The reason that the cross section is high for these energetic neutrinos is that neutrinos above 6.0 MeV energy will be captured to produce an excited state in Ar^{37} at 5.2 MeV. Bahcall[4] has pointed out that this state is the analog state to the ground state in Cl^{37} and hence the neutrino capture to form this analog state is a superallowed transition and therefore has a high cross section. Bahcall's prediction has been recently verified by two separate experimental groups, at Brookhaven[5] and at McGill.[6] They observed the beta decay of Ca^{37} to reveal the 5.2-MeV level in the mirror nucleus K^{37}. The fact that the cross section for energetic neutrinos is large, had led us to believe we could observe the B^8 solar neutrinos by the Cl^{37}-Ar^{37} method.[4,7] It is interesting to note that the production of B^8 in the sun depends strongly on the central temperature, therefore a measurement of the B^8 neutrino flux allows one to deduce an accurate value for the central temperature of the sun.

Using the calculated solar-neutrino fluxes from Be^7 and B^8 and the values of the cross section for the $Cl^{37}(\nu, e^-)Ar^{37}$ reaction one deduces the value of the

$$\sum \phi\sigma = 3 \pm 2 \times 10^{-35} \text{ sec}^{-1} .$$

The error indicated reflects the uncertainties in the solar model calculation. The error in the cross section values are small, around 10 percent. This sum of the products of the flux and the cross section would correspond to an expected capture rate of 5 ± 3 per day in 600 tons of perchloroethylene. Let us now describe the pilot experiment which uses 1000 gallons of perchloroethylene to illustrate how a neutrino detector based upon reaction (1) operates. The performance of this modest scale detector will also show how close we are to observing the presently calculated solar neutrino flux.