amounts in an easterly direction. It would appear that a separate basinal area existed toward the end of Middle Jurassic time in Manitoba, receiving clastic sediments from the north and east.

The Shaunavon formation can not be traced lithologically in this facies district but approximately equivalent picks can be made from electric and radiation logs. The lithologic character of the uppermost Gravelbourg, Shaunavon, and Vanguard formations in Manitoba resembles closely that of the Sundance formation in North and South Dakota.

Callovian time is represented by the lower part of the Vanguard formation. During this time uniform basinal conditions were established across the entire area. A slight unconformity, recognizable in western Saskatchewan, marks a change from marine to brackish conditions which must have taken place in middle Oxfordian time. In the center of the basin 150 feet of marine middle Vanguard represent the Oxfordian interval. The upper Vanguard is partly marine, partly brackish and contains Kimmeridgian fauna. The lithologic character of the upper Vanguard, and the fact that it contains reworked fragments of older Jurassic faunas, indicate redeposition of material from the truncated basin flanks into the center.

The hiatus between Kimmeridgian and Lower Cretaceous is represented by a major unconformity which marks the top of the Jurassic system in Saskatchewan.

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Stratigraphy of Jurassic Type Localities of Northern United States and Correlation with Adjoining Areas

On the basis of faunal and lithologic correlations, Jurassic units can be traced northward from their type areas of the northern United States Rocky Mountains into southern Canada. The five-unit classification of the marine Jurassic in the Black Hills is useful in the subsurface for only a limited distance from the type area. The most useful nomenclature for subsurface work in the northern Rocky Mountains of the United States is probably that of the Ellis group of Montana. The Swift, Rierdon, and Piper units of the Ellis group can be correlated throughout most of the Western Interior United States. Within the central part of the Williston basin, however, these units are not yet recognizable on a lithologic basis alone, but micropaleontologic work indicates that these units may be distinguishable paleontologically.

The major tectonic elements affecting the marine Jurassic sedimentary pattern in the northern United States were the Belt island of western Montana, the Williston basin of North and South Dakota, eastern Montana, and southern Saskatchewan, and the Twin Creek trough of southeastern Idaho, central and northern Utah, and western Wyoming. Isopach maps indicate that several minor "positive" and "negative" elements were also present within the shelf area of Montana, Wyoming, western Colorado, and eastern Utah.

JURASSIC COMMITTEE

Cross Section: Jurassic Correlation in Western Canada Basin and Northern United States

The stratigraphic correlations herein proposed were prepared by a committee consisting of the following members: Hans Frebold (chairman), Miss D. M. Loranger (co-chairman), G. Blakslee, P. Chamney, M. B. Crockford, A. Klingspor, H. Lackie, W. D. MacDonald, R. Milner, J. Peterson, G. Springer, and Miss Ruth L. Thompson.

In Saskatchewan, the basal unit of the Mesozoic is the Watrous formation (Gypsum Spring). It is considered to be pre-Middle Bajocian and its lower beds might even be Triassic in age. The Watrous is overlain by the Sawtooth formation, which is equivalent to the Gravelbourg and part of the Shaunavon. The top of the Sawtooth is still under discussion, some favor placing it at the top of the upper Shaunavon. The Gravelbourg and the lower Shaunavon are equivalents of the Middle Bajocian Rock Creek member of the Fernie group. In the plains of Alberta and Saskatchewan the upper Sawtooth may include strata of Upper Bathonian age; however, no proof is currently available. The Montana and Alberta Rierdon formation represents the Lower Callovian. In Saskatchewan the lower Vanguard and perhaps a part of the upper Shaunavon are of the same age. In the Fernie group the Lower Callovian consists of the Gray beds, which are locally replaced by the facies of the *Corbula munda* and *Gryphaea* beds. In Saskatchewan the Oxfordian is represented by the middle and upper Vanguard which are equivalent to the Alberta and Montana Swift formations and to the Green beds and lower Passage beds of the Fernie group. The presence of an unconformity at the top of the middle Vanguard is possible. The sands of the middle Vanguard pinch out to the west toward the Sweetgrass arch.

Strata of Kimmeridgian age are represented in the Fernie group by at least part of the upper Passage beds. On a micro-paleontological basis, Loranger and others regard the uppermost part of the Vanguard formation as Kimmeridgian and consider this part of the section in the Alberta and Saskatchewan Plains as part of the Montana Morrison formation.

In the subsurface of the Peace River area the Jurassic is developed as Fernie group; the Nordegg member, the Toarcian and the Rock Creek member have been recognized on a lithological basis and