siderations which are often confusing and contradictory, and which often appear to defy solution. With the constantly declining ratio of reserves to yearly production, can the demands be met?

MIDDLE PERMIAN EVAPORITES IN SOUTHWESTERN OKLAHOMA

WILLIAM E. HAM

The two thickest outcrop sections of evaporites in the Midcontinent region of the United States are in the Blaine and Cloud Chief formations of southwestern Oklahoma. Each is composed mainly of gypsum at the outcrop and of anhydrite in subsurface.

The earlier sequence is the Blaine, of Late Leonardian or Early Guadalupean age. It has maximum thickness of 250 feet and consists of four principal cycles. Each cycle is a three-fold division beginning with dolomite less than 5 feet thick, continuing upward with white gypsum normally 15-30 feet thick, and ending with reddish-brown shale 10-30 feet thick.

The upper half of the Blaine formation is 90 feet thick and is made up of massive gypsum containing as many as four thin dolomite beds but practically no shales, thus representing a composite of several incomplete normal cycles. Northward in subsurface this evaporite unit grades into nearly pure halite.

Four hundred feet above the Blaine is the thickest single evaporite body in the Midcontinent region. It is in the lower part of the Cloud Chief formation, of probable Late Guadalupean age, and consists of gypsum and anhydrite 120 feet thick with no interbedded shale or dolomite. Extensive core drilling has shown that the Cloud Chief evaporite body is massive and non-cyclic. By Cloud Chief time the position of the evaporite basin had shifted markedly eastward, as it was then situated over the shoreward or clastic facies of the Blaine. The Cloud Chief gypsum also is noteworthy for containing marginal tongues of strontium minerals, chiefly celestite, and for containing in the massive gypsum a few small nodules of the borate mineral probertite.

1) Presented before International Geological Congress, 1960.

IMPLICATIONS OF PALEOGEOLOGIC MAPS OF NORTH AMERICA

A. I. LEVORSEN

A sequence of subcrop and paleogeologic maps of North America are presented showing the geology at the beginning of the Ordovician, Devonian, Mississippian, Pennsylvanian and Cretaceous systems.

There are many implications to be seen in such a set of maps. Some are as follows:

1. The continent has been in repeated periods of broad structural upswells in which great arches formed. Later the crests were eroded, the surface peneplaned, and the overlying sediments deposited across the truncated edges of the older rocks.

2. The intervening basins are structural and not depositional in nature. Their location is fortuitous, inasmuch as the boundaries are formed by arches that occurred at different times.

3. Each time an arch or regional uplift occurs, the pressures and temperatures within the sediments change, volumes change, and as the pressures and temperatures return to equilibrium, the fluids move to adjust to the changing conditions. This is the time of oil and gas migration, and local traps present at the time of migration become the sites of oil and gas pools. Hydrodynamic phenomena are set up and the flow of all fluids is influenced by these uplifts. Either barren or productive regions may be due to these changes in fluid flow and fluid pressure.

4. The location of favorable rock and fluid regions is greatly helped by the preparation of paleogeologic maps and thus becomes a powerful exploration tool.

DEPOSITIONAL ENVIRONMENTS AND SANDSTONE PETROLOGY OF TRIASSIC SEDIMENTARY ROCKS, WESTERN NOVA SCOTIA, CANADA

GEORGE DEVRIES KLEIN[1]

The Triassic sedimentary rocks of the Canadian Maritime Provinces occur at Grand Manan Island, Point Lepreau, the St. Martin's area and Salisbury Bay in New Brunswick, and the Annapolis-Cornwallis Valley, the Minas Lowlands and the western shores of Chedabucto Bay in Nova Scotia.

The stratigraphic sequence of the Triassic of western Nova Scotia has been subdivided as follows (descending order):

Annapolis-Cornwallis Valley & Hants County	Minas Basin North Shore
Scots Bay Formation (limestone and claystone)	North Mountain Basalt
North Mountain Basalt.	Blomidon Formation intertonguing with Wolfville Fm
Blomidon Formation (Red claystone, siltstone, sandstone)	McKay Head Basalt
Wolfville Formation (Red conglomerate, sandstone, claystone).	Wolfville Formation.

The Wolfville Formation was divided into 2 facies. A Gerrish Facies, recognized on the Minas Basin North shore, is characterized by crudely stratified and thick-bedded red sharpstone conglomerates interbedded with fine- to medium-grained sandstone and claystone. The irregular sorting and the crude stratification is similar to that described from alluvial fan sequences. It is inferred that the Gerrish Facies represents alluvial fan sedimentation.

A second facies of the Wolfville, the Hants Facies, occurs on the Hants County Minas Basin shore and the Annapolis-Cornwallis Valley. It is characterized by interbedded red roundstone conglomerate, coarse- to medium-grained sandstone and claystone. Channel stratification, planar, lenticular and wedge-shaped cross-stratification, imbricate boulders, current lineation and claystone breccia blocks are characteristic and suggest that the Hants Facies represents a transitional zone between a floodplain and the alluvial fans of the Gerrish Facies.

The overlying and intertonguing Blomidon Formation is also divided into 2 facies. A Del Haven Facies, characterized by interbedded red fine-grained sandstone,

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