tiary and Quaternary sediments that were deposited in a basin formed by the subsidence of a lithified and folded Mesozoic basement complex. This Anadyr basin is evidently an extension of the depression containing up to 3 km of Tertiary strata below the Anadyr Lowland on the west of the Gulf of Anadyr. A basement sill extends eastward from the southwest corner of the gulf; apparently, the sill is the continuation onto the shelf of the Koryak Mountain structural province. Tertiary layers generally are little deformed over the basement sill, thus it is suggested that this broad arch has been in existence throughout the Tertiary. If the thick Tertiary deposits of the Anadyr, Bristol, Norton, and Chukchi basins are shallow marine in origin, the extent of an exposed Bering Sea shelf during the Tertiary may not have been as great as previously thought. Some draining of the shelf is suggested, however, near the end of Tertiary time by a distinct erosional unconformity below Quaternary sediments in the northwestern part of the Gulf of Anadyr.

On seismic profiles Quaternary sediments appear to be highly deformed across parts of the Anadyr shelf. These deformed Quaternary deposits are ascribed to continental ice encroachment on the shelf, and they define the outer limits of ice advance during the maximum glaciation as lying approximately along a line from St. Lawrence Island to a point 150 km east of Anadyr Bay, then south roughly parallel with the coast. Buried erosion surfaces and stream channels within the Quaternary sediments are evidence of sea-level fluctuations during that time.

Present bathymetry and the sediments and fauna of 1-m cores suggest a sea level stillstand at approximately −75 to −80 m. Lack of suitable material precludes dating of this stillstand.

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Organic Material in Modern Sediments of Arctic Ocean

The distribution and composition of the organic material in the modern sea and ocean sediments play a significant role in the process of sedimentation and in subsequent diagenesis.

Materials introduced by river flow, marine plankton, and to a lesser degree, benthonic organisms are the sources of the organic material in the sediments of the Arctic Ocean. These three sources do not have equal importance in the formation of the sea and ocean sediments.

River flow transports the principal organic components—allochthonous organic material which is transferred into the sea sediments. A less important source, plankton, provide the autochthonous organic material to the deep-sea sediments.

An analysis of much of the available data concerning the contents and distribution of the organic carbon in the sediments of the Arctic Ocean indicates close relations among the organic carbon centent, the character of the ocean water mass, the relief of the sea bottom, and the granulometric composition of the sediments.

The organic carbon content within the limits of 0.5–1.0% characterizes the general geochemical background of the sediments studied. A higher organic carbon content (1–2%) is observed (1) in the sediments of the Arctic seas that are affected by influx from the continents, and (2) in the sediments overlying the ocean ranges and continental slope in the areas where warm waters enter from the Atlantic and Pacific Oceans. The maximum organic carbon content (up to 3%) observed near the mouths of the large Siberian rivers, results from the transfer of organic material by continental river flow.

The minimum amount of organic carbon, less than 0.5%, is in the sediments of the deep ocean depressions, where the temperature of the bottom water is below zero. The concentration of organic material in the thin dispersion sediments is characteristic of the Arctic Ocean sediments.

Despite the small amount of data concerning the composition of the organic material, it has been found that the change of the diffused organic material is directed toward the bitumens.

Further study of the composition of the organic material and its distribution in the sediments will solve the problem of the tranformation of this material under Arctic lithogenetic conditions and the role of organic material in defining the medium of sedimentation.

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Tectonic Framework of Northern and Central Alaska

The traditional tectonic framework of northern and central Alaska, based on Payne's pioneering study of Mesozoic and Cenozoic history, is inadequate to accommodate new evidence of older tectonic events, revised general models arising from plate tectonics, and the current plethora of hypotheses, conflicting, concerning Arctic tectonics. New concepts must accommodate evidence suggesting (a) Precambrian eugeosynclinal terranes and subsequent fold belts in Romanzof Mountains, Seward Peninsula, Yukon-Tanana Upland, and central Alaska Range; (b) stable though negative conditions throughout Paleozoic time in Seward Peninsula and Yukon-Porcupine area; (c) early Paleozoic eugeosynclinal terranes and fold belts in and north of the Brooks Range, and thin carbonates and graptolitic shales in a zone parallel with, and southeast of, Payne's Ruby geanticline; (d) middle and late Paleozoic miogeosynclinal and south-directed clastic wedge deposition in Brooks Range; (e) successive initiation of later eugeosynclinal terranes between the Brooks and Alaska Ranges, from the Kuskokwim area during the late Paleozoic (largely sedimentary) northward to the Koyukuk area in early Mesozoic (largely volcanic), and subsequent northward progression of Cretaceous and Tertiary centers of clastic deposition across Brooks Range and North Slope; (f) disparity between patterns of Precambrian and Paleozoic elements of Alaska and those of the cordilleran tectonic regime, and possibility that Mesozoic and Cenozoic tectonic framework is inherited; and (g) gross translation of terranes in the Mesozoic and afterward, northwestward on Tintina fault and Livengood thrust zone, northeastward along Kaltag fault, Yukon-Porcupine lineament and thrusts in eastern Brooks Range, northward throughout the Brooks Range and Foothills thrust belt, eastward on thrusts in western Koyukuk area, and northward and eastward in Collier thrust belt on Seward Peninsula, as well as dislocation in Paleozoic time, evidenced by pre-Mississippian thrusting in the Romanzof Mountains.