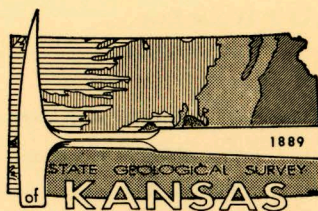


# Kansas Basement Rocks Committee Report for 1962 and Additional Precambrian Wells

By Virgil B. Cole, Daniel F. Merriam,  
and William W. Hambleton

STATE  
GEOLOGICAL  
SURVEY  
OF  
KANSAS

BULLETIN 165, PART 4



THE UNIVERSITY OF KANSAS  
LAWRENCE, KANSAS - 1963

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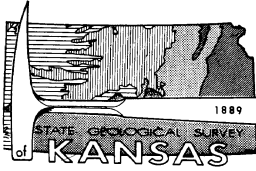
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VIRGIL B. COLE

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# Kansas Basement Rocks Committee Report for 1962 and Additional Precambrian Wells

## ABSTRACT

The Kansas Basement Rocks Committee of the Kansas Geological Society, in cooperation with the State Geological Survey of Kansas, is continuing an active research program on Precambrian basement rocks. A list of 112 wells, in addition to those previously published, that penetrate the buried Precambrian basement in Kansas is presented. The number of wells known to encounter the basement as of December 31, 1962, is about 2,300.

## Résumé

Le "Kansas Basement Rocks Committee" du "Kansas Geological Society," en coopération avec le "State Geological Survey of Kansas," continue un actif programme de recherches sur les roches du socle précambrien. On offre ici une liste supplémentaire de 112 puits qui ont pénétré dans le socle précambrien enseveli dans le Kansas. Le nombre total des puits qu'on sait ont rencontré le socle dès décembre 31, 1962, est à peu près 2300.

## Resumen

El "Kansas Basement Rocks Committee" de la "Kansas Geological Society," en cooperación con el "State Geological Survey of Kansas," está continuando un programa de investigación activa sobre las rocas Precambrian del basamento. Una lista suplemental de 112 pozos que penetraron el basamento Precambrian en Kansas es presentada. El número total de pozos que han dado con el basamento, hasta el 31 de Diciembre de 1962, es cerca de 2300.

## Auszug

Das "Kansas Basement Rocks Committee" der "Kansas Geological Society" setzt in Zusammenarbeit mit dem "State Geological Survey" ein intensives Forschungsprogramm über Präkambrische Liegendgesteine fort. Es legt eine ergänzende Zusammenstellung über 112 Brunnen vor, die in Kansas den verdeckten Präkambrische Untergrund durchtreten haben. Die Gesamtzahl der Brunnen, von denen bekannt ist, dass sie mit dem Untergrund in Berührung kommen, betrug am 31. Dezember 1962 ungefähr 2300.

## INTRODUCTION

Increased interest in the Precambrian basement in recent years has resulted in numerous studies of these rocks which form a rigid, complex "floor" beneath the overlying sedimentary sequence. Since its formation in 1958, the Kansas Basement Rocks Committee of the Kansas Geological Society, in cooperation with the State Geological Survey of Kansas, has been collecting information pertaining to the basement. To date, data on more than 2,300 wells reaching the buried basement have been tabulated and published so that they are readily available. This report is one of the series of such publications.

In addition to tabulating information on wells penetrating the Precambrian basement in Kansas, the Committee is actively collecting well cuttings and cores for analysis and preservation for future study. Selected samples will be studied for information on rock type, magnetic susceptibility, density, and radioactive age dates. These data can then be analyzed to gain understanding of the relations between the surface magnetic and gravity values and the configuration and distribution of basement rocks, to resolve the age of the basement complex, and perhaps to allow grouping of the rocks into meaningful units to help interpretation of their complex history. A knowledge of the basement will also be useful in understanding waves transmitted through the earth and recorded at seismograph stations.

It is possible that undetected mineral deposits of potential commercial value occur in the buried Precambrian rocks of Kansas. Only the closest scrutiny could reveal iron ore such as the Pea Ridge deposit found in Missouri's Precambrian several years ago. For many years, oil has been known to occur in fractures in Precambrian rocks, and it is produced in several fields in the central part of the state on the Central Kansas Uplift. Approximately 0.5 percent of Kansas' cumulative oil production has come from reservoirs in Precambrian rock. Exploration, and especially exploitation, of the Precambrian basement will be difficult, but the potential rewards warrant such investigations.

#### ACKNOWLEDGMENTS

We would like to acknowledge the continuing support of the Kansas Geological Society and of the many individuals and companies that have graciously supplied information and samples. A list of Precambrian wells maintained by the Oil and Gas Division of the Kansas Survey, of information reported by Data, Incorporated, was especially useful for checking the list prepared for this report. Miss Sally S. Liggett of the Kansas Geological Survey helped assemble and check the information on the wells.

#### PROJECTS OF THE COMMITTEE

Several preliminary and progress reports have been issued by members of the committee:

*Wells Drilled Into Precambrian Rock in Kansas*, by V. B. Cole, D. F. Merriam, P. C. Franks, W. W. Hambleton, and P. L. Hilpman: Kansas Geol. Survey Bull. 150, p. 1-169, 1961.

*Distribution of Precambrian Basement Rock Types in Kansas*, by D. F. Merriam, V. B. Cole, and W. W. Hambleton: Am. Assoc. Petroleum Geologists Bull., v. 45, no. 12, p. 2018-2024, 1961.

*Configuration of Precambrian Basement Rocks in Kansas*, by V. B. Cole: Kansas Geol. Survey Oil and Gas Inv. 26, map, 1962.

*Progress Report of the Kansas Basement Rocks Committee and Additional Precambrian Wells*, by V. B. Cole and D. F. Merriam: Kansas Geol. Survey Bull. 157, pt. 2, p. 1-11, 1962.

*History of Precambrian Studies in Kansas*, by D. F. Merriam: Kansas Acad. Sci. Trans., v. 65, no. 4, p. 433-447, 1962.

These reports indicate the general nature of the Precambrian rocks, but many aspects of the Kansas basement need to be studied.

Currently, members of the Kansas Basement Rocks Committee are engaged in directing sev-

eral projects. Petrography and petrology of the basement rocks are being investigated in some detail. Stratigraphy of beds overlying the Precambrian is being studied. Potassium-argon age dates have been determined for several samples and soon will be reported in print by J. L. Kulp. A bibliography of publications dealing with the Precambrian in Kansas is being compiled. Wells producing from the Precambrian and their production history are being listed.

For ease in handling and updating data, all Precambrian well information is being transcribed to punch cards for processing by high-speed, electronic digital computers. Several projects utilizing electronic data processing are under consideration; preliminary investigations have been generously supported by The University of Kansas Computation Center, R. G. Hetherington, Director.

The task of collecting information is never-ending, and donations of cores or cuttings are always gratefully accepted. The information is kept on file in the offices of the Kansas Survey at The University of Kansas, Lawrence, and the data made available to all interested students of Precambrian geology.

#### LIST OF PRECAMBRIAN WELLS

The following list (Table 1) contains information for each well as to county, company and farm name, location, surface elevation, depth to Precambrian, Precambrian datum, rock type, rock unit on basement, and total depth. The wells are arranged by township and range, west ranges listed first. Information is presented in the same format as that in the earlier publications.

These data have been collected from a variety of sources including electric and radioactivity logs, top cards, drillers logs, sample logs, and logs of the Kansas Sample Log Service. For verification, information was checked from two sources wherever possible. The list includes not only boreholes completed in 1962, but some older wells omitted from the previous lists. Any additions, corrections, or omissions noted should be addressed to the Kansas Survey.

All information has been forwarded to the American Association of Petroleum Geologists Basement Rocks Project Committee, P. T. Flawn, Chairman, and to the basement rocks project of the Advanced Research Projects Agency, W. R. Muehlberger, Director.

TABLE 1.—Additional boreholes drilled to Precambrian rocks in Kansas.

County	Company, well number, and farm	Location	Surface elevation, feet	Depth to Precambrian, feet	Elevation of Precambrian, feet	Precambrian rock type	Rock unit on basement	Total depth, feet
Norton	Terrel & Nat'l. No. 1 McRoy	19-1-23W NW NW NW	2411	3594	—1183	19 ft. granite wash on granite	Pennsylvanian	3623
Do	Raymond No. 1 Sauer	31-1-23W C SW NW	2472	3707	—1235	35 ft. granite wash on granite	Pennsylvanian	3771
Do	Raymond No. 1 McKinley	15-1-24W C NW NW	2373	3551	—1178	7 ft. granite wash on granite	Marmaton	3566
Do	Geochemical No. 1 Scrivner	8-1-25W C SE NE	2394	3570	—1176	39 ft. granite wash on granite	Pennsylvanian	3618
Do	Geochemical No. 1 Jenkins	9-1-25W C NE SW	2341	3532	—1191	14 ft. granite wash on granite	Pennsylvanian	3560
Do	Champlin No. 1 Railsback	15-1-25W C NW NE	2403	3573	—1170	33 ft. granite wash on granite	Pennsylvanian	3606
Decatur	Walker No. 1 Huff	10-1-26W C NE SE	2493	3591	—1098	15 ft. granite wash on granite	Pennsylvanian	3618
Do	Sauvage No. 1 Cozad	11-1-26W C NW SE	2440	3582	—1142	20 ft. granite wash on granite	Pennsylvanian	3612
Do	Chem. & Tech. No. 1 Knutson	11-1-26W C SE NW	2477	3606	—1129	19 ft. granite wash on granite	Pennsylvanian	3631
Do	Murfin & Ainsworth No. 1 Bremmer	18-1-26W NW NW NW	2500	3591	—1091	granite	Marmaton	3602
Do	Sauvage No. 1 Mizell	25-1-26W SW SW NW	2518	3747	—1229	15 ft. granite wash on granite	Pennsylvanian	3769
Do	Sauvage No. 2 Kilzer	2-1-27W C NW NE	2605	3674	—1069	19 ft. granite wash on granite	Pennsylvanian	3702
Do	Sauvage No. 1 McQuillan	23-1-27W C NW NE	2433	3565	—1132	granite	Reagan	3582
Do	Kidd No. 1 McQuillan	23-1-27W NW NW NW	2475	3554	—1079	granite wash	Marmaton	3560
Do	Rains & Williamson No. 1 Metcalf	33-1-27W C NW NW	2486	3600	—1114	granite	Pennsylvanian	3608
Do	Sauvage No. 1 Smalberger	4-1-28W NE NE SE	2651	3893	—1242	8 ft. granite wash on granite	Reagan	3906
Do	Rains and Williamson No. 1 Waldo	23-1-30W C SW SW	2672	4332	—1660	19 ft. granite wash on granite	Reagan	4356
Rawlins	Murfin & Ladmer No. 1 Stolte	6-1-32W C NW NW	2847	4549	—1702	15 ft. granite wash on granite	Reagan	4576
Norton	Pubco No. 16-13 Drommer	16-2-22W C SW SW	2324	3733	—1409	4 ft. granite wash on granite	Arbuckle	3739

TABLE 1.—Additional boreholes drilled to Precambrian rocks in Kansas (continued).

County	Company, well number, and farm	Location	Surface elevation, feet	Depth to Precambrian, feet	Elevation of Precambrian, feet	Precambrian rock type	Rock unit on basement	Total depth, feet
Norton	Reading & Bates No. 1 Lecount	1-2-25W C SE NW	2477	3688	-1211	13 ft. granite wash on granite	Pennsylvanian	3712
Do	Cities Service No. 1 Curran	11-2-25W C NE NE	2510	3734	-1224	8 ft. granite wash on granite	Reagan	3762
Do	C & G and Shields No. 1 Rubendall	35-2-25W NE NE NW	2500	3845	-1345	granite	Reagan	3855
Decatur	Farmer No. 1 Thomsen	1-2-28W C NE NW	2580	3992	-1412	granite	Arbuckle	4001
Do	Savage No. 1 Smick	9-2-28W C NW NW	2643	4135	-1492	granite	Arbuckle	4138
Do	Murfin & Donnelly No. 1 Miller	12-2-28W C NE SW	2490	3930	-1440	32 ft. granite wash on granite	Arbuckle	4040
Do	Rock Island No. 1 Reeves	12-2-28W C SW NE	2488	3904	-1416	8 ft. granite wash on granite	Reagan	3940
Norton	Terrel & Pentagon No. 1 Henderson	4-3-23W NW SE SE	2251	3536	-1285	10 ft. granite wash on granite	Reagan	3552
Do	Barker No. 1 Moody	22-3-23W NE NW NE	2408	3718	-1310	14 ft. granite wash on granite	Pennsylvanian	3769
Do	Glickman No. 2 Horning	30-3-23W N2 N2 NE	2447	3772	-1325	granite wash	Lansing-Kansas City	3805
Do	Harms & Riggs No. 1 Davis	19-3-24W S2 SE NE	2331	3636	-1305	30 ft. granite wash on granite	Reagan	3676
Do	C & G and Shields No. 1 "A" Ankenman	29-3-24W NE NE SE	2346	3678	-1332	47 ft. granite wash on granite	Reagan	3730
Do	Continental No. 1 Hemphill	8-4-22W NE NE SW	2370	3866	-1496	14 ft. granite wash on granite	Reagan	3903
Do	Colorado No. 1 Foss	32-4-22W NE NW NW	2235	3712	-1477	14 ft. granite wash on granite	Reagan	3727
Do	Petroleum No. 1 Browne	25-4-23W C NW NW	2360	3748	-1388	59 ft. granite wash on granite	Pennsylvanian	3810
Do	Sterling No. 1 Shewey	29-4-23W C SE SE	2437	3980	-1543	9 ft. granite wash on granite	Reagan	3997
Do	Continental No. 1 Wittfong	9-4-24W NW NW NW	2485	3905	-1420	25 ft. granite wash on granite	Reagan	3952
Phillips	Cities Service No. 1 Kowitz	18-5-20W W2 NE SE	2128	3750	-1622	granite wash	Reagan	3761
Do	Messman-Rinehart No. 1 Steele Estate	34-5-20W SW SW NE	2100	3676	-1576	granite	Reagan	3680



Do	Cities Service No. 1 "B" Wiltrout	36-5-20W NE NE SW	2064	3620	—1556	quartzite	Reagan	3630
Norton	Ainsworth No. 1 Fitzsimmons	4-5-22W C SE SE	2198	3634	—1436	26 ft. granite wash on granite	Reagan	3674
Do	D & D No. 1 Krehbiel	24-5-22W C SE NW	2300	3737	—1437	granite wash	Reagan	3765
Do	Antry & Warren No. 1 McKinley	26-5-22W SW SW SE	2235	3748	—1513	granite wash	Marmaton	3780
Rooks	Hoover No. 1 Steel Estate	9-6-20W C SW NW	2162	3624	—1462	weathered granite	Pennsylvanian	3630
Do	Veverka No. 1 Hance	13-8-19W C SE SW	2009	3700	—1691	14 ft. granite wash on granite	Arbuckle	3720
Do	Cities Service No. 2 Rempe (OWWO)	21-9-18W SE SW SE	2164	4099	—1935	granite wash	Reagan	4108
Do	Cities Service No. 4 "U" Smith	15-10-16W SW NW SE	2003	3765	—1762	3 ft. granite wash on granite	Reagan	3798
Ellis	Sunray No. 1 Hadley	13-11-18W N2 NE NW	1860	3898	—2038	granite wash	Reagan	3909
Do	Dreiling No. 11 "A" Dreiling	13-12-16W NW NW NE	1806	3702	—1896	granite wash	Arbuckle	3705
Russell	Home-Stake No. 0-16 Linenberger	33-13-15W C NE SW	1897	3372	—1475	4 ft. granite wash on granite	Reagan	3382
Ellis	Dreiling No. 1 "D" Staab	7-13-17W NE NW NW	2047	3915	—1868	granite	Arbuckle	3916
Trego	Murfin No. 4 Cromb	1-13-21W NE NW SE	2171	3904	—1733	dunite? granite?	Reagan	3906
Russell	Dreiling No. 2 Krug	4-14-14W C SE	1835	3319	—1484	granite wash	Reagan	3339
Do	Kim No. 1 Krug	17-14-14W SE SW NW	1877	3313	—1436	granite wash	Pennsylvanian	3326?
Do	Phillips No. 3 Carrie	18-14-14W SE NW NE	1871	3309	—1438	granite wash	Arbuckle	3320
Do	Melton No. 2 Hall	21-14-14W E2 NW SE	1851	3267	—1416	granite wash	Lansing-Kansas City	3290
Do	Home-Stake No. 0-15 "E" Witt	3-14-15W C NE SW	1884	3286	—1402	granite wash	Lansing-Kansas City	3307
Do	Home-Stake No. 0-19 Dortland	4-14-15W C SW NW	1896	3287	—1391	granite wash	Marmaton	3348
Do	Home-Stake No. 0-20 Dortland	4-14-15W C SE NW	1878	3264	—1386	granite wash	Marmaton	3316
Do	Home-Stake No. 0-14 "D" Witt	4-14-15W C SE SE	1884	3280	—1396	granite wash	Marmaton	3300

TABLE 1.—Additional boreholes drilled to Precambrian rocks in Kansas (continued).

County	Company, well number, and farm	Location	Surface elevation, feet	Depth to Precambrian, feet	Elevation of Precambrian, feet	Precambrian rock type	Rock unit on basement	Total depth, feet
Russell	Birmingham-Bartlett No. 3 "A" Driscoll	19-15-11W W2 W2 SW	1858	3264	-1406	quartzite	Lansing-Kansas City	3269
Do	Nixon No. 1 Herber	19-15-11W SW NW SE	1859	3305	-1446	granite wash	Lansing-Kansas City	3311
Do	Dreiling No. 2 Heinze	24-15-12W E2 E2 SE	1866	3269	-1403	quartzite	Lansing-Kansas City	3274
Do	Dreiling No. 1 Janne	24-15-12W C SW NE	1852	3269	-1417	quartzite	Lansing-Kansas City	3273
Do	Birmingham-Bartlett No. 2 "G" Staudinger	26-15-12W S2 S2 NW	1837	3221	-1384	quartzite	Lansing-Kansas City	3222
Do	Farmer No. 4 Buchler	26-15-12W N2 N2 SW	1837	3182	-1345	quartzite	Lansing-Kansas City	3197
Rush	Frontier No. 1 Kansas State	6-16-17W NE NE SE	1927	3633	-1706	granite wash	Reagan	3637
Do	Frontier No. 1 "A" Stegman	22-16-17W SW NE SE	2009	3730	-1721	quartzite on granite	Reagan	3744
Barton	Magnolia No. 3 "A" Grossard	9-17-11W C SW NW	1841	3467	-1626	granite wash	Arbuckle	3526
Rush	Petroleum No. 1 "B" Giesick	19-17-16W SE NW NW	2018	3500	-1482	granite wash	Lansing-Kansas City	3540
Do	Northern Natural No. 1 "A" Rothe	30-17-16W SE NW SE	2034	3565	-1531	weathered granite	Lansing-Kansas City	3604
Do	Frontier No. 2 McGill	3-17-17W C SW	2077	3600	-1523	granite wash	Lansing-Kansas City	3633
Do	Frontier No. 1 Frye	4-17-17W C NE	2057	3588	-1531	granite wash	Lansing-Kansas City	3619
Do	Northern Natural No. 1 "A" Grumbien	9-17-17W SW SE NE	2080	3592	-1512	10 ft. granite wash on granite	Lansing-Kansas City	3620
Do	Frontier No. 1 Appl	10-17-17W NW SE NW	2066	3565	-1499	granite wash	Lansing-Kansas City	3573
Do	Northern Natural No. 1 Hondrick	10-17-17W NW SE NE	2067	3582	-1515	24 ft. granite wash on granite	Lansing-Kansas City	3609
Do	Frontier No. 1 Rau	10-17-17W NW SE SE	2059	3567	-1508	granite wash	Lansing-Kansas City	3600
Do	Petroleum No. 1 "K" Schneider	13-17-17W NE SW SE	2044	3537	-1493	47 ft. granite wash on granite	Pennsylvanian	3590
Do	Frontier No. 1 "A" Ernie	14-17-17W NW NE NE	2053	3557	-1504	granite	Lansing-Kansas City	3575

Do	Frontier No. 1 "A" Foos	22-17-17W SW NE NE	2070	3575	—1505	6 ft. granite wash on granite	Lansing-Kansas City	3608
Do	Frontier No. 1 Foos	25-17-17W NE SW SE	2007	3500	—1493	granite wash	Lansing-Kansas City	3531
Do	Frontier No. 1 Erbes	26-17-17W NE SW SE	2041	3559	—1518	granite wash	Lansing-Kansas City	3578
Do	Frontier No. 1 Neuhauser	27-17-17W W2 W2 NE	2031	3545	—1514	granite wash	Lansing-Kansas City	3560
Do	Morrison No. 1 Wagner	33-17-17W W2 NW NE	2015	3580	—1565	10 ft. granite wash on granite	Pennsylvanian	3592
Do	Frontier No. 1 Beahm	36-17-17W W2 E2 NE	1999	3495	—1496	granite wash	Lansing-Kansas City	3540
Do	Frontier No. 1 Scheuerman	36-17-17W SW NE SE	1997	3501	—1504	granite wash	Lansing-Kansas City	3613
Do	Petroleum No. 1 Kahler	20-17-18W C NE NW	2118	3801	—1683	granite wash	Pennsylvanian	3822
Barton	Alpine No. 4 Blankenship	20-18-13W SW SW SW	1905	3710	—1805	granite wash	Arbuckle	3730
Do	Shirer No. 5 McCauley	12-18-14W SW SE NE	1866	3520	—1654	granite wash	Arbuckle	3551
Rush	Morrison No. 1 Dirks	7-18-16W NW SE SE	1950	3515	—1565	26 ft. granite wash on weathered granite	Reagan	3554
Do	Morrison No. 1 Schneider	17-18-16W SE NW NW	1950	3530	—1580	granite wash	Reagan	3535
Do	Morrison No. 2 Huenergardt	18-18-16W SE NE SE	1949	3546	—1597	granite wash	Reagan	3585
Do	Morrison No. 1 Pechanec	18-18-16W SE SW NE	1951	3566	—1615	granite	Reagan	3606
Do	Woodman & Iannitti No. 1 Green	17-18-17W C NE SW	1997	4007	—2010	granite	Reagan	4009
Barton	Glickman-Houston & Seeber No. 1 Pasco	10-19-15W SE SE SE	1933	3488	—1555	granite wash	Reagan	3504
Do	Nixon No. 2 Schartz	26-19-15W SW SW SW	1922	3480	—1558	quartzite	Lansing-Kansas City	3482
Do	Bove No. 5 Button	35-19-15W E2 NE NW	1920	3565	—1645	quartzite	Pennsylvanian	3574
Do	Nixon No. 1 "B" Ewing	36-19-15W NW SW SW	1942	3503	—1561	quartzite	Reagan	3506
Do	Petroleum No. 1 "B" Hiss	32-20-13W SE SE SE	1897	3560	—1663	quartzite	Arbuckle	3617
Edwards	White & Willkenson No. 1 Reaves	1-24-16W S2 SW NW	2053	3976	—1923	54 ft. weathered granite on granite	Lansing-Kansas City	4038

TABLE 1.—Additional boreholes drilled to Precambrian rocks in Kansas (concluded).

County	Company, well number, and farm	Location	Surface elevation, feet	Depth to Precambrian, feet	Elevation of Precambrian, feet	Precambrian rock type	Rock unit on basement	Total depth, feet
Pratt	Continental No. 6 Brehm	23-28-13W NE SW SW	1956	5072	-3116	granite wash	Reagan	5150
Riley	Valentin No. 1 Kunze	33-6-5E C NE SE	1141	2462	-1321	granite	Simpson	2547
Do	Phillips No. 1 Winkler	8-6-6E C SE NE	1413	2584	-1171	amphibolite?	Simpson	2735
Do	Pawnee No. 1 Marks	26-10-6E SW NE NW?	1213	2400?	-1187?	granite	Simpson?	2445
Do	Johnston No. 1 Deep Creek Ranch	32-10-9E SW NW SW	1105	1078	+ 27	granite	Pennsylvanian	1094
Do	Johnston No. 1 Hayden	34-10-9E SW NW SW	1120?	1070	+ 50?	granite	Marmaton	1089
Do	Johnson No. 1 Moore	6-11-9E SE SE SW	1055	1124	- 69	granite	Marmaton	1130
Do	Johnson No. 1 Newell Estate	6-11-9E SW SE SW	1070	1147	- 77	granite	Marmaton	1183
Do	Johnson No. 1 "B" Durein	15-11-9E NW SW SE	1390	1438	- 48	granite	Marmaton	1452
Morris	Rex & Morris and Mobil No. 1 Buchman	4-14-8E C NE NE	1525	2424	- 899	granite	Arbuckle	2428
Do	Forrester No. 1 Mangle	6-17-7E NW NW SE	1538	2300?	- 762?	granite	Arbuckle?	2560
Butler	Empire No. 30 Murphy	31-25-5E SW SE NE	1387	3285?	-1898?	dark basic igneous rocks	Arbuckle	3375
Cowley	Texaco No. 4 Goodrich	21-31-4E NW SW SE	1211	4187	-2976	granite	Arbuckle	4188

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**1963 REPORTS OF STUDIES**

- Part 1. **Preliminary Report on Conodonts of the Meramecian Stage (Upper Mississippian) from the Subsurface of Western Kansas**, by Thomas L. Thompson and Edwin D. Goebel, p. 1-16, fig. 1-3, August, 1963.
- Part 2. **Sources of Error in Thermoluminescence Studies**, by Jesse M. McNellis, p. 1-23, fig. 1-26, December, 1963.
- Part 3. **Test-Hole Exploration for Light-Firing Clay in Cloud and Ellsworth Counties, Kansas**, by Norman Plummer, Clarence S. Edmonds, and Maynard P. Bauleke, in press.
- Part 4. **Kansas Basement Rocks Committee Report for 1962 and Additional Precambrian Wells**, by Virgil B. Cole, Daniel F. Merriam, and William W. Hambleton, p. 1-10, December, 1963.