## ONE PRESUMPTIVE PALEOGEOGRAPHY FOR THE PHANEROZOIC OF WHAT IS NOW THE NORTH AMERICAN ARCTIC*

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### ABSTRACT

*The Arctic edge of North America mirrored the Atlantic edge for the first three-quarters of Phanerozoic time. Big events shaped its rock, water or air interfaces: Pangaean drift, Devonian accretion of a trough and continental borderland, Cretaceous telescoping of the edges of the American plates, and Cenozoic construction of the isthmus between America and Asia.*

*First quarter of the Phanerozoic.—Paleoequatorial uplands on the Canadian shield faced a broad extension of Iapetus/Eo-Pacific; submarine settings consisted of the Franklinian platform, miogeoclinal and oceanic(?) (Hazen Trough) realms, and, farther offshore, the De Long (here named) slope-shelf realm.*

*Next 50 Ma.—Telescoping into Catskill-like lands of the midoceanic realms joined the De Long realm and its granitoid provenance (Nukaland) to the continent.*

*Next 200 Ma.—These tectonic lands, at mid-paleolatitudes, narrowed to a provenance (Barrovia) for the Arctic Alaska Basin upon Mississippian transgression by the De Long sea and sinking of the Sverdrup Basin. Nukaland diminished early in the Pennsylvanian, and its space was taken by 150-Ma-cooling mafic igneous realms. The De Long realm became a platform of ocean-mimicking deposition seaward of the Arctic Alaska Basin. Barrovia responded to rifting and finally converted to passive margins of the Arctic Ocean early in the Cretaceous, while the Sverdrup Basin subsided rapidly.*

*Next 90 Ma.—A Cretaceous orogenic chain grew along the edges of the Arctic Alaska, and nuclear American plates rotated against a proto-Pacific Ocean. Between Wrangel Island and the Yukon Territory, the skins of the De Long and adjacent oceanic(?) realms were shingled into this ancestral Brooks Range. The Pacific and Arctic Oceans bordered successor basins flanking the orogen.*

*Last tenth of the Phanerozoic.—The chain grew into the present isthmus as dextral drift between the western Cordillera and the Arctic crunched the foldbelt into the Arctic syntaxes and moved the rest of the state into place.*

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## STRUCTURAL INTERPRETATION OF THE NE BROOKS RANGE FLEXURE, NORTH ALASKA: A HYPOTHESIS*

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### ABSTRACT

*A new hypothesis of the NE Brooks Range flexure has been deduced on the basis of the data from the literature. The structural framework of the Brooks Range and some of its surrounding tectonic features can be synthesized as follows. 1) An imbricated set of nappes and thrust faults were produced during the Meso-Cenozoic orogenesis of the Brooks Range. Nappe structures have been recognized in the western portion, whereas their occurrence is not well defined in the eastern portion of the chain. Mostly north-verging, thrusts and related folds are widespread throughout the Brooks Range: their trend follows the geographical outline of the chain, bending in both its western as well as its eastern extremities from E-W to N-S. The structural relationships and the involvement of Late Cretaceous and Tertiary deposits in the interior NE Brooks Range and in its NE Foothills, confirm the younger activity of the thrust faults compared to the nappe emplacement. 2) South of the Brooks Range, the Kaltag-Porcupine fault produced tens of miles of right-lateral displacement during the Late Cretaceous to Tertiary. In the NE area of the Kaltag-Porcupine fault the structural pattern of the Brooks Range bends progressively from E-W to N-S and no strike-slip fault alignment can be traced with continuity. Further NE, in the Porcupine River area, an en-echelon fold pattern trends about NE-SW. 3) In SE Alaska and in the Canadian Cordillera, the NW-SE trending Tintina fault system has been one of the most important tectonic elements during the Cretaceous and the Tertiary, producing hundreds of miles of right-lateral motion. The nature of its NW extension is not clear, even though it seems to terminate against the Kaltag-Porcupine fault. An interpretation of this NE Alaska structural framework takes into account a possible connection between the NE Brooks Range thrust pattern flexure and the displacement of the Kaltag-Porcupine fault. Thus, a change in style from brittle deformation in the SW to relatively ductile, in the NE portion of the fault, should be invoked. As a result, the NE termination of the Kaltag-Porcupine fault could have formed the arcuate trend of the NE Brooks Range through a mechanism explainable in terms of wrench tectonics. The total crustal shortening of the NE Brooks Range could be the result of the northward compression due to the combined effect of both the Kaltag-Porcupine and the Tintina fault displacement, during the Late Cretaceous(?)-Tertiary. Such a model requires the north-eastward motion of a wedge-shaped microplate bounded by the Kaltag-Porcupine fault, and the Brooks Range respectively in its SE and northern sides.*

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