IV. THE "BIG" AND "OSWEGO LIMES" IN THE AREA OF TULSA*

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Introduction

The field work on which this paper is based consisted of a series of trips with other geologists. The writer is particularly indebted to Dr. Edward Bloesch, Mr. Robert Dott, Mr. Luther White, and Mr. Max Pishel.

The "Big Lime"

This is the drillers' term for the Oologah limestone. Its escarpment from a point east of Oologah to Broken Arrow is a conspicuous feature of the landscape; but if the geologic map of Oklahoma be consulted, it will be noted that the Oologah quits sharply at the north edge of Broken Arrow. This is not altogether in accord with the facts, for, while the escarpment stops here, a thin remnant of Oologah dips to the southwest in sections 2 and 3, T. 18N., R. 14E., and disappears below the surface. The surface between Broken Arrow and Arkansas River is covered with a deposit of silt and alluvium which effectually blankets all Pennsylvanian outcrops.

This southernmost appearance of the Oologah is thin, partly because it was originally thus and partly because much of the limetsone has been removed by solution, leaving a tripoli-like silicious remainder. As far as known to the writer it does not appear again at the surface southward recognizable as the Oologah.

It seems to be thicker in Ts. 20-21N. than elsewhere either north or south. Logs west of its outcrop, which show the entire thickness, report it 130 to 150 feet thick in T. 21N. and in the northern part of T. 20N., where it is 140 to 180 feet above the upper Oswego (Ft. Scott) lime. It thins rapidly to the south; 70 feet in central T. 20N., 40 feet in southern T. 20N., 5 to 15 feet in southern T. 19N., absent to 8 feet in northern T. 18N., where it is only 150 feet above the upper Oswego. That is, both the Oologah and the shale below it thin to the south.[1]

Some geologists have been inclined to correlate the shelly fossiliferous beds exposed west of Bixby (sections 15 and 22, T. 17N., R. 13E.) with the Oologah, but this zone is about 350 feet above the upper Oswega, as nearly as can be determined from well logs. The beds west of Bixby have been traced southward and found to overlie the thick sandstone which dips almost due north in the southern part of T. 15N., R. 13E. This sandstone is considered by Dr. Bloesch to be the top of the Wewoka formation, so that the beds under consideration are in the lower part of the Holdenville shale.

The Labette Shale

No special study has been made of the Labette shale in this area. Its thickness as shown by well logs has already been given. Although mostly shale, it contains some shaly micaceous sandstone at different stratigraphic levels in a few places. South of Arkansas River a sandstone near the base becomes a conspicuous member of the section. Dr. Bloesch considers this to be the basal member of the Wewoka, and it is so shown on the U. S. Geological Survey map of Oklahoma.

The Upper "Oswego Lime"

The "Oswego" or the upper "Oswego" as it is sometimes termed is considered by the writer to be both the upper and lower members of the Ft.

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[1]Well logs show this is also true westward from the outcrop.

Scott limestone. In the vicinity of Catoosa, it is probably at least 25 or 30 feet thick, including several shale partings. The upper and thicker part is gray limestone like the upper Ft. Scott. The lower part is a blue, argillaceous, somewhat silicious limestone which weathers buff. The shale partings are mostly of the black fissile slaty type. In the vicinity of Broken Arrow the upper Ft. Scott can not be found on the outcrop, due to solution, but its horizon is marked by the presence of chert. The most southerly outcrop of the lower Ft. Scott north of Arkansas River is at Elm Grove School House at the east quarter corner of section 27, T. 18N., R. 14E., where it is overlain by black shale.

On the south side of the river below the mouth of Snake Creek and on Concharty Mountain are many outcrops of the lower Ft. Scott overlain by black shale and this in turn by light shale and sandstone. The Ft. Scott is seemingly absent, although the cutcrop of its horizon is poorly exposed. On Concharty Mountain the lower Ft. Scott is 10 to 12 feet thick and weathers to a buff porous silicious material resembling tripoli.

Upper Member of the Cherokee Shale

The interval from the lower Ft. Scott to the Verdigris limestone ranges from 60 feet near Catoosa to 120 feet on Concharty Mountain. At the top is some black slaty shale and locally a thin coal bed. The remainder is extremely variable, ranging from shale to massive sandstone. This sandstone is prominent in the vicinity of Catoosa and is well exposed at the Highway 66 bridge on Verdigris River, but thins to the south. As it thins, an impure fossiliferous limestone appears at the top of the sandstone. This limestone caps a low bench in the vinicity of Broken Arrow, and is logged in many wells south and west of Broken Arrow as a limestone 5 to 15 feet thick. The sandstone is believed to be the Calvin.

The "Lower Oswego Lime"

"Lower" or "Little Oswego" is known on the outcrop as the Verdigris limestone. It is probably the equivalent of the so-called "Diamond Rock"[1] in the vicinity of Ft. Scott, Kansas. It is 1 to 3 feet thick on the outcrop, but usually logged as 5 to 10 feet thick. It is underlain by a few feet of black slaty shale, below which is gray shale followed by the Broken Arrow coal seam. The interval from the Verdigris limestone to the Broken Arrow coal ranges from 10 to 20 feet or more. About 80 feet lower is another coal bed which is well exposed at the base of Concharty Mountain, where it is overlain by a shale containing a rich fossil flora. One of these coal beds is the Henryetta, but the exact correlation can not be made at this time.

[1]Named from the diamond shaped blocks caused by two sets of joints.