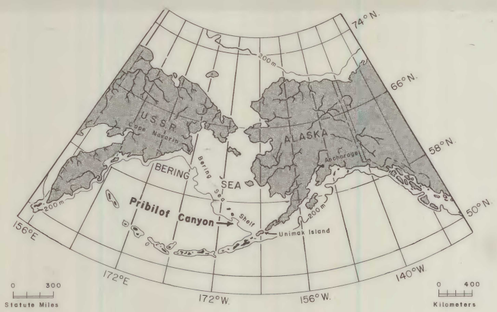

Figure 1 index map of the Bering Sea

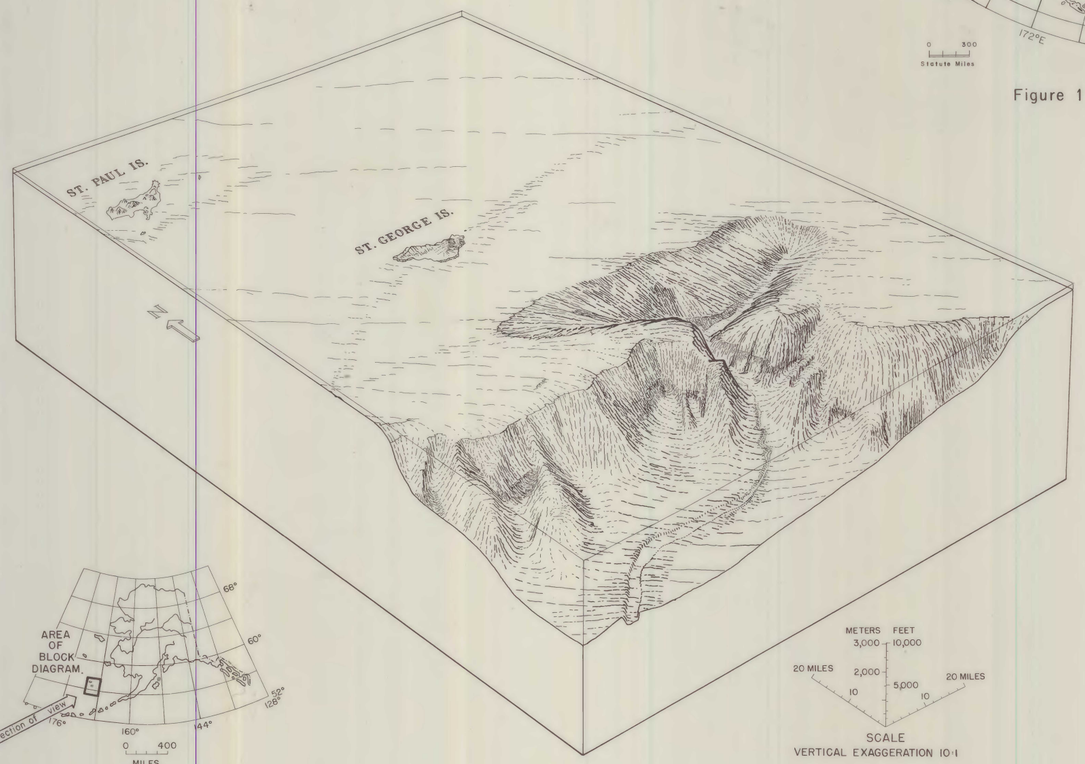

Figure 2 Pribilof Canyon (1970 data) viewed from the southwest

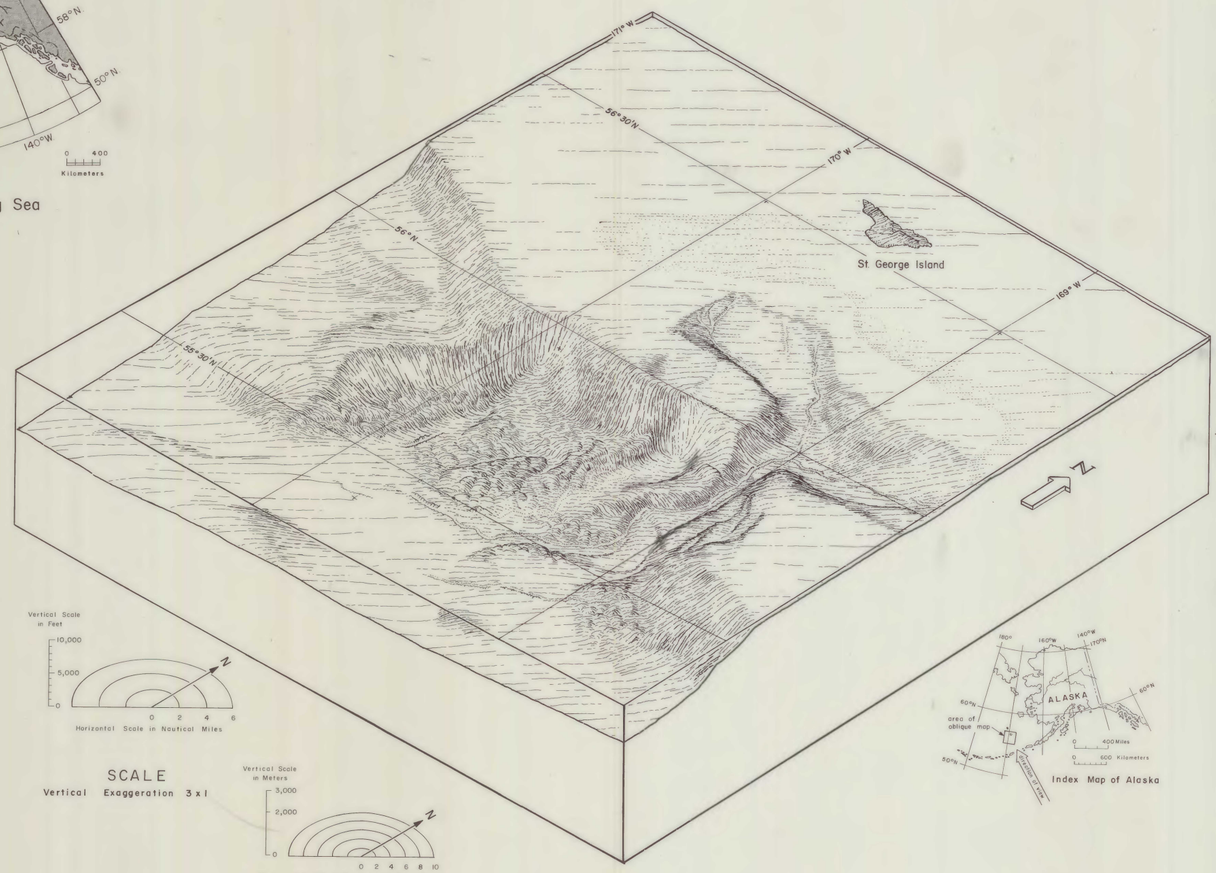

Figure 3 Pribilof Canyon (1978 data) viewed from the southeast

Three of the worlds largest submarine canyons are located along the edge of the Bering Sea shelf. The shelf trends southeast to northwest from Unimak Island near the Alaska Peninsula to Cape Navarin in northeastern Siberia (Fig. 1). The southernmost canyon, Bering Canyon, is 50 km from Unimak Island; Pribilof Canyon is due west of the Pribilof Islands; the northernmost canyon, Zhemchug Canyon, is cut into the central edge of the margin.

Pribilof and Zhemchug Canyons are both shaped in the form of a "T", and the upper or headward part of the canyons (cross bar of the "T") is parallel to the shelf edge. The headward part of Pribilof Canyon is thought to have formed by down faulting along the western side of the head, parallelling the trend of the margin (Scholl, 1970; Marlow and others, 1976, 1977; Gardner, personal communication, 1977). Erosion of the canyon may have begun in the Late Tertiary (Scholl, 1970) and was probably accelerated in Pleistocene time due to lowered sea levels.

Figure 2 is an oblique map of Pribilof Canyon viewed from the southwest published by Scholl and others (1970) and represents knowledge of the canyon at that time. The planimetric data (bathymetric contours) were derived from Nichols and Perry (1966) and Scholl and others (1968) and was overlaid on a grid consisting of two sets of parallel lines perpendicular to each other. A second set of bathymetric contours were derived using a two-point perspective grid which consists of one set of lines that converge to a vanishing point to the upper left and one set of lines converging to the upper right. With the two point perspective there is no uniform scale that can be used throughout the oblique map. The interval of the bathymetric contours on the two-point perspective was then expanded to a vertical exaggeration of 10 to 1. This framework of planimetrically-displaced contours (on a two-point persepctive base) was used to construct the drawing of Pribilof Canyon shown in Figure 2. Relief is portrayed by lines that represent shape, slope, and surface texture. Slope and relief are represented by lines that strike perpendicular across the expanded contours. Surfaces that are vertical or horizontal are drawn either vertically or horizontally. Most landforms are indentified by outlines, and their shape is portrayed by a heavy outline or a coalescing of lines. Surface texture is represented by changing the character of the line to represent hard, resistant rock types or soft, smooth rock types. Light is assumed to be from the upper right hand corner and produces an attached (rather than cast) shadow to the drawing. The contrast between shadow and light gives depth to the oblique map and is accomplished by varying the density and thickness of the lines.

Pribilof Canyon in Figure 2 is portrayed by showing its relationship to Pribilof Islands and to the edge of the Bering Sea shelf. The acoustic basement rocks were differentiated by thicker, heavier, and denser spacing of the lines than those used to portray the softer, sedimentary layer (Scholl and others, 1970). A leveed channel was drawn extending from the mouth of Pribilof Canyon on to the floor of the Aleutian Basin although its existence was not known in 1970. The assumption was made that there probably was a leveed channel here because levees were found at both mouths of Bering and Zhemchug Canyons. In 1977 new data revealed that there was indeed a well-developed tributary system of levees along the length of Pribilof Canyon (J. Gardner and S. Lewis, personal communication, 1977). Figure 3 is a revised oblique map of Pribilof Canyon at a vertical exaggeration of 3 to 1 and viewed from the southeast. The angle of view and the amount of exaggeration were changed from Figure 2 to obtain a better view of the north side and floor of the canyon.

The construction of Figure 3 did not involve the two-point perspective method used in Figure 2, but instead involved the use of a machine called an isometrograph (Dufor, 1917; Alpha, 1971). This machine allows the contours from a planimetric map to be foreshortened by a constant 30° angle from the horizon while the contour interval is being expanded to a vertical exaggeration of 3 to 1. The result is a parallel persepctive framework of expanded contours of constant scale throughout the oblique map. The same method of relief portrayal described above was used in constructing Figure 2.

Other than the angle of view and vertical exaggeration, the only difference between the two figures is the addition of new data in Figure 3. These two oblique maps allow the viewer to readily recognize the spatial relationship between the edge of the Bering Sea shelf, St. George Island, and the "T" shape of Pribilof Canyon.

Revised oblique map of Pribilof Canyon

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