Triassic Rocks on Goff Creek, Texas County, Oklahoma[1]

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This paper reports on red beds that crop out along Goff Creek in central Texas County, Okla. They occur as an inlier surrounded by the Ogallala formation, of Pliocene age, and are believed to be of Triassic age (Figure 1). They have not been described heretofore, nor shown on published geologic maps (3, 5, 6, 9, 10, 11).

Texas County is the middle county of the three constituting the Oklahoma Panhandle, and Guymon, the county seat, is near the middle of it. Goff Creek is a tributary emptying into the North Canadian River from the northwest, and the red beds are exposed on both sides of it in a small area about eight miles northwest of Guymon.

Red-bed inliers are not new in the geology of Texas County. Gould (3) mapped the larger ones, which are west of Guymon along the North Canadian River and a tributary named Tepee Creek, and he classed the rocks as "red beds of uncertain relationship." Later, he assigned them to the Triassic(?), stating that in doing so he deferred to the opinions of other geologists but personally was inclined to consider them Permian (4,5). Clifton (2) discovered invertebrate fossils of Early Cretaceous age in the beds overlying the red beds at the locality west of Guymon, and Bullard (1) reported on them. He mapped the locality as a group of small outliers of Lower Cretaceous rocks on rocks of Triassic age. The present writer (11) offered two measured sections of the rocks exposed west of Guymon and reported an unconformity involving about 20 feet in vertical relief and a 20° dip. This unconformity was regarded as marking the top of the Triassic(?) rocks, and the beds next above it were assigned tentatively to the Jurassic, although fossil evidence from beds immediately above and below the unconformity was lacking. The inlier on Goff Creek is believed to include only rocks that belong below the unconformity and that, therefore, are of Triassic(?) age. The field work for this paper and the accompanying map was done in 1950, in connection with investigations of the ground-water resources of Oklahoma, which are carried out cooperatively by the U. S. Geological Survey and the Oklahoma Geological Survey.

ROCK EXPOSURES. The red beds are exposed at five places from the middle of sec. 29 downstream beyond the middle of sec. 28, T. 4 N., R. 14 E. C. M., a distance of about 1.2 miles along Goff Creek. The best exposures are along minor unnamed tributaries on the south side of the main stream in the NW¼SE¼ sec. 29 and the W½SE¼ sec. 28. There are only two exposures in the bank of Goff Creek itself: (a) on the south side, at

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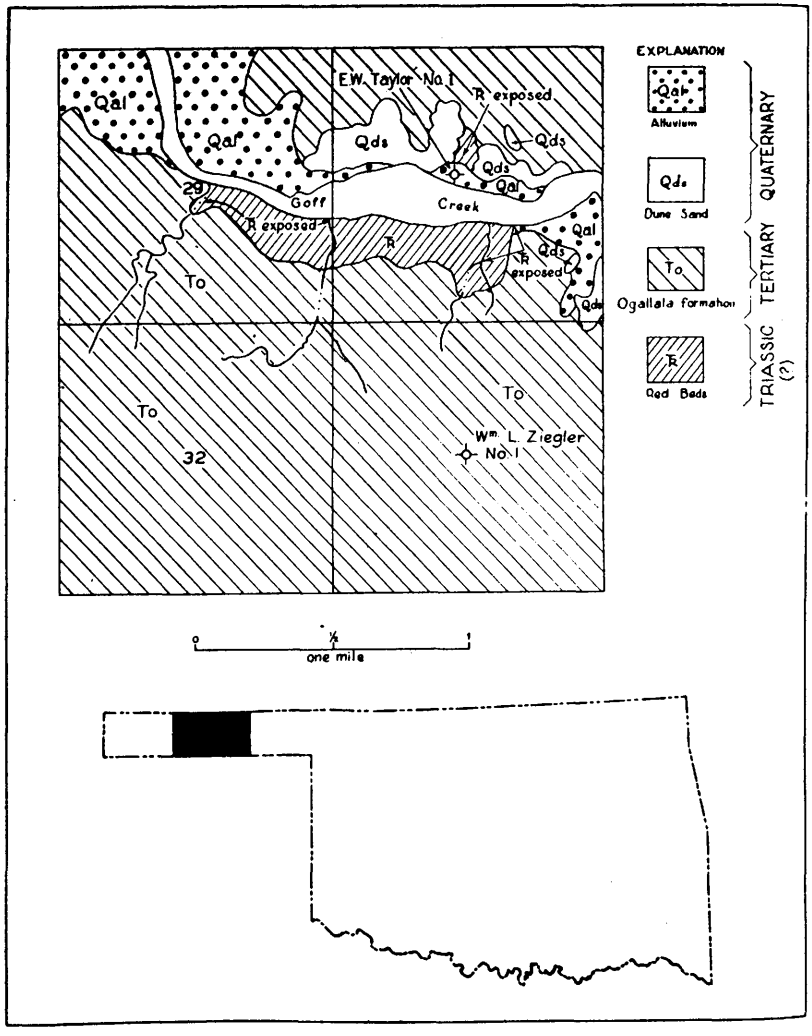

FIGURE 1. Map of Part of T. 4N., R. 14 E. C. M., Texas County, Showing Outcrop of Triassic(?) Rocks on Goff Creek and (below) Index Map Showing Location of Texas County in Oklahoma.

the mouth of a tributary near the east line of sec. 29; and (b) about 0.7 mile downstream, also in the south bank. The only exposure on the north side of Goff Creek is at the E. W. Taylor No. 1 gas well of the Cities Service Co. It extends northward about 0.15 mile. It might be a larger exposure if it were not for dune sand, which has accumulated extensively on the north side of the creek. On the forthcoming geologic map of Oklahoma (7), these exposures will appear as one inlier, which will be tiny notwithstanding the exaggeration necessary if it is to appear at all.

LITHOLOGY. The red beds of the inlier at Goff Creek consist of red shale, gray and red fine-grained conglomerate, light-gray siltstone, and white, gray, and reddish-brown fine- to medium-grained sandstone. The conglomerates are distinguished by the softness of nearly all their pebbles. These are mainly of reddish-brown shale and white and yellow soft fine-grained sandstone and siltstone. In one exposure the conglomerate is cross-bedded with respect to the bedding of the shale immediately below it. Similar conglomerate with bedding similarly at an angle to the bedding of adjacent shales was found also along the North Canadian River west of Guymon in the beds below the unconformity. This similarity in the conglomerates of the two localities, together with the general similarities of the shales and sandstones, suggests that the red beds of Goff Creek belong below the unconformity and, hence, are of the same age as those along the Canadian River, believed to be Triassic.

The dominant color of these beds is red as this color term commonly is used, but comparison with the rock-color chart of the National Research Council (8) shows that none of it is truly red. Instead, the dominant colors are dark reddish brown and moderate reddish brown. Other colors in the shale are light brown and moderate yellowish brown.

STRUCTURE. The red beds are gently flexed. The creek in the SE¼ sec. 29 has cut into a small anticline. In the exposure in the W½SE¼ sec. 28 the strike and dip were measured as N. 66° W., 13° NE. and, a few hundred feet downstream, N. 57° E., 7° SE. These dips indicate a small syncline. In the exposure at the Taylor gas well the dip is about 5° SE. Sandstone beds in both secs. 28 and 29 are broken by joints in two sets, one trending approximately north-south, and the other approximately east-west.

THICKNESS OF TRIASSIC(?) BEDS. The red beds exposed on Goff Creek are only a few feet of the several hundreds of feet of red beds probably assignable to the Triassic in the subsurface rocks of Texas County. Their base is somewhere below the surface. The diverse dips noted above coupled with short covered intervals conspire to make uncertain the measurement of thickness, even in small exposures, such as the one in the E½SE¼ sec. 28. At that location, however, a section was pieced together and totals about 26 feet. This is less than the height of the top of the red beds above the bed of Goff Creek. In the other exposures the thickness of the visible rocks of Triassic (?) age appears to be less.

RELATION TO YOUNGER ROCKS. The unconformable contact of the Ogallala formation, of Pliocene age, on the red beds is exposed in the creek bed about 0.1 mile north of the S¼ cor. sec. 28. In so small an exposure no great relief on the surface of unconformity is to be expected, but small irregularities ranging from several inches to about one foot are evident. The basal bed of the Ogallala is light-gray conglomerate about two feet thick and is approximately horizontal. Fragments of the red beds are abundant in a zone about eight inches thick in one part of this exposure but otherwise such fragments are few and small.

AREAS UPSTREAM AND DOWNSTREAM. Careful search upstream for about nine miles from the outlier and downstream to the mouth of Goff Creek failed to disclose other exposures of red beds, and the logs of gas wells suggest that none are likely to be found. Red beds were reported at shallow depths in the Taylor gas well and in the William L. Ziegler No. 1 well of the Cities Service Co., both of which are very close to the outcrop. Not all the gas wells were logged so as to show the top of the red beds, but the others that do so show it at depths from 200 to 600 feet below the surface, with one exception. This exception is the Gabel *et al.* No. 1 well of the Western Production Co., which is more than two miles upstream from the nearest exposure of red beds and begins high above the flood plain. In this well the red beds were logged beginning at a depth of only 76 feet,

but no exposures of red beds were found nearby. Possibly the red beds are close to the surface but are concealed by slump, soil, vegetation, and alluvium. Where the red beds are more than 200 feet below the surface in wells, they are not likely to be exposed by Goff Creek and its tributaries because Goff Creek has cut its valley only 100 to 150 feet deep in the lower part of its course, and to lesser depths in the upper part. Therefore, the liklihood of finding exposures of the red beds along the upper reaches is less. The search for them was extended upstream approximately to the west line of T. 4 N., R. 13 E.C.M.

Conclusions

The red beds in the inlier on Goff Creek have much in common lithologically with red beds along the North Canadian River west of Guymon, which for a long time have been regarded as of Triassic(?) age. Therefore the exposures on Goff Creek are classed as of Triassic(?) age.

Literature Cited

1. Bullard, F. M. 1929. Lower Cretaceous of western Oklahoma. Oklahoma Geol. Survey Bull. No. 47:90-92.

2. Clifton, R. L. 1925. See Bullard, p. 90.

3. Gould, C. N., 1905. Geology and water resources of Oklahoma. U. S. Geol. Survey Water-Supply and Irrigation Paper 148:73.

4. ————. 1925. Index to the stratigraphy of Oklahoma. Oklahoma Geol. Survey Bull. No. 35:103.

5. ————, and J. T. Lonsdale. 1926. Geology of Texas County, Oklahoma. Oklahoma Geol. Survey Bull. No. 37:25-26.

6. Miser, H. D. 1926. Geologic map of Oklahoma. U. S. Geol. Survey.

7. ————. Geologic map of Oklahoma. U. S. Geol. Survey (in preparation).

8. National Research Council. 1948. Rock color chart.

9. Six, R. L. 1930. Oil and gas in Oklahoma; Beaver, Texas, and Cimarron Counties. Oklahoma Geol. Survey Bull. No. 40-WW.

10. ————. 1930. Oil and gas in Oklahoma; Beaver, Texas, and Cimarron Counties. Oklahoma Geol. Survey Bull. No. 40, vol. 2:470-479.

11. Schoff, S. L. 1939. Geology and ground-water resources of Texas County, Oklahoma. Oklahoma Geol. Survey Bull. No. 59:49-51.