detector one hundred times larger is now being built that is designed to measure the presently calculated solar neutrino flux. The design and aims of this experiment will be described.

In planning a solar neutrino experiment one is guided by the present calculations of solar neutrino fluxes. These calculations have been developed in recent years, and one presently has confidence that the neutrino flux can be calculated within a factor of two. Sears[1] in particular has calculated the solar neutrino flux with his model using various values for the solar composition, age, luminosity, and nuclear parameters to test the errors introduced in the values of neutrino flux. Independent calculations have also been performed by Pochoda and Reeves,[2] and Cameron and Ezer,[3] and their results agree within a factor of two with those of Sears. It is generally agreed that the P-P chain of reactions is the dominant mechanism for the sun. In this chain, neutrinos are produced by three processes, the $H(H,e^+\nu)D$ reaction and the radioactive decays of Be^7 and B^8. The neutrino spectrum from these three sources may be combined to represent the gross neutrino spectrum from the sun. Figure 1 shows this spectrum and the fluxes of neutrinos at the earth as calculated by Sears. The neutrinos from the $H(H,e^+\nu)D$ reaction are below the threshold (0.816 MeV) for the capture reaction (1). However, the 0.861 MeV neutrino line from the Be^7 decay is above threshold for reaction (1), and contributes about ten percent of the expected capture rate in chlorine-37. The flux of energetic neutrinos from the B^8 decay (E_{max} = 14.2 MeV) is only 1.9×10^7 cm^{-2} sec^{-1} since the $Be^7(p,\gamma)B^8$ reaction plays only a minor role in the solar energy generation process. However, the cross section of reaction (1) is so large for these energetic neutrinos that the B^8 neutrinos would be expected to produce about 90 percent of the total signal in a detector based upon the $Cl^{37}(\nu,e^-)Ar^{37}$ reaction.