GK giants (McCuskey 1965), but the demographic changes as the magnitude limits increase, and faint, nearby degenerate stars and M dwarfs begin to compound the picture with their unusual colors and larger measuring uncertainties. Emission, binarity, overly bright stars suffering from image saturation, objects lying away from the main sequence (Caldwell et al. 1993), and low quality observations for faint stars all combine to generate scatter in such plots, but using two separate color-color diagrams and limiting the analysis to stars fainter than the bright survey limits and brighter than the faint survey limits assures that likely AF dwarfs are identified properly. They are the small fraction of objects that deredden uniquely to the intrinsic relation for such stars in Figure 2, as confirmed by their JHK_s colors.

The derived reddenings for stars analyzed in each field were adjusted to equivalent color excesses for a B0 star according to their inferred intrinsic colors and the dependence of reddening on intrinsic color summarized by Fernie (1963). Interstellar extinction affects the effective wavelengths of broad band BV filters differently according to the continuum of the star being observed, such that a typical Cepheid of, say, $(B-V)_0 = 0.60$ reddened by $E(B-V) = 0.90$ suffers identical extinction to a B0 dwarf star of $(B-V)_0 = -0.30$ reddened by $E(B-V) = 0.97$ (cf. η factor of Fernie 1963). Such adjustments are necessary when comparing reddenings of stars across a wide range of intrinsic color. Zero-age main sequence (ZAMS) values of M_V as a function of intrinsic $(B-V)_0$ color (Turner 1976a, 1979) were also assigned to each star from the photometric dereddening solutions in order to provide estimates, or at least underestimates, of apparent distance modulus, V–M_V, for the stars in each field. The stars were then plotted in a variable-extinction diagram, such as those for each field summarized in Figure 3, as a means of assessing the likely space reddening of each Cepheid. Figure 3 represents only a portion of each variable-extinction diagram, namely the most heavily-populated regions associated with the expected parameters for each Cepheid.

Mean $\langle B \rangle$ and $\langle V \rangle$ magnitudes are available for each Cepheid from Berdnikov (2007) and the present study, and rough estimates of reddening and luminosity were made from older, published period-color (e.g., Fernie 1990a,b) and period-luminosity (e.g., Turner 1992) relations, which do not differ substantially from more recent results (Turner 2001, 2010). It was then possible to establish roughly where in each variable-extinction diagram the parameters for the Cepheid should fall, keeping in mind that an extremely liberal interpretation of such "predictions" is essential to avoid biasing the results. Some of the sample Cepheids are suspected Type II objects or overtone pulsators, for example, which affects estimates of both reddening and luminosity. Generous uncertainties of ± 0.1 or more in E_{B-V} and ± 1 in M_V were therefore assumed in the analysis. Note that the "predictions" for IO Cas, FO Cas, and V1882 Sgr are inconsistent with expectations for classical Cepheids (they have larger predicted distance moduli than those for surrounding stars of similar reddening), which means that they are potential Type II objects. The situation for HZ Per, BD Pup, and OT Per is more ambiguous.

All such information is needed in order to establish which stars in the field of each Cepheid are useful for deriving its space reddening. In the case of UY Mon, for example, the estimated distance and reddening for the Cepheid associate it with the group of slightly reddened stars at $E_{B-V} \simeq 0.1$, $(V\text{–}M_V)_0 \simeq$ 11–12 ($d \simeq$ 1.6–2.5 kpc), but less distant and less reddened than stars of $E_{B-V} \simeq 0.5$, $(V\text{–}M_V)_0 \simeq$ 12.5–13 ($d \simeq$ 3–4 kpc), in its vicinity. The best match is therefore to the 4 stars within $5'$ of UY Mon that are reddened by $E_{B-V} \simeq 0.1$. Other cases are more complex because of the patchy reddening that permeates most fields, but have been resolved by considering only stars close to each Cepheid.

What appears to be a continuous run of reddening with distance in some fields results from the patchy extinction in each field combined with larger-than-average uncertainties in the inferred color excesses, E_{B-V}. The extinction associated with most Galactic star fields is typically associated with individual dust clouds dispersed along the line of sight (Turner 1994). But large uncertainties in reddening can confuse the picture. Figure 4 presents the results of a simulation of such circumstances in a field where the scatter in the color excesses is taken to be ± 0.05, with associated uncertainties in absolute magnitude of ± 0.5, both quantities being applied randomly to the test points. Star densities were assumed constant as a function of distance, and the input parameters included specific amounts of reddening and extinction arising in discrete dust clouds located along the line of sight at distances of 0.5 pc, 0.9 pc, and 1.1 pc, producing mean color excesses of $E_{B-V} = 0.2$, 0.5, and 0.7, respectively. An extinction law with $R = 3.0$ is depicted for the last group. The parameters, in particular the adopted scatter, were chosen in order to produce the greatest complexity in the resulting variable-extinction diagram. The resulting scatter produces results similar