ble to distinguish separate water bodies in this region. The following principles and criteria are the bases of constructing zoogeographical divisions into smaller subdivisions or districts: (1) the degree and the rank of endemism; (2) endemism of species; (3) the areal extents of species, genera, and families; and (4) the coefficient of the community (K_c = the ratio of the quantity of species, genera, and families characteristic of a district, to the total number of species, genera, and families).

Endemic families and genera are absent. High values of K_c are found at the family level. Thus the very great similarity of the Late Jurassic middle Volzhian fossil complexes of the Pechora basin, and western and middle Siberia (K_c = 0.70–0.77), and the endemism of species (22–48%) indicate that these districts belong to the North Boreal subregion of the Boreal region. Values of K_c, and the areal distribution and endemism of species made it possible to recognize the Pechora–West Ural (Pechora basin, West Siberian basin) and North Siberian (Ust'-Yenisey district, middle Siberia) provinces in middle and early Volzhian times. In late Volzhian time a climatic change took place. The ensuing temperature decrease of the marine water caused a narrowing of the distribution of almost all species in middle Siberia and an increase in agglutinated Foraminifera (Ammodiscidae, Ataxophragmiidae, Trochamminidae). The basins of the Pechora, western Siberia, and middle Siberia districts were part of the Boreal region, the boundary of which shifted southwestward. In Berriasian (Early Cretaceous) time, the water area of the Soviet Arctic zone was included in the Boreal region with the western and northern Siberia provinces.

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Oil and Gas Problems of Northeastern Asia and Adjoining Shelf

1. Northeastern Asia and vast areas of the adjoining shelf attract the attention of petroleum geologists, particularly after the discovery of many large oil and gas fields in structurally similar areas nearby, and in Alaska.

2. There are 18 possible oil-gas bearing basins in the northeast of USSR (excluding Kamchatka).

3. *Geosynclinal basins* (Khatyrka, Olyutorka, Korfovskiy) are linked with young depressions within the Olyutorka-Kamchatka system of the Cenozoides. These basins are characterized by the presence of orthogeosynclinal lithologic sequences, complex folding, and numerous oil and gas seeps that also are known on the adjoining shelf areas.

4. *Proto-orogenic basins* are confined to various intermontane areas. Their positions are defined by the geotectonic setting and the structure of the underlying late geosynclinal and postgeosynclinal rocks. Primary exploration objectives are in molasse complexes. Examples include: Momskiy, Indigirka-Zyryanka, Yamsk-Tauy, Kresty Bay, Anadyr, Penzhino, Parapol' and Pustoretsk basins. In the Anadyr basin, gas flows and definite oil shows were recovered in the wells which have been drilled.

5. *Deutero-orogenic basins* (Ulyogan, North Kolyma) in the area are found entirely within old middle Mesozoides massifs, and are characterized by the presence of two facies: The subplatform and molasse complexes.

6. *Platform-type basins* are confined to an extensive area of epi-Mesozoic depressions on the Arctic and Okhotsk shelves. These depressions are partly exposed on land. The Arctic group of basins is in depressions formed during the waning stages of the Mesozoides. It is possible that in the Arctic shelf conditions similar to those of Prudhoe Bay field in northern Alaska will be found.

7. On the basis of a comparative geologic-economic analysis, the most prospective and immediate objectives are the Anady basin, Indigirka-Zyryanka basin, the inland part of the Laptiyev-Yanskiy basin, and the inner zone of the Novobirsk basins. The large reserves for the future are on the shelves.

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Cretaceous Paleogeography of Arctic Canada

In Early Cretaceous time Berriasian-Valanginian boreal seas covered North Yukon and Sverdrup basins and were connected at the site of the present Beaufort Sea. Dawson City strait connected the North Yukon sea with the North Pacific sea of the Saint Elias trough across the present Klondike plateau. The remainder of Arctic Canada was dry land.

In latest Valanginian time, uplift excluded the Hauterivian-Barremian seas from Sverdrup basin but North Yukon basin and Dawson City strait remained flooded after partial, early Hauterivian regression.

An Aptian boreal transgression flooded the Sverdrup basin and restored direct connection with the North Yukon sea which subsequently spread eastward into Darnley Bay and lower Peel River areas. Aptian orogeny closed the Dawson City strait and separated permanently the Canadian Boreal and North Pacific seas.

The early and middle Albian boreal seas covered Sverdrup and North Yukon basins and most of Mackenzie Lowlands and Mountains but late Albian and Cenomanian seas were restricted to a residual seaway east of Mackenzie River that connected the Mowry sea with that of Sverdrup basin.

An early Turonian transgression flooded the present regions of northern Yukon, Mackenzie Mountains, and, possibly, the Sverdrup basin; its total extent is still obscure. In the late Turonian the sea left the Mackenzie Mountains region but the North Yukon and Sverdrup basins remained flooded and were connected with a residual seaway east of Mackenzie River. A new seaway, connecting Sverdrup basin with the West Greenland sea across Ellesmere Island and Baffin Bay, opened in the late Turonian.

The most extensive flooding of Arctic Canada was caused by the Coniacian to mid-Santonian transgression which covered the areas of the Mackenzie Mountains, North Yukon basin, and Sverdrup basin, and extended east as far as Coppermine River.

Strong late Santonian uplifts on the west side of the Mackenzie Lowlands were followed by a series of increasingly intense uplifts that caused progressive eastward retreat of the Campanian-Maestrichtian seas. A residual seaway connecting the Bearpaw sea with that of West Greenland across the Canadian Arctic Archipelago and Baffin Bay continued to exist east of Mackenzie River until late Maestrichtian time. All of Arctic Canada became dry land in late Maestrichtian or early Paleocene time.

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Marine Geology of Atlantic North of Arctic Circle

As with all oceanic sea floor, the process of axial accretion along the crest of an active mid-oceanic ridge is of paramount tectonic importance to the geologic fabric of the northern Atlantic Ocean floor.

The chronologic evolution of the Norwegian-Greenland Sea region has been derived from the analysis of Raff-Mason magnetic anomaly patterns by several investigators. These studies indicate that Norway and Greenland were severed when rifting commenced 60–70 m.y. ago, approximately along what are now the edges of their continental shelves. A half rate of 1.2 cm/year has been measured as the rate for this earliest sea-floor spreading. A second episode of spreading lasted from 40 to 18 m.y. ago, and was accompanied by a westward axial shift of the mid-oceanic ridge in the Norwegian Sea. At present, the axis of activity is along the Iceland-Jan Mayen and Mohns Ridges. Mohns Ridge apparently has been stable throughout the evolution of the region whereas the Iceland-Jan Mayen Ridge appears to be a very recent feature. In the Greenland Sea the Knipovich Ridge is apparently now acting as a trench which connects the mid-oceanic ridge branches in the Arctic and Norwegian Seas.

Baffin Bay is enigmatic as to whether it is downfaulted continental or oceanic crust. The writers prefer the hypothesis that Baffin Bay was formed at the same time as the Labrador Sea (prior to 60 m.y. ago) in a proto-North Atlantic by the process of sea-floor spreading. The now-extinct Mid-Labrador Sea ridge would have extended via transform faults through Baffin Bay and perhaps even to the Alpha Ridge in the Arctic. This system then slowed down and became extinct in the Tertiary.

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GEOLOGY, PETROLEUM POTENTIAL, AND EXPLORATION OF HUDSON BAY BASIN, CANADA

The Hudson Bay basin is a major sub-Arctic sedimentary province of Canada. Situated south of the Arctic Circle the basin underlies much of Hudson Bay, an extensive but shallow inland sea.

The basin covers approximately 270,000 sq mi and has a Phanerozoic stratigraphic thickness variously estimated between 6,000 and 10,000 ft. It is dominated by Devonian, Silurian, and Ordovician carbonate rocks with local Cretaceous clastics.

The geology of the basin is considered as a present northern exploration frontier. Estimates of hydrocarbon potential have been made.

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SPECULATIONS ON LATE MESOZOIC TECTONIC HISTORY OF PART OF SOUTHERN ALASKA

Late Mesozoic sedimentary and volcanic rocks in southern Alaska form 2 crudely parallel, arcuate belts that are concave on the south. The northern belt consists of the southern Wrangell Mountains and their ill-defined mergence with part of the St. Elias Mountains on the east. The southern belt consists of the eastern part of the Chugach Mountains and part of the St. Elias Mountains. Both belts include large tracts of geologically unmapped terrane; knowledge of their geology is based mainly on reconnaissance investigations and a few local detailed studies.

The northern belt is the less structurally complicated of the two. It contains a sequence of Late Triassic, Jurassic, and Cretaceous shelf deposits that overlies widespread Triassic subaerial basalt. Mesozoic rocks of the northern belt clearly have continental affinities and probably were deposited on a late Paleozoic oceanic terrane that collapsed against the continental margin during the early Mesozoic.

Geologic details of the structurally complex southern belt are less well known. Late Mesozoic rocks of this belt, which attain great thickness, include argillite, slate, graywacke, submarine lavas, and small bodies of ultramafic rock. These rocks are cut by numerous granitic plutons of Mesozoic and early Tertiary ages and locally have been metamorphosed. The Mesozoic rocks are interpreted to have been deposited at least in part on the oceanic crust and later underthrust against the continental margin.

The rocks of the region have been affected by at least 2 major orogenies; the older from the Late Jurassic to Early Cretaceous and the younger from Late Cretaceous to earliest Tertiary. Each of the orogenies involved significant crustal shortening by folding and imbricate faulting in the southern belt and similar but less severe coeval deformation in the northern belt. Details of the Mesozoic tectonic history of the southern belt have been partly obscured by Cenozoic tectonic events.

Both the northern and southern belts appear to be truncated on the east by a system of major dextral transform faults. Late Mesozoic rocks similar to those of the northern belt occur about 500 mi southeast on the Queen Charlotte Islands near the present continental margin. Rocks similar to those of the southern belt are absent there, suggesting that they may have been thrust beneath the continent.

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STRATIGRAPHIC SCHEME OF ORDOVICIAN OF NORTHEASTERN USSR AND ITS CORRELATION

Ordovician deposits occur in marginal uplifts of the Kolyma medial massif (different facies zones of the Omulevka Mountains, Selennyakh Ridge, Tas-Khayakhtakh Ridge), middle part of the Kolyma River, in the Verkhoyansk fold-mountains region (Sette-Daban Ridge), in the Chukotsk Peninsula. Recent data indicate the presence of Ordovician in the Omolon and Okhotsk medial massifs. A correlation chart was prepared, and it shows the correlation of Ordovician deposits of all principal regions of the northeastern part of USSR by ostracod, brachiopod, trilobite, and graptolite associations. The biostratigraphic zones corresponding to the Upper Ordovician of the international stratigraphic standard are accepted as principal units of regional stratigraphic importance. However, the stratigraphic positions of some biostratigraphic suites have been revised. This resulted in the revision of the contents and names of some zones.

The oldest Ordovician deposits (Inaya horizon) are correlated conditionally with the Tremadocian of England, the Gasconadian Stage of North America, and the Ust'kut Stage of the Siberian platform. The correlation is based on brachiopod and trilobite associations and stratigraphic position. The Khita horizon is compared with Beekmantown Stage of North America and the Chunya Stage of the Siberian platform on the basis