

almost at right angles to the Alberta ridge and the North Saskatchewan trough. These trends parallel those of the Rimbey-Leduc and Sundance-Windfall subsurface trends and are the most prominent features of this basin. The development of a later Devonian trend is documented by the presence of the southern part of the Southesk complex and the northwest part of the Fairholme complex above the thickest (most negative?) parts of the North Saskatchewan trough.

The positive Alberta ridge exerted a secondary control on the distribution of the Miette, Southesk, and Fairholme complexes. The thickest sections of the Fairholme Group (about 2,000 ft) are at the westernmost outcrops and appear to mark the western shelf margin of the Alberta basin.

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COMPARISON OF SOME ALBERTA UPPER DEVONIAN REEF COMPLEXES WITH MODERN CARIBBEAN REEFS

Reefs on the eastern coast of Carriacou (southern Grenadines) are considered to be representative of this part of the Caribbean. The upper Southesk stage of the Upper Devonian reefs closely resembles these modern reefs. Similarities are (1) narrow reef crest zone a few 10s of feet wide, (2) a slightly broader rubble zone just inside the reef, (3) lagoonal sediments consisting of fine- to coarse-grained coral-algal particles, making up about 80% by area of the reef complexes, (4) interior parts of the lagoon are progressively finer grained and poorly sorted, (5) sediment filling of the lagoon occurs from the reef inward, depending on lagoon topography and rates of sediment supply, (6) active reef growth was established at suitable depths (40–100 ft) during a rise in sea level and progresses from a submerged to a nearly emergent reef bank, and (7) stromatoporoids fulfilled the same role as modern corals, and algae-like *Renalcis* acted as encrusting frame-builders.

Differences include (1) the lack of abundant terrigenous sediments, foreereef talus, and carbonate mud in Carriacou reefs, (2) lack of ripples and cross-stratification, but the presence of prominent planar bedding in the Devonian lagoonal deposits, and (3) the less diverse fauna with less marked differentiation of growth forms in Devonian reefs. These are not significant differences and can be explained in terms of different basin sedimentation, organisms, preservation, diagenesis, etc. Modern reefs provide useful prototypes for testing concepts and models of Devonian reefs and banks. The Miette and Ancient Wall reef complexes (and others) are comparable to modern offreef drape types.

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DOLOMITIZATION, DOLomite DISTRIBUTION, RESERVOIR ROCKS

Approximately 80% of the hydrocarbon reserves in carbonate rocks in North America are found in rock that is essentially pure dolomite. In many reservoirs the field limits are determined by the distribution of dolomite, because the dolomitization process is conducive to the production of a favorable reservoir rock. The distribution of dolomite may be determined by (1) those rocks that were within the flow path of a dolomitizing fluid (water-controlled dolomitization) and (2) the susceptibility of a rock within the flow path of

a dolomitizing fluid to dolomitization (rock-controlled dolomitization). The second factor may be controlled by permeability at the time of dolomitization, particle size, or solubility of the original particles. The identification of the cause of the location of an individual dolomite body is significant to understanding its size and distribution.

Paleozoic carbonate rocks containing abundant cements commonly illustrate the idea of rock-control dolomitization. The significant parameter appears to be the original fabric of the sediment and is related to the ratio of carbonate mud to carbonate sand-size grains. The hydrology of hypersaline brine on Bonaire in the Netherlands Antilles provides a model from the Holocene that illustrates water-controlled dolomitization. In this model, access to hypersaline brine determines whether a sediment or rock will have the opportunity for dolomitization.

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CACHE CREEK FUSULINIDS FROM SOUTHERN BRITISH COLUMBIA

Permian fusulinids in the Cache Creek Group in southern British Columbia have been reported from several localities in the region between Vernon and Clinton. However, the only faunas described are from Marble Canyon and northeast of Kamloops. These faunas range in age from late Wolfcampian to Guadalupian.

Over the past few years, systematic search of the limestone beds of this area has resulted in the discovery of several important fusulinid faunas. For example, the distinctive genus *Pseudoschwagerina*, has never been described from this area, but it occurs at several localities between Vernon and Clinton.

A new fusulinid fauna from a series of limestone bodies northwest of Meadow Lake, about 25 mi northwest of Clinton contains many Lower Permian species and 2 species of Middle Pennsylvanian (Missourian) *Triticites*. Species referred to the Permian indicate a late Wolfcampian or early Leonardian age and include 2 species of *Schubertella*, several species of *Triticites* and *Schwagerina*, a *Paraschwagerina*, 3 species of *Pseudoschwagerina*, and 2 species of *Quasifusulina*. The species of *Quasifusulina* occur with *Pseudoschwagerina* and represent the second reported occurrence of this genus in North America. A similar fauna containing *Quasifusulina* has been described from the Fort St. James area of central British Columbia.

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EVALUATION OF PETROLEUM PROSPECTS UNDER CONDITIONS OF UNCERTAINTY

Recent advances in computer technology have made practical the use of well-established methods for evaluating the consequences of uncertainty. Because of the complex and intricate process of translating exploration data into economic terms, these methods promise to be of great benefit to the managements of companies in the minerals industry. In addition to providing a means for evaluating risk or probability of financial loss, the methods provide information to aid in evaluating the importance of specific variables with respect to desired answers. As a means of communication they provide the mechanism whereby the qualifications