(S5) /Terence W. Harley. /A. Frank Linville. /Gary D. McNeely. (Texas Instruments Incorporated, Dallas, Texas) Crustal Refraction Measurements Across the Aleutian Island Arc Using Source and Ocean Bottom Seismometer Arrays. The crustal structure across the Aleutian Ridge in the vicinity of Amchitka was determined from two inline reversed refraction profiles located to the northeast and southwest of Amchitka. Both profiles employed ten Ocean Bottom Seismometers (OBS) spaced at 20 km intervals and five-ton shots detonated at 20 km intervals off each end of the OBS line. Data quality is generally good; however, nearly all identifiable arrivals are Moho refractions so that the upper crustal structure is not well defined. Travel times were corrected to a datum plane 4.5 km below sea level to minimize lateral velocity variations associated with the large changes in water depth in the area. Depth to the Moho along the profile was determined using standard refraction analysis, the time-term method and model perturbation techniques. Calculations give a Moho depth of 16 km at the northern end of Petrel Bank increasing to 40 km just north of Amchitka and decreasing to 10 km south of the Aleutian Trench. The Moho velocity is 8.1 km/sec in the area.

(S6) /Joseph G. McDermott. /Edgar G. BeAbout. (Texas Instruments Incorporated, Dallas, Texas) A 30-Day Ocean-Bottom Seismograph System. Natural and man-made seismic activity in ocean environments can be recorded by ocean-bottom seismograph systems. A brief history of the development of a self-contained, free-fall, remote-recall, deep-ocean seismograph package is presented. The Ocean-Bottom Seismograph is designed to operate unattended and untethered in ocean depths up to 25,000 feet and is capable of continuous recording for a period of 30 days with a maximum "bottom-time" of 40 days. Instrumentation for recording short-period seismic and pressure data in the 1 to 10 Hz band is described along with unit subsystems for timing, recall and recovery. A general review of Ocean-Bottom Seismograph operations indicates that field experiments during the past seven years have led to advanced instrument design, refined operational techniques, demonstrated unique capabilities, and improved system reliability.

(S7) /R. S. Crosson. /N. I. Christensen. (Univ. of Washington, Seattle) Anisotropy in the Pacific Upper Mantle. Laboratory measurements indicate that many ultrabasic rocks possess elastic anisotropy characterized by an axis of symmetry. Since this anisotropy, termed transverse isotropy, is mainly a function of mineral orientation via deformational history, it follows that it is of interest to seek evidence of large scale transverse isotropy in the upper mantle. The traditional method of searching for differences in the propagation velocity of SV and SH waves is based mainly on the assumption of transverse isotropy with a vertical symmetry axis in the mantle. The results of this search have been inconclusive. However anisotropy may exist in the upper mantle as evidenced by observed systematic variation of P_n velocity with azimuth. In particular a transversely isotropic model with unrestricted symmetry axis orientation may be used to explain azimuthal variation of P_n velocity in the vicinity of the Mendocino and Molokai fracture zones as observed by Raitt and Shor. Two general classes of transverse isotropic elasticity, corresponding to relatively low or high symmetry axis velocity, arise in the analysis. For some sub-classes constraints may be placed on the angle of tilt of the symmetry axis independent of the assumption of elastic parameters for the model. Using the present model, a nearly horizontal symmetry axis is indicated for the data of Raitt and Shor.

(S8) / Gilbert Dewart. (Ohio State University, Columbus) Seismic Velocity Anisotropy in Foliated Ice. Seismic velocity measurements were made at the confluence of two arms of the Kaskawulsh Glacier, Yukon Territory. The ice was characterized by foliation consisting of alternating clear and bubbly layers, and by various types and degrees of preferred orientation of the ice crystal c-axes. Where foliation and crystal fabric were strong, the velocities of P-waves propagating normal to the S-planes of the foliation were smaller than parallel to the S-planes. It is concluded that velocity anisotropy is caused mainly by the foliation structure. Crystallographic fabrics were seldom strong enough to cause significant velocity anisotropy. Measured velocities agreed with velocities calculated for models constructed from crystallographic and foliation fabric data obtained in the field. In no case did P- or S-wave velocity vary with direction of propagation by more than five percent.