

WILLISTON BASIN STRATIGRAPHIC NOMENCLATURE CHART

MISCELLANEOUS SERIES NO. 61

by John P. Blumle, Sidney B. Anderson, and Clarence G. Carlson

NORTH DAKOTA GEOLOGICAL SURVEY

1981

Chart A

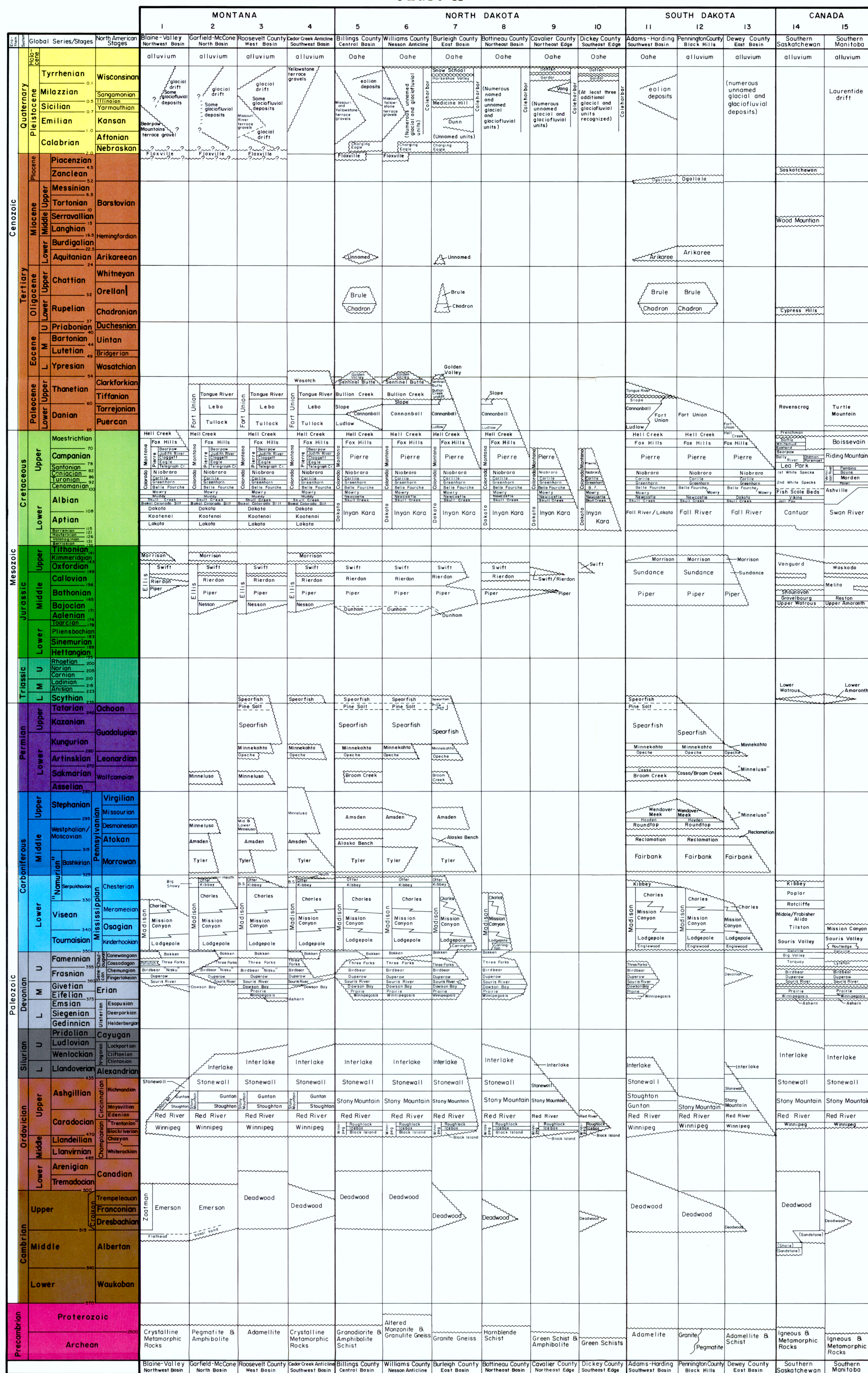
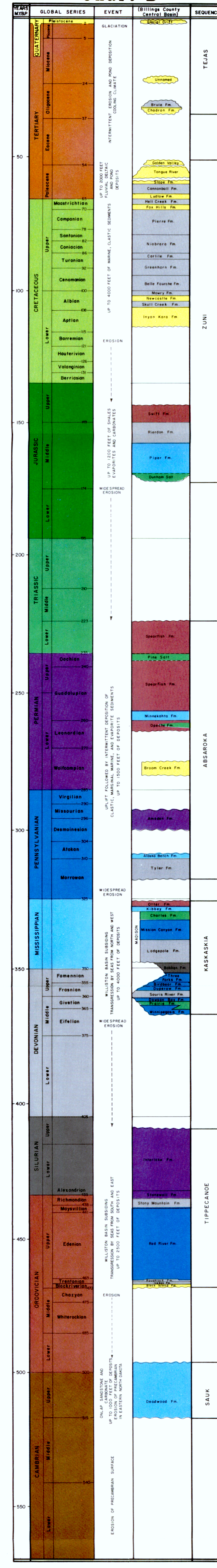
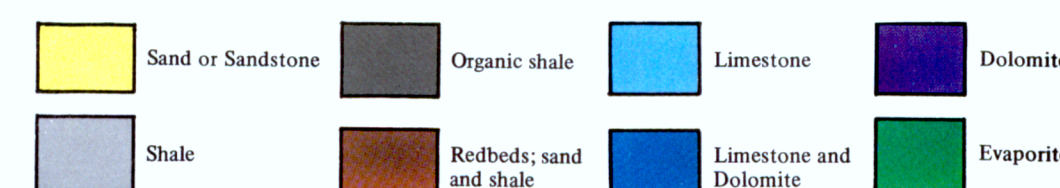


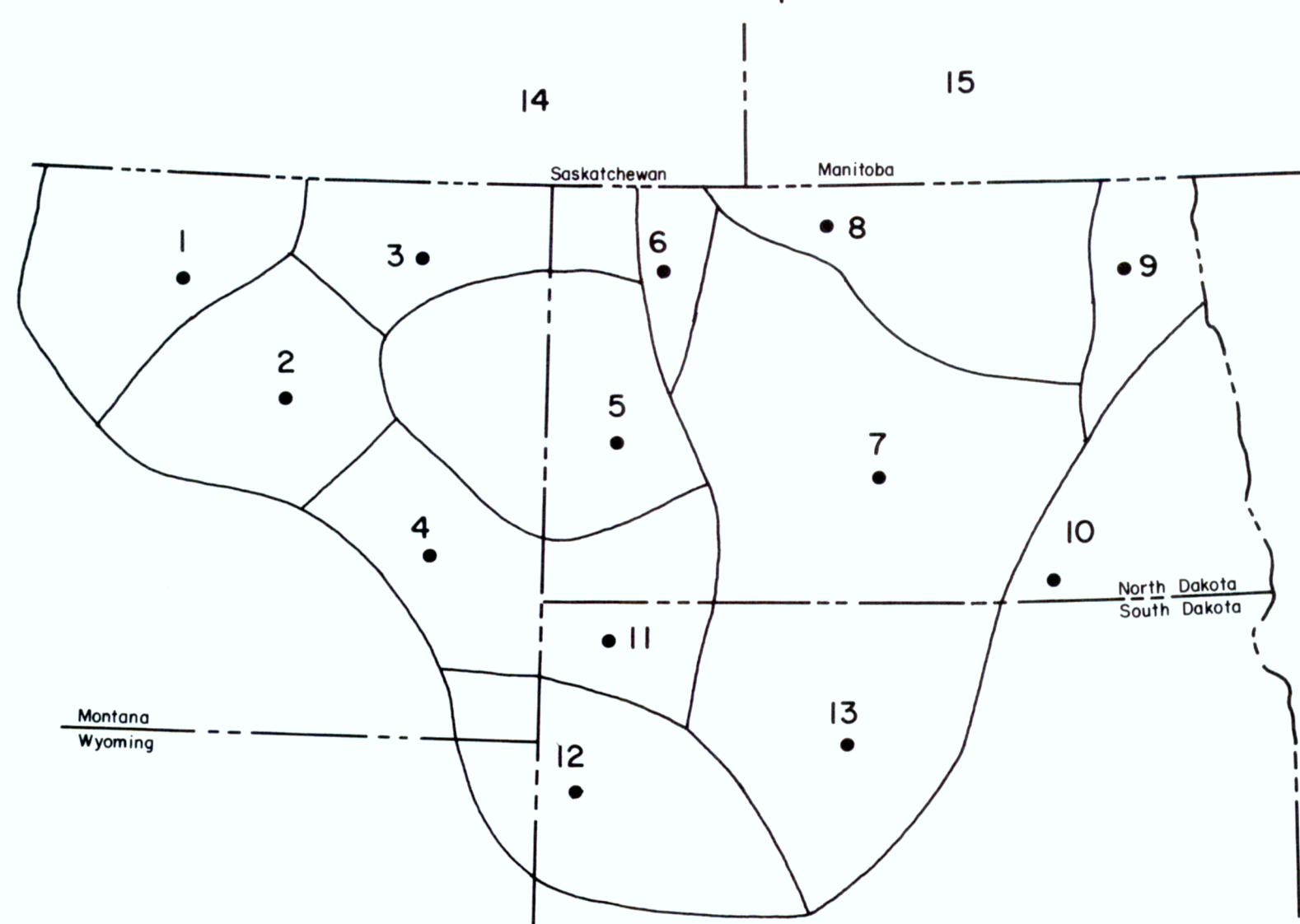
Chart B



LITHOLOGIC LEGEND
(refers to lithologies on Chart B; rock units shown on Chart A are generally similar although minor variations may occur)



Column Index Map



The numbered columns on Chart A correspond to the areas designated on this map. Chart B corresponds to area 5 on this map. Within each area, the X corresponds to the approximate location of a well that is typical of that area. However, each column is representative of the entire area, as shown on this index map.

WILLISTON BASIN STRATIGRAPHIC NOMENCLATURE CHART

Chart A is a correlation chart of chronostratigraphic units of the Williston Basin. It compares 15 areas in Montana, North Dakota, South Dakota, Saskatchewan, and Manitoba (see index map). The units included are those in use by geologists working in the Basin; they are units that are widely recognized and commonly picked on geophysical logs.

The variable vertical scale used on Chart A has been either compressed or expanded for convenience in drafting, depending on the number of recognized units that occur within the various time intervals and the amount of detail shown. The geochronological scale (numerical time scale in millions of years) varies accordingly. For example, the two million years of Quaternary time require about two vertical inches; the 40 million years of Triassic time require less than one inch because few units of Triassic age are recognized. Absolutely no connotation of thickness of units can be inferred from the columns on either Chart A or B.

The left-hand columns on Chart A list Global Series/Stages and North American Stages that are adapted from the AAPG Correlation of Stratigraphic Units of North America (COSUNA) research project. Although most of the series and stage names are not widely used by geologists working in the Williston Basin, they are included here for the sake of completeness, and to allow more precise comparisons and correlations with other areas.

Wavy lines generally represent unconformities and show that the time-section (geologic time) is incompletely represented. The horizontal scale within each column represents lateral continuity in a very general sort of way. For example, a wavy line sloping downward and to the right on top of a formation shows that the preserved section to the east is older than it is to the west. A unit that does not extend all the way across a column is present in only part of the area represented by the column.

The erosional events depicted on the stratigraphic columns (both Charts A and B) were of unknown length. An unknown amount of older rock, above a given level (the surface of the unconformity), was eroded. For example, a period of erosion was interrupted when Winnipegosis sedimentation began in Devonian time. This erosion had removed any Silurian and Devonian rocks that may have rested on top of the Interlake Formation, as well as removing undetermined amounts of the Interlake Formation itself, depending on geographic location within the Basin. Rocks of uppermost Silurian and Lower Devonian age are absent. We do not know for certain whether they ever existed in the area. If rocks of these ages were once present, they were eroded prior to Winnipegosis sedimentation. We know, therefore, that the erosional episode ended during the Middle Devonian. It may have started any time after Interlake deposition.

Chart B is a stratigraphic column of the central Williston Basin (McKenzie-Billings County area of western North Dakota, comparable to area 5 on the column index map and column 5 on Chart A) drawn using a linear time scale on which one vertical inch equals 24 million years. The column shows geologic time and the events that occurred throughout geologic time, and it shows the preserved sedimentary rock section. The preserved formations correspond to regional sedimentary rock sequences (farthest right column on Chart B) that can be correlated over much of the North American continent.

These charts are working versions, subject to revision. Some of the correlations and some of the nomenclature are controversial. We ask for constructive criticisms and comments to enable us to improve future editions of the chart. All letters received will be acknowledged and all information will be assessed and applied as revisions or additions.

We are indebted to the following people for help in preparing the Montana and South Dakota portions of the charts: Jim Cannon, John Graham, Bill Hupp, Carl Kendall, Harold Silkwood, Fred Steece, Jim Stenson, Dan Vice, and Mike Walen.