BIOSTRATIGRAPHY OF THE UPPER PENNSYLVANIAN WAYLAND SHALE IN McCULLOCH-COLEMAN COUNTIES, CENTRAL TEXAS

by

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ABSTRACT

The Wayland Shale of Late Pennsylvanian (Virgilian) age was studied at selected outcrops near the Colorado River in McCulloch and Coleman Counties, Texas, in order to interpret the environments of deposition. More than 40 exposures were examined and 23 key sections were measured and described in detail to provide information of the stratigraphic relationships of the shale and the overlying and underlying units. Generally, the shale is about 30 feet thick.

Samples taken from key intervals in the measured sections were studied in the laboratory in polished sections, thin sections, acetate peels, and washed residue. One representative exposure, location M-5 just east of Fife, was sampled vertically at close intervals through the fossiliferous part of the Wayland Shale in order to provide quantitative information on any successive changes in the fauna and on the physical properties of the sediments. Representative cuts of unwashed material and washed residue from locality M-5 were described in detail, the fossils identified, and specimens counted. A survey of published information on the fauna of the Wayland Shale was made, and in most cases, commonly accepted names are used to identify the fossils. Illustrations of the key fossils are included, however, as a means of providing a basis for resolving conflicting identifications in lieu of rigid taxonomic analyses.

By tabulating and reducing the data and by graphing changes and trends, it was found that distinctive faunal assemblages could be recognized. Relationships between these assemblages and the physical properties, kinds, and distribution of the sediments together with analogies with recent physical processes with morphological types of animals provide a basis for reconstructing the depositional history on a local scale.

Four faunal assemblages within the fossiliferous part of the Wayland are recognized: the Amphisites - Glyphostomella (offshore marine), the productid (intermediate marine), the Earlandinita pereglans (transitional marine), and the textulariid (marginal marine). Three facies in the units overlying the Wayland Shale also are distinguished: skeletal, algal, and fusulinid limestone types.

At locality M-5, the Wayland Shale is interpreted to represent deposition in a shallow relatively nearshore environment but as having alternated from distinctively marine conditions (nodular limestones) to very shallow marine conditions reflecting the influence of nearby fluviatile deposition.