrite to red shale. Microlog shows salt, 8528-8578.
8540 Limestone, medium light gray, fine grained, dense dolomitic, little anhydrite; brown gray limestone and red shale.
8600 Limestone, medium light gray, fine grained, dense, dolomitic.
Little white to light gray anhydrite.
8610 Shale, much reddish silty, some reddish, fine grained sandstone (cave?) little dolomitic limestone and anhydrite as above.
8620 Shale, reddish brown, silty; little reddish brown, fine grained sandstone.
8630 Shale and limestone as above; white to light gray anhydrite and medium light gray, fine grained dolomite.
8640 White to light gray anhydrite and some medium light gray dolomite.
8650 Shale, reddish brown, some anhydrite and dolomite as above.
8670 Limestone, brown gray to light brown gray, fragmental dense; some reddish silty shale and little reddish fine grained sandstone.
8690 Dolomite, medium light gray, fine grained, dense; reddish brown silty shale and anhydrite.
8700 Limestone, brown gray, fragmental, dense.
8710 Limestone, light brown gray to brown gray, fragmental, little pinpoint porosity.
8736 Limestone, light brown gray, fine grained to fragmental, dense.
8830 Limestone, light brown gray, fragmental, little pinpoint porosity.
9160 Limestone, brown gray, fragmental, dense.
9170 Limestone, light brown gray, fragmental, dense.
9200 Limestone, light brown gray, fragmental to brown gray fragmental, dense.
9250 Limestone, brown gray, fragmental, dense.
9300 Limestone, light brown gray to brown gray, fragmental, dense.
9330 Limestone, dark brown gray and some light brown gray, fragmental, dense.
9340 Limestone, dark brown gray and much whitish to yellow gray, fragmental.
9350 Limestone, dark brown gray to light brown gray, fragmental, dense.
9370 Limestone, dark brown gray to pale yellow brown, fragmental, dense.
9390 Limestone, mostly pale yellow brown, fragmental, some dark brown gray, fragmental.
9440 Limestone, pale yellow brown, fragmental.
9470 Limestone, brown gray, fine grained, dense; very light gray, fine grained, dense limestone.
9540 Limestone, medium dark gray to medium light gray, fine grained, dense.
9560 Limestone, medium light grey to dark brown gray, fine grained, dense.
9600 Limestone, medium dark gray to medium light gray, fine grained, dense.
9620 Limestone as above and few pieces of chert.
9690 Limestone, medium dark gray, fine grained, dense.
10060 Limestone, medium dark gray to light gray, fine grained, dense.
10052 Circ. 30 min. Limestone as above and few pieces of dark gray shale.
10057 Circ. 30 min. Limestone as above.
10057 Circ. 1 hr. Limestone as above and few pieces of dark gray shale.
10057 Circ. 1 1/2 hrs. Limestone as above and few pieces of dark gray shale.
10070 Limestone and shale as above.
10100 Shale, dark gray.
10130 Shale as above and few pieces of fine grained, medium gray sandstone.
10178 Circ. 1 hr. Shale as above and some fine grained, medium gray limey sandstone; few pieces of light brown gray limestone.
10178 Circ. 2 hrs. Shale, dark gray, very little fine grained light gray sandstone.
10200 Shale as above and little whitish to light gray, fine grained limey sandstone.
10220 Shale as above, light gray to pale yellow brown, little pale orange, fine granular limestone, little brown gray, fine grained, dense, crystalline limestone.
10270 Limestone, pale orange, fine granular, dolomitic.
10300 Dolomite, pale orange to pinkish orange, fine granular and some brown gray, fine grained, dense, crystalline limestone.
10320 Dolomite and limestone as above; some pale yellow brown, fine grained, dense, limestone.
10330 Dolomite, pale orange to pinkish orange, fine granular.
10350 Dolomite as above; green argillaceous limestone.
10360 Dolomite as above and some light gray dolomite.
10370 Dolomite as above, some brown gray, fine grained, dense, crystalline limestone; little white to pink anhydrite.
10390 Limestone, light gray, fine granular to brown gray, fine grained, dense, crystalline.
10410 Limestone, pale yellow brown to brown gray, fine grained, dense, crystalline; few pieces of white anhydrite.
10440 Limestone, light brown gray, fragmental and some brown gray, fine grained, dense crystalline.
10450 Limestone, light brown gray, fragmental.
10460 Limestone, brown gray, fine grained, dense, crystalline; some limestone as above.
10457 Circ. Limestone, light brown gray, fragmental and some brown gray, fine grained, dense; crystalline.
10457 Circ. Limestone, as above.
10480 Limestone, brown gray, fine grained, dense, crystalline.
10550 Limestone as above to light brown gray, fine granular to fragmental.
10600 Limestone, brown gray, fine grained, dense, mostly light brown gray fragmental.
10610 Limestone as above and light brown, fine granular with fair pinpoint porosity.
10630 Limestone, light brown gray, fine granular (with fair pinpoint porosity) to fragmental and brown gray, fine gained, dense.
10644 Circ. Limestone, as above.
Limestone, brown gray, fine grained, dense, crystalline and some light brown gray, fragmental.
Limestone, brown gray, fine grained, dense, crystalline.
Limestone as above to light brown, fine grained, dense.
Limestone, light brown gray, fragmental.
Limestone, light brown, fine grained to fragmental and brown gray, fine grained, dense, crystalline.
Limestone, light brown, fine grained and brown gray, fine grained, dense, crystalline.
Limestone as above and some dark gray shale (baked).
Limestone as above.
Limestone, brown gray, fine grained crystalline and tan fine granular.
Circ. Limestone as above, mostly brown gray, fine grain, crystalline, dense.
Limestone as above with some tan, fine granular limestone.
Limestone, brown gray, fine grained, dense crystalline and much light brown or tan, fine granular.
Limestone, brown gray, fine grained, dense, crystalline and light gray, very fine granular.
Limestone, brown gray, fine grained, dense crystalline and some light gray, very fine granular limestone.
Limestone, brown gray, fine grained, dense, crystalline and light gray, very fine granular.
Limestone, much very light brown gray to light gray, fine granular.
Limestone, light brown gray, fine granular.
Limestone as above and brown gray, fine grained, crystalline, dense.
Limestone, light gray, fine grained, dense to brown gray, fine grained dense, crystalline.
Limestone, brown gray, fine granular, dense.
Dolomite, brown gray, fine granular to fragmental, calcitic.
Dolomite, brown gray, fine granular to granular, with some pinpoint porosity.
Dolomite, brown gray, fine granular to granular, slightly calcitic, with fair pinpoint porosity.
Dolomite as above and brown gray, fine grained, dense limestone.
Limestone, brown gray, fine grained to very fine granular dense.
Limestone, brown gray, fine granular.
Circ. 2 hrs. Limestone as above and brown gray, very fine grained, dense limestone.
Circ. 3 hrs. Limestone as above.
Limestone, brown gray, very fine granular to brown gray, fine grained, dense, crystalline limestone.
Dolomite, brown gray, granular to fine grained, dense.
Limestone, light brown gray, very fine granular.
Dolomite, light brown gray, very fine granular and brown gray, fine grained to very fine granular limestone.
Dolomite as above.
Dolomite as above and few pieces of brownish anhydrite.
Dolomite, light brown gray, fine granular and brown gray, fine grained, dense; brown gray, fine grained, dense, limestone.
Limestone and dolomite as above and some reddish calcareous shale.
11690  Limestone and dolomite as above, mostly reddish argillaceous limestone.
11800  Limestone, light brown gray to brown gray, fine grained, dense, crystalline to fragmental, dense.
11860  Limestone, light brown gray, fine grained, dense to brown gray, fine grained, dense, crystalline.
11870  Limestone, light gray, fine grained, dense; brown gray, fine grained, dense crystalline dolomite.
11900  Missing samples.
11920  Limestone, brown gray, fine grained, dense, crystalline.
11970  Limestone as above and little very pale brown, fine grained, dense dolomite.
11980  Dolomite as above and much reddish argillaceous and anhydritic dolomite.
12000  Limestone, whitish to very pale yellow brown, fine grain dense to dense crystalline.
12010  Limestone, brown gray, fine granular, dense and very light gray dense limestone; very light gray to tan anhydrite.
12020  Limestone, very pale yellow brown, fine grained, crystalline, some pinpoint porosity and some anhydrite.
12027  Circ. Limestone, very pale yellow brown, fine grained, crystalline to fragmental, dense, slightly dolomitic.
12060  Limestone as above to pale pinkish, some pinpoint porosity.
12232  Circ. 1 hr. Limestone, very pale yellow brown to almost whitish, fine grained, dense, crystalline, slightly dolomitic.
12232  Circ. 2 hr. Limestone as above to pale yellow brown. 3 hr. circ. as above.