anomaly maps, has been identified in the central part of the Powder River basin, Wyoming. By comparing productive areas and sandstone trends to the high, it is apparent that it has affected deposition of sedimentary units since at least Lower Cretaceous time and conceivably since marine foreland deposition began.

Sandstone sequences, such as the Muddy Formation, deposited in a primarily fluviodeltaic environment were deflected around the flanks of the high whereas units deposited in a predominantly marine system, such as the Shannon, had their best sandstone development on top of the high. Understanding the relations between the positive element and sandstone distribution is an obvious aid to exploration.

Similar highs in other Rocky Mountain structural basins are identified and exploration targets discussed. These highs provide early migration paths for hydrocarbons, platforms for the development of porosity in clastic rocks, and in some places, can be shown to be areas unfavorable for exploration because of the absence of sandstone.

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Oil Production from Fractured Cherts of Woodford and Arkansas Novaculite Formations, Oklahoma

The chert section of the Woodford Formation has been known to be productive of oil and gas for at least 30 years. However, little was known about the chert as a reservoir until 1969 when Jones and Pellow Oil Co. and Westheimer-Neustadt Corp. jointly developed the Northeast Alden pool extension in T7N, R13W, Caddo County, Oklahoma. Cores, thin sections, X-ray analyses, and combustion tube studies indicate that the Woodford Chert is a prime source bed for hydrocarbons, and when fractured is an excellent reservoir.

In February 1977, Westheimer-Neustadt Corp. drilled the No. 1 Wallace in Sec. 2, T8S, R5E, to test the Arkansas Novaculite, which is similar to the Woodford Chert, and completed the well for a potential flow of more than 1,000 bbl of oil per day. The significance of the discovery has not been fully realized by industry in that it may have opened a new petroleum province in the Ouachita facies that extends from southeastern Oklahoma in a broad arch for over 600 mi (966 km) to the Marathon Mountains near the Mexican border.

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Getting the Most Out of Radon Geochemistry

Radon and radium are specific indicators of uranium. Radon in particular is easily analyzed in the field or in a portable lab. For this reason and because of its mobility as a soluble noble gas, radon has received considerable attention in exploration. The mobility of radon is complicated by its short half-life (3.8 days) and by movements of earlier members of the decay series.

Claims of the successful application of radon geochemistry to detect uranium deposits beneath several tens of meters of cover (including shale and coal beds) seem extravagant but may warrant further study. In areas of shallow overburden, radon in soil gas can extend evaluation to depths beyond reach of the scintillometer. Radon to thoron ratios are useful in this work as well as radon content itself. Day-to-day variations of radon content in soil gas are confusing, but seldom obscure trends and anomalies.

Lake-water radon anomalies are associated with two recent major uranium discoveries in the Canadian Shield. In both discoveries, the radon anomalies were detected in the earliest stages of exploration in the area.

Radium, the parent of radon, also can be readily determined in a portable laboratory. In an example from southeast Texas, a dramatic reduction in radium values has been measured in groundwater within a few hundred feet of an orebody. Anomalous radium measurements other than those associated with uranium mineralization or geothermal waters are extremely rare.

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Cementation, Diagenesis, and Paragenetic Sequence in Biyad-Wasi Sandstones (Lower-Middle Cretaceous) of Central Saudi Arabia

Although most of the Biyad-Wasi sandstones are friable and poorly cemented, some specimens reveal some cementation principally by secondary silica (or quartz), carbonate, or ferruginous material. The Biyad-Wasi sandstones have undergone several important diagenetic changes during their postdepositional history. The full paragenetic sequences commence with primary partial silica cementation, which was followed by precipitation of iron solutions in the remaining pore spaces; both these stages involved quartz overgrowths, produced as a result of pressure solution. Later stages resulted in precipitation of iron-rich clays and carbonate in new pore spaces created by partial replacement and corrosion of detrital quartz grains. The lack of quartz overgrowths is believed to be due to inhibition of pressure solution in these stages. The final diagenetic stages include weathering, which has created new pore spaces, and precipitation of silica dust (probably of aeolian origin) in such pores, and the formation of secondary silica overgrowths in the form of microcrystalline quartz. This process gives rise to the "quartzitic" crusts developed on many elevated outcrops of the Biyad and Wasi sandstones.

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Evolution of Brooks Range Thrust Belt and Arctic Slope, Alaska

Rotation of a small continental lithospheric plate in Early Cretaceous time formed the southern part of the Canada basin of the Arctic Ocean and an Atlantic-style extensional plate margin underlying the continental shelf north of Alaska. Simultaneously a compressional margin formed to the south, causing over 500 km of crustal shortening and large-scale obduction of ophiolitic rocks over the leading edge of the Arctic alaska plate. An asymmetric foredeep north of the thrust belt is filled with Neocomian to Albian lithic flysch derived from the imbricated sedimentary and mafic-ultramafic igneous terranes. Middle and Late Cretaceous isostatic rebound of the depressed sialic crust resulted in several kilometers of vertical uplift in the southern Brooks