

main untested, but most lands acquired at the 1964 sale have been quitclaimed. Although source rocks are distributed throughout the section, a lack of permeable reservoirs has been discouraging. Despite the negative aspects, the writer believes that the area has much exploratory potential. Another industry exploration cycle is anticipated in the not too distant future.

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PALEOECOLOGICAL ANALYSIS OF SOME MIDDLE DEVONIAN FOSSIL AGGREGATIONS

Fossil clusters in the Ludlowville Shale near Buffalo, New York, are nearly circular in bedding-plane outline and plano-convex (convex down) in cross section, the dimensions being about 1 m across and 2 cm thick. The clusters contain several brachiopod species and less abundant bryozoans, trilobites, crinoids, ostracods, bivalves, gastropods, and solitary corals. Their consistent presence across a considerable geographic area and their high diversity suggest that they are an *in situ* "life" assemblage, but their shape and distinct boundaries may be interpreted as evidence that they are not an *in situ* "life" assemblage.

The spiriferid brachiopod *Ambocoelia umbonata* was sampled quantitatively in successive 0.5-cm layers within the fossil clusters. Shell distortion, shell fragmentation, and valve ratios illustrate no vertical trends. Therefore these phenomena must be related to factors that have acted uniformly throughout the clusters. Consistent trends in shell disarticulation, shell position, shell density, and pyrite content are related to factors controlling cluster development. This relation, together with random beak orientations and bimodal size-frequency distributions, favors a biologic origin. The clusters apparently record establishment and succession of organisms on a soft substrate.

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SHALLOW SHELF SEDIMENTATION IN ROCK RECORD—INTRODUCTION TO SYMPOSIUM

A shelf is defined in *Webster's Third International Dictionary* as "1 a : a thin, flat, usually long and narrow piece of wood or other material fastened horizontally at a distance from the floor (as on a wall or in a frame) to hold objects"; and "2 : something resembling a shelf in form or position."

"Something resembling a shelf" in the contemporary geologic scene cannot be well defined. For example, modern continental shelves are defined in different ways by hydrographers, by geographers, and by geologists. Some describe the continental shelf as a surface marginal to continents and lying between the strandline and that place where the sloping surface of the lithosphere steepens toward a deeper part of the ocean basin, regardless of water depth. Others define the shelf as that surface between sea level and a particular depth (commonly 100 fm), irrespective of steepening of the surface. Still others apply the term "shelf" to surfaces formed under the control of erosional, depositional, or structural agencies, or by various more specific biologic or sedimentologic agencies. In most cases, a surface so defined displays the same topographic

habit for a distance in either direction from the strandline. With so many apparent variations, can any consensus definition of "shelf" be established within the geologic community?

The presumably representative *AGI Glossary* and the pertinent literature demonstrate that the term "shelf" is applied to any shallow marine sediment. Examples include deposits formed in a great range of physical and tectonic environments. Among these are continental shelves, broad shallow intracontinental basins (epeiric seas), "stable shelves" at cratonic margins, shallow intracratonic basins, and various types of geosynclines. Physical environments in which shelf deposits form are neritic, littoral, and paralic.

For the purpose of this symposium, "shelf" is used in a broad sense. Shelf sediments are subaerial and submarine sediments which were deposited on a relatively shallow, uniformly, gently sloping surface which includes the marine-land interface of the strandline. The zone of shelf sedimentation as here defined is terminated landward and seaward by a perceptible change in the slope and topographic character of the depositional interface.

The purpose of this symposium is to bring together various contemporary viewpoints on shelf sediments. To this end authors representative of the various schools of thought and subdisciplines of shelf studies have been invited to contribute basic papers related to the geology, biology, and chemistry of shelves, or papers illustrating "typical" shelves from various parts of the rock record. It is hoped that such an enunciation of principles and examples will bring into focus the parameters that have controlled sediment accumulation in shallow seas associated with the continental masses and will lead to the construction of reliable theoretical models for their interpretation.

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MINERAL RESOURCES OF NORTHERN ALASKA¹

Recent production tests near Prudhoe Bay on the Arctic coast show that northern Alaska is a potential major oil province. This potential was first recognized when oil seeps were reported in 1900. By 1930 favorable structures and rocks were known. During exploration of Naval Petroleum Reserve No. 4, gas was discovered in Lower Jurassic rocks at Barrow, oil in Lower Cretaceous rocks at Umiat, and gas in Upper Cretaceous rocks at Gubik. Now oil and gas have been found in Triassic and Mississippian rocks at Prudhoe Bay.

The oil-bearing section consists of Mississippian through Lower Jurassic shelf deposits derived mainly from a northern source, and of up to 20,000 ft of Jurassic and Cretaceous geosynclinal deposits derived mainly from the south.

The Jurassic and Cretaceous Colville geosyncline is bounded on the south by the Triassic and upper Paleozoic rocks of the Brooks Range and on the north by a rise in the pre-Mississippian(?) basement to a depth as shallow as 2,500 ft near Barrow. The stratigraphy of the geosyncline is characterized by northward regression of intertonguing marine and nonmarine detrital sedimentary rocks shed from a southern orogenic source. The structural complexity of the geosyncline

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