The Solar Neighborhood XII:
Discovery of New High Proper Motion Stars
with $1.0''/\text{yr} > \mu \geq 0.4''/\text{yr}$ between Declinations $-90^\circ$ and $-47^\circ$

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ABSTRACT

We report the discovery of 141 new high proper motion systems (1.0″/yr > μ ≥ 0.4″/yr) in the southern sky (δ = −90° to −47°) brighter than UKST plate $R_{59,F} = 16.5$ via our SuperCOSMOS-RECONS (SCR) search. When combined with the nine systems having μ ≥ 1.0″/yr and/or late spectral type from the initial phases of this effort (Hambly et al. 2004; Henry et al. 2004), we find that 73 of the 150 total systems are moving faster than 0.5″/yr, and are therefore new members of the classic “LHS” (Luyten Half Second) sample. These constitute a 21% increase in the sample of stars with μ ≥ 0.5″/yr in the declination region searched, thereby comprising an important addition to this long-neglected region of the sky.

Distance estimates are provided for the entire sample, based upon a combination of photographic plate magnitudes and 2MASS photometry, using the relations presented in Hambly et al. (2004) for the presumed main sequence stars. Three systems are anticipated to be within 10 pc, and an additional 15 are within 25 pc. Eight of these 18 nearby systems have proper motions falling between 0.4″/yr and 0.6″/yr, hinting at a large population of nearby stars with fast, but not extremely high, proper motions that have not been thoroughly investigated.

*Subject headings:* stars: distances — stars: statistics — solar neighborhood
1. Introduction

In an effort to identify the Sun’s nearest neighbors, the Research Consortium on Nearby Stars (RECONS) is utilizing the SuperCOSMOS Sky Survey (SSS) to reveal previously unknown high proper motion (HPM) stars in the southern hemisphere. Here we report the discovery of 141 new HPM systems with $1.0''/\text{yr} > \mu \geq 0.4''/\text{yr}$ found between declinations $-90^\circ$ and $-47^\circ$ that are brighter than $R_{59F}$ of 16.5. The stars are mainly white dwarfs, subdwarfs, and red dwarfs that are underrepresented in the solar neighborhood population because of their intrinsic faintness (Henry et al. 1997).

Recent HPM surveys, listed in Table 1, have uncovered numerous new stars that complement the traditional surveys of Giclas et al. (1971, 1978) and Luyten (1979). Luyten summarized his effort in the famous Luyten Half Second Catalogue (Luyten 1979, hereafter LHS), which has become the gold standard for more recent proper motion surveys. While most of these surveys have targeted limited pieces of the sky, all have revealed important new HPM objects (the work of Pokorny et al. (2003) is currently difficult to assess because our initial checking of many of the objects in the list of 6206 detections indicates that many are previously known and several are not real HPM sources). Noteworthy is the large SUPERBLINK survey employed by Lépine et al. (2002, 2003) in the northern hemisphere, which included 49% of the entire sky, and consequently ranks as the largest contributor of new LHS stars since the pioneering days of Luyten and Giclas.

One goal of our RECONS group is to complete a comprehensive proper motion survey of the southern sky that reaches to a magnitude limit similar to that of the Lépine work (mag $\sim$20 at $R$). To reveal new high proper motion objects, we mine the SuperCOSMOS database developed and maintained at the Royal Observatory in Edinburgh, Scotland. Two previous papers in The Solar Neighborhood series, Hambly et al. (2004) and Henry et al. (2004), report initial results of this effort, which we refer to as the SCR (SuperCOSMOS-RECONS)
survey. In this paper we present comprehensive results of the SCR survey for the portion of sky centered on the south celestial pole and reaching northward to $\delta = -47^\circ$.

2. Search Methodology

The search techniques utilized here are identical to those in Hambly et al. (2004), where a full discussion can be found. The SCR search utilizes all astrometric and photometric information from the four photographic plates available ($B_J$, $ESO-R$, $R_{59F}$, and $I_{IVN}$) in the portion of the sky searched. Parameter limits for the current search are $10.0''/\text{yr} \geq \mu \geq 0.4''/\text{yr}$ and brighter than $R_{59F} = 16.5$.

The current search includes 13.4% of the entire sky reaching from the south celestial pole northward to $\delta = -47^\circ$. As shown in Figure 1, a few fields have not been searched because of a limited spread in epochs for available plates or crowding near the Magellanic Clouds or Galactic plane. These missed regions include only 2.3% of the entire sky, so the current SCR search covers 83% of the sky south of $\delta = -47^\circ$.

In the search region, a total of 1424 candidate objects were detected with the adopted parameters. A three-step sifting process was then used to vet the candidates for true and false detections, including checks of magnitudes, colors, and image ellipticities: (1) the two $R$ magnitudes were checked for consistency, and (2) the colors were examined to determine whether they matched that of a real object, i.e., both $B - R$ and $B - I$ positive, or both negative. If the candidate passed these initial two checks, it was selected for visual inspection. In cases where a candidate failed the first two tests, (3) the ellipticity quality flag was also checked. Experience revealed that if two or more image ellipticities were larger than 0.2, the object was spurious. Detections that failed all three tests were classified as false without visual inspection. As a final check, all of the 99 candidates found between $\delta$
= −90° and −80° were inspected visually (regardless of the checks), and all fell into the appropriate true or false detection bins.

For the true detections, coordinates were cross-checked with the SIMBAD database and the NLTT (Luyten 1995) catalog. If the coordinates agreed to within a few arcminutes and the magnitudes and proper motion were consistent, the detection was considered previously known. In a few cases, the coordinates and proper motions agreed well, but the magnitudes did not. Three of these near matches turned out to be new common proper motion companions to previously known proper motion objects.

The final count of real, distinct, new systems with 1.0″/yr > μ ≥ 0.4″/yr and brighter than $R_{59F} = 16.5$ is 150, including five systems from Hambly et al. (2004) and four additional systems from Henry et al. (2004). For completeness, all 150 objects are listed in Table 3 and finder charts are given at the end of this paper in Figure 6. We continue using our naming convention, “SCR” for objects discovered during the survey.

It is worth noting that the extension of the cutoff from 1.0″/yr in Hambly et al. (2004) down to 0.4″/yr in this paper has resulted in an increased hit rate for objects — only 0.7% of objects detected with 10.0″/yr ≥ μ ≥ 1.0″/yr are real, while 87% of objects detected with 1.0″/yr > μ ≥ 0.4″/yr are real. These fractions include both new and known objects. The higher hit rate is due to the fact that higher proper motion searches are susceptible to spurious contamination because reliable source association between different epochs is more difficult for fast-moving sources. The greater the search area for the counterpart, the higher the likelihood that an incorrect match will be made (especially if one plate has a defect, a fairly common occurrence).
3. Comparison to Previous Proper Motion Surveys

The classic work of Luyten still remains the most fruitful proper motion survey to date. This is demonstrated in Figure 2, in which the objects listed in the LHS Catalogue with $\mu \geq 0.5''/\text{yr}$ are plotted. Many HPM objects were also provided by Giclas et al. (1971, 1978), although none were south of $\delta = -47^\circ$. What is immediately obvious is that objects south of $\delta = -30^\circ$ are undersampled relative to similar northern declinations. A direct comparison of counts in the four quartiles of sky illustrate this bias clearly: 1004 objects are found between $\delta = +90^\circ$ and $+30^\circ$, 988 between $+30^\circ$ and $00^\circ$, 944 between $00^\circ$ and $-30^\circ$, but only 666 between $-30^\circ$ and $-90^\circ$. It is therefore not surprising that six of the seven recent proper motion surveys have concentrated on the southern hemisphere. The one notable exception is the work of Lépine and collaborators (2002; 2003) utilizing SUPERBLINK, which has been very successful at filling in gaps in the northern hemisphere (primarily along the Galactic plane). Table 1 lists the number of new discoveries by each of these surveys. Of the southern hemisphere surveys, many only cover small portions of the sky. Although we avoid the Galactic plane and Magellanic Clouds, the SCR survey has the most uniform sky coverage in the southern hemisphere. Figure 3 shows the distribution of HPM objects discovered by five recent proper motion surveys (distinguished by various symbols; Pokorny et al. (2003) not shown because of the difficulties mentioned previously).

A primary goal of the SCR effort is to further complete the LHS Catalogue for stars listed by Luyten to have $\mu \geq 0.5''/\text{yr}$. Our extension of the cutoff to $\mu \geq 0.4''/\text{yr}$ in this survey is to ensure that no known LHS stars were missed due to proper motion measurement errors for objects very near the $0.5''/\text{yr}$ limit. Only two objects for which our measured proper motion was below $0.5''/\text{yr}$ are LHS stars — LHS 3694 with $\mu = 0.493''/\text{yr}$, and LHS 3803 with $\mu = 0.444''/\text{yr}$.

An assessment of the completeness of the SCR search indicates that for $R_{59F} < 16.5$,
we recover 216 of 287 (75%) of LHS stars in the portion of sky searched. For stars brighter than $R_{59F} = 10.0$, we recover only 29 of 71 (41%) of LHS stars because the search is insensitive to bright objects that are saturated in the photographic emulsions. In what we consider the "sweet spot" of the SCR search, $10.0 < R_{59F} < 16.5$, we recover 87% of the LHS stars. This relatively high recovery rate is virtually identical for stars moving faster than $1.0''/yr$ (30 of 35) or $0.4$–$1.0''/yr$ (155 of 178), indicating that there is no particular bias in whether fast or slow moving objects are recovered more easily.

In addition to LHS recoveries, the SCR search recovered numerous objects from other recent proper motion surveys. During the compilation of values listed in Table 1, we noticed sources with similar sets of coordinates appearing in more than one survey. In total, seven stars have been found to be duplicates, even though two surveys claimed the discovery. Table 1 reflects counts for each object only once, assigned to the original discovery survey. The seven overlap stars include: ER 2 (Ruiz & Maza 1987) is listed as WT 392 (Wroblewski & Torres 1991); LHS 1140, LHS 1147, LHS 1152, and LHS 1160 (Luyten 1979) are listed as WT 1138, WT 1147, WT 1161, and WT 1170 (Wroblewski & Torres 1996) respectively; LHS 3983 (Luyten 1979) is listed as WT 1007 (Wroblewski & Torres 1994); WT 1141 (Wroblewski & Torres 1996) is listed as WD0045-061 (Oppenheimer et al. 2001).

4. Data Mining

4.1. SuperCOSMOS — Astrometry and Plate Photometry

Coordinates, proper motions, and plate magnitudes have been extracted from SuperCOSMOS, and are listed in Table 3. Coordinates are for epoch and equinox J2000. Errors in the coordinates are typically $\pm 0.3''$, and errors in the proper motions are given. Errors in position angle are usually $\pm 0.1^\circ$. Photometric magnitudes are given for three sets
of plates — $B_J$, $R_{59F}$, and $I_{IVN}$. Extractions of a region around each SCR object have been made to check for problems in the data retrieved via the automated source extractions. In a few cases, one or more plates were not available or sources were merged, thereby preventing the determination of reliable magnitudes.

4.2. 2MASS — Infrared Photometry

Infrared photometry is used to extend the color baseline, which allows more accurate photometric distance estimates for red dwarfs and permits a fairly reliable separation of the white and red dwarfs. The infrared $JHK_s$ photometry has been extracted from 2MASS via Aladin. Each SCR object has been identified by eye to ensure that no extracted magnitudes are in error. In nearly every case, the errors are smaller than 0.03 mag. Exceptions include objects with $J > 15$, $H > 14.5$, and $K_s > 14$, where the errors are 0.05 mag or greater. In several cases where $H > 16$ or $K_s > 15$, the error is null, and the value is therefore unreliable.

5. Analysis

5.1. Color-Magnitude Diagram

The color magnitude diagram illustrated in Figure 4 clearly shows that the new SCR objects are generally fainter and redder than those found by previous studies. Sources south of $\delta = -47^\circ$ with $\mu \geq 0.5''$/yr from the previous studies are collectively labeled as “known” in Figure 4 (and in Figure 5 as well). Large open symbols for the SCR stars indicate new LHS members, while smaller symbols are for additional SCR stars with $0.5''$/yr > $\mu \geq 0.4''$/yr.
Other than the white dwarfs, there are very few known sources fainter than $R_{59F} \sim 14$, whereas most of the new SCR sources are fainter. This is caused primarily by the lack of red plates available to Luyten. Nonetheless, there are a half dozen new SCR objects brighter than $R_{59F} = 13$, the brightest of which has $R_{59F} = 11.7$. That such bright HPM objects remain unknown indicates that this portion of the sky, which has comprehensive coverage only from the Bruce Proper Motion Survey carried out by Luyten (with a blue photographic limit of $\sim 15.5$), had not yet been thoroughly searched until this SCR effort.

Several of the objects are quite red, including the remarkable object SCR 1845-6357 ($V - K_s = 8.89$, M8.5V, Henry et al. 2004) for which a trigonometric parallax of $\pi = 282 \pm 23$ mas has been determined from photographic plates (Deacon et al. 2005). This object is represented in Figure 4 as the single point to the far right. We note that there is no obvious decrease in the number of objects at the faint limit of $R_{59F} = 16.5$ adopted for the current search, hinting that there is likely to be a large population of fainter objects yet to be discovered in the SuperCOSMOS data.

### 5.2. Reduced Proper Motion Diagram

The reduced proper motion (RPM) diagram shown in Figure 5 is a powerful diagnostic for assigning rough luminosity classes for stars using the observables, proper motion and apparent magnitude. It is similar to an H-R diagram except that absolute magnitude is replaced by reduced proper motion, where the proper motion is used in lieu of a trigonometric parallax measurement to determine $H_R$, as follows:

$$H_R = R_{59F} + 5 + 5 \log \mu.$$

The assumption here is that proper motion is directly related to distance — an assumption certainly not always valid because high velocity populations, such as subdwarfs
with large tangential velocities, can masquerade as very nearby main sequence stars. Nonetheless, utilization of the RPM diagram allows the identification (albeit roughly) of subdwarfs, which are found at fainter $H_R$ values for a given color or, alternately, at bluer colors for a given $H_R$. In addition, white dwarfs are clearly differentiated from the main sequence stars and subdwarfs, providing a reliable means for identifying new white dwarfs.

From Figure 5 it is apparent that most of the new SCR stars are main sequence red dwarfs, as expected, while there are a few dozen new subdwarf candidates. The dotted line represents a somewhat arbitrary boundary between the subdwarfs and white dwarfs, of which five new candidates have been found in the SCR search. As in Figure 4, the single point to the far right is SCR 1845-6357.

### 5.3. Red Dwarfs — Photometric Distances

Once all available data has been collected, we can search for targets that are potentially nearby, specifically within the volumes defined by the RECONS sample (horizon at 10 pc) and the CNS (Catalog of Nearby Stars, Gliese & Jahreiß 1991) or NStars (Nearby Stars) samples (horizons at 25 pc).

Distances for the SCR objects in Table 3 have been estimated using a combination of plate magnitudes from SuperCOSMOS and infrared photometry from 2MASS, following the methodology of Hambly et al. (2004). Briefly, the six magnitudes provide 15 color–M$_K$ combinations, 11 of which can be used to estimate individual distances ($JHK_s$—only colors are not used because of limited color discrimination, and $(B_J - R_{59})_F$ is not reliable). These relations have been developed using a large set of stars within 10 pc that have high quality parallaxes, plate magnitudes (specifically extracted from the SuperCOSMOS database for this purpose), and 2MASS infrared photometry. The relations assume that the objects are
single, main sequence, dwarfs of types \( \sim K0V \) to M9V. To estimate the reliability of this technique, the same 10 pc sample that generated the relations was run through giving a mean difference between the photometric and trigonometric distances of 26%.

Results indicate that three of the 150 systems are within 10 pc (each has been discussed previously in Hambly et al. 2004 and/or Henry et al. 2004), SCR 1845-6357 (3.5 pc), SCR 0630-7643AB (6.9 pc), and SCR 1138-7721 (8.8 pc). An additional 15 systems are predicted to be within 25 pc.

We have also run distance estimates for the 266 known objects recovered and find that 120 have distance estimates placing them within the 25 pc horizon. Of these, 34 objects have trigonometric parallaxes in the Yale Parallax Catalogue (van Altena et al. 1995, hereafter YPC) and/or from the Hipparcos mission (Esa 1997) that confirm they are within 25 pc, while 24 objects have trigonometric parallaxes placing them beyond 25 pc. As with any volume-limited survey, most of the objects are found near the distance limit, so it is not surprising that a substantial sample of objects slip beyond the adopted horizon. These statistics strongly suggest the necessity of determining a trigonometric parallax prior to inclusion of the NStars 25 pc sample based solely on photometric distance estimates. The remaining 62 stars have no trigonometric parallax. Of these, 21 are currently being observed as part of our Cerro Tololo InterAmerican Observatory Parallax Investigation (CTIOPI) Program including three with distance estimates nearer than 10 pc: LHS 271 (GJ 1128, 8.0 pc), LHS 263 (GJ 1123, 8.2 pc), and LHS 532 (GJ 1277, 9.1 pc).

A small subsample of 16 SCR stars have distance estimates in excess of 200 pc (the five white dwarf candidates have been removed from this count). K and M type subdwarfs tend to have larger distance estimates than their true distances because the relations assume luminosities of main sequence stars, whereas subdwarfs are intrinsically fainter (hence closer for a given brightness). These 16 stars are therefore the best subdwarf candidates. Worthy
of note is the most extreme star in this subsample, SCR 2249-6324, which has a distance estimate of nearly 400 pc. The colors of this object indicate that it is only slightly red, though red enough to nearly eliminate the possibility that it is a cool white dwarf. Its position in Figure 5 \((H_R = 19.56, (R_{59F} - J) = 1.58)\) lies in the subdwarf region just above the broken line. Follow-up spectroscopy will confirm its luminosity class.

5.4. White Dwarfs

Five SCR discoveries lie in the white dwarf region of Figure 5 — SCR 0252-7522, SCR 0311-6215, SCR 0821-6703, SCR 2012-5956, and SCR 2016-7945. We have obtained spectroscopy on each and confirmed that all are white dwarfs. The spectra will be presented in a future publication.

Of the 150 systems in the complete list, only two have no distance estimate due to colors too blue to be addressed by the relations — SCR1257-5554B and the white dwarf SCR 0311-6215. Cooler white dwarfs having colors that are within the ranges covered by the relations tend to have very large distance estimates because the relations assume they are intrinsically bright F or G dwarfs. The distance estimates in Table 3 for the four new white dwarfs with colors covered by the relations range from 267 pc to 734 pc. This provides a second diagnostic for identifying white dwarfs that is useful but not as reliable as the reduced proper motion diagram.

SCR 1257-5554B is a source too faint to be picked up in this SCR search, but was noticed on frames that were blinked to confirm its primary. Infrared data is not available because this object exceeds the faint limit of 2MASS. The \(R\) magnitude quoted in Table 3 is \(ESO - R\) due to blending in the \(R_{59F}\) plate. We suspect it is a hot white dwarf due to its plate colors and because its companion is a modestly bright M star estimated to be at
39 pc. The B component is not plotted in Figure 5 due to the lack of the \((R_{59} - J)\) color.

Oppenheimer et al. (2001) has derived a single color linear fit to obtain distance estimates for white dwarfs using plate magnitudes. We utilize this relation and adopt the error quoted therein of 20% to give the following distances: SCR 0252-7522 = 29.8 ± 6.0 pc; SCR 0311-6215 = 60.7 ± 12.2 pc; SCR 0821-6703 = 10.9 ± 2.2 pc; SCR 2012-5956 = 18.0 ± 3.6 pc (consistent with Henry et al. (2004) using CCD photometry and the relation of Salim et al. (2004) to obtain a distance of 17.4 ± 3.5 pc); SCR 2016-7945 = 29.3 ± 5.9 pc. Note that should the distance for SCR 0821-7522 hold true, it would become an addition to the 13 pc sample (thought to be largely complete) from which Holberg et al. (2002) determine the white dwarf local density. CTIOPI parallax observations are currently underway for verification.

5.5. Comments on Individual Systems

The five systems with \(\mu \geq 1.0''/yr\) have been discussed in detail in Hambly et al. (2004) and Henry et al. (2004). Four more systems (one double) having spectral types of M6.0V or M6.5V were also discussed in Henry et al. (2004). Here we provide details of additional noteworthy systems, each of which is a multiple.

SCR 0005-6103 (\(\mu = 0.504''/yr\) at position angle 084.3 degrees) is a common proper motion companion to LHS 1018 (\(\mu = 0.519''/yr\) at position angle 085.7 degrees), for which there is no trigonometric parallax available. The distance estimates for SCR 0005-6103 and LHS 1018 are 43.2 pc and 34.0 pc, respectively. This is a reasonably good match considering the errors in the distance estimation technique (26%).

SCR 0006-6617 (\(\mu = 0.559''/yr\) at position angle 161.7 degrees) at first appears to be a very widely separated (\(\sim 27''\)) common proper motion companion to LHS 1019 (\(\mu\))
= 0.576′′/yr at position angle 158.9 degrees). However, the estimated distance for SCR 0006-6617 is 63.2 pc, while the trigonometric parallax from YPC for LHS 1019 indicates a distance of 17.6 pc. In addition, SCR 0006-6617 (\(H_R = 18.85\), \((R_{59F} - J) = 3.10\)) does not fall within the subdwarf region of Figure 5 rendering it unlikely that this object is a subdwarf with an overestimated distance estimate. We conclude that this is a rare case of two physically unassociated objects of similar proper motion being found in the same region of sky.

SCR 0630-7643AB was discussed in Henry et al. (2004). It is a new nearby (~7 pc) binary with separation 1.0′′ and brightness difference of ~0.25 mag at \(I_C\).

SCR 1257-5554AB was discussed in §5.4 as a probable red dwarf/white dwarf pair.

SCR 2155-7330 is a common proper motion companion to HIP 108158. The Hipparcos parallax for this object is 0.02510 ± 0.00074′′ (distance = 39.8 pc), which is reasonably consistent with the photometric distance estimate for SCR 2155-7330 of 31.6 pc.

SCR 2250-5726AB is noticeably peanut-shaped in the SuperCOSMOS frames. CCD frames taken at the CTIO 0.9m confirm it to be a close binary source with separation 2.3′′ at position angle 28°.

SCR 2352-6124 is a common proper motion companion to LHS 4031, which has a Hipparcos parallax of 0.02070 ±0.00120′′ (distance = 48.3 pc), which is consistent with our photometric distance estimate for SCR 2352-6124 of 50.3 pc.

6. Discussion

Listed in Table 2 is a summary of the number of SCR systems with distance estimates within each of the two horizons (10 pc and 25 pc) and beyond. The five confirmed
white dwarfs have been removed; however, there remain several likely subdwarfs with overestimated distances that are not accounted for in the statistics — a few may be within 25 pc. Perhaps the most surprising result of this survey is the discovery that the slowest proper motion bin of width 0.2″/yr — stars moving between 0.4″/yr and 0.6″/yr — contains the largest number (nine) of new candidates for systems within 25 pc. One of these systems, SCR 0630-7643AB, is a binary with separation ∼1″ that is probably only ∼7 pc distant (Henry et al. 2004), yet has a relatively low proper motion of only 0.483″/yr. Of course, the largest number of new proper motions stars is found in the slowest bin, yet the presence of so many nearby candidates hints that large numbers of nearby stars may lie undetected at even smaller proper motion values. It is quite possible that stars within a few parsecs of the Sun have escaped detection simply because they exhibit little proper motion. Pushing to lower proper limits and combining efforts with full-sky photometric surveys may yet reveal these hidden neighbors.

The SCR search detailed here for 13.4% of the sky currently has revealed ∼one-third as many new LHS systems as the SUPERBLINK effort of Lépine et al. (2002, 2003), which covered 49% of the sky. We anticipate that as we move further northward, the discovery rate of new objects will decrease because Luyten, Giclas, Lépine, and several of the others listed in Table 1 have searched portions of these regions. Nonetheless, viable new nearby star candidates undoubtedly remain to be found.

Once the SCR search employing the current constraints (magnitude and proper motion) is completed for the southern hemisphere, we intend to carry out new searches with fainter magnitude limits (to R ∼ 20, consistent with Lépine’s survey) and to smaller proper motions (perhaps to µ ≥ 0.18″/yr to match the NLTT catalog limit). These searches will again begin at the south Galactic pole and progress northward. We predict that both surveys will produce considerable numbers of potential nearby systems and help us to
provide a more accurate census of the solar neighborhood.

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Fig. 1.— Plate coverage of the SCR survey reported here. Plates colored in white were excluded from the search for reasons mentioned in the text.

Fig. 2.— Sky distribution of LHS objects. Only stars with $\mu \geq 0.5''/\text{yr}$ are plotted. The curve represents the Galactic plane.

Fig. 3.— Sky distribution of new LHS objects from recent proper motion surveys. Only stars with $\mu \geq 0.5''/\text{yr}$ are plotted. Small filled circles are from the SUPERBLINK survey. Filled triangles are from the SCR survey. Open circles are from the WT survey. Open triangles are from the Scholz survey. Open boxes are from the Calan-ESO survey. Open stars are from the Oppenheimer survey. The curve represents the Galactic plane.

Fig. 4.— Color-magnitude diagram for the SCR systems with $\mu \geq 0.4''/\text{yr}$ (size of the points splits SCR sample into stars with $\mu$ more or less than $0.5''/\text{yr}$) and known systems with $\mu \geq 0.5''/\text{yr}$ and south of $\delta = -47^\circ$.

Fig. 5.— Reduced proper motion diagram for the SCR systems with $\mu \geq 0.4''/\text{yr}$ (size of the points splits SCR sample into stars with $\mu$ more or less than $0.5''/\text{yr}$) and known systems with $\mu \geq 0.5''/\text{yr}$ and south of $\delta = -47^\circ$. The dashed line serves merely as a reference to distinguish white dwarfs from subdwarfs.

Fig. 6.— Finder charts for the 150 SCR systems, 5' on a side. North is up, east is to the left. The observation epoch for each frame is given.
Table 1. Proper Motion Surveys and Number of New Objects Discovered.

| Survey                          | $\mu \geq 1.0''/\text{yr}$ | $1.0''/\text{yr} > \mu \geq 0.5''/\text{yr}$ | # of Publications $^a$ |
|--------------------------------|-----------------------------|-------------------------------------------|-------------------------|
| LHS                            | 528                         | 3074                                      | 1                       |
| SUPERBLINK                     | 18                          | 180                                       | 2                       |
| SuperCOSMOS-RECONS             | 5                           | 68                                        | 3                       |
| WT (Wroblewski and collaborators) | 2                           | 46                                        | 7                       |
| Scholz and collaborators       | 5                           | 21                                        | 3                       |
| Calan-ESO (Ruiz and collaborators) | 3                           | 14                                        | 2                       |
| Oppenheimer et al.             | 3                           | 8                                         | 1                       |
| Pokorny et al.                 | unknown                     | unknown                                   | 1                       |

$^a$references include Luyten (1979), Lépine et al. (2002, 2003), Hambly et al. (2004), Henry et al. (2004), Wroblewski & Torres (1989, 1991, 1994, 1996, 1997), Wroblewski & Costa (1999, 2001), Scholz et al. (2000, 2002, 2004), Ruiz & Maza (1987); Ruiz et al. (2001), Oppenheimer et al. (2001), and Pokorny et al. (2003)

Table 2. Distance Estimate Statistics for SCR Stars (Excluding White Dwarfs).

| Proper motion | $d \leq 10$ pc | $10 < d \leq 25$ pc | $d > 25$ pc |
|---------------|----------------|---------------------|-------------|
| $\mu \geq 1.0''/\text{yr}$ | 2              | 0                   | 2           |
| $1.0''/\text{yr} > \mu \geq 0.8''/\text{yr}$ | 0              | 3                   | 3           |
| $0.8''/\text{yr} > \mu \geq 0.6''/\text{yr}$ | 0              | 4                   | 25          |
| $0.6''/\text{yr} > \mu \geq 0.4''/\text{yr}$ | 1              | 8                   | 97          |
| Total         | 3              | 15                  | 127         |
Table 3. Proper motions, photographic and infrared photometry, and distance estimates for the SuperCOSMOS–RECONS sample with $\mu \geq 0.4''$/yr and south of $\delta = -47^\circ$.

| Name         | RA (J2000) | DEC | $\mu$ | $\sigma_{\mu}$ | $\theta$ | $B_J$ | $R_{50F}$ | $I_{IVN}$ | $J$  | $H$  | $K_s$ | $R_{50F} - J$ | Est Dist (pc) | Notes                  |
|--------------|------------|-----|-------|----------------|----------|------|----------|----------|------|------|------|----------------|---------------|-----------------------|
| SCR 0005-6103 | 00 05 56.49 | -61 03 55.2 | 0.504  | 0.009         | 084.3    | 18.19| 16.02    | 13.37    | 12.04| 11.43| 11.18| 3.98          | 43.2          | cpm with LHS 1018     |
| SCR 0006-6617 | 00 06 33.73 | -66 17 30.8 | 0.559  | 0.011         | 161.7    | 16.94| 15.11    | 13.18    | 12.01| 11.36| 11.11| 3.10          | 63.2          |
| SCR 0038-5038 | 00 38 48.00 | -50 38 22.3 | 0.726  | 0.010         | 115.1    | 16.77| 14.92    | 12.76    | 11.43| 10.94| 10.66| 3.49          | 44.9          |
| SCR 0051-8441 | 00 51 16.42 | -84 41 59.0 | 0.502  | 0.007         | 077.2    | 18.22| 16.20    | 14.57    | 13.26| 12.71| 12.50| 2.94          | 126.3         |
| SCR 0111-4908 | 01 11 47.51 | -49 08 09.0 | 0.542  | 0.008         | 213.1    | 18.93| 16.50    | 13.01    | 11.54| 11.00| 10.61| 4.96          | 23.6          |
| SCR 0138-6029 | 01 38 01.13 | -60 29 56.0 | 0.580  | 0.009         | 083.3    | 17.46| 15.17    | 12.44    | 11.19| 10.66| 10.29| 3.98          | 28.7          |
| SCR 0210-6622 | 02 10 45.17 | -66 22 26.6 | 0.769  | 0.020         | 056.3    | 16.86| 14.60    | 12.15    | 10.97| 10.43| 10.09| 3.63          | 30.0          |
| SCR 0234-8204 | 02 34 44.28 | -82 04 25.3 | 0.618  | 0.017         | 333.3    | 20.29| 14.13    | 12.81    | 11.11| 10.51| 10.25| 3.03          | 28.5          |
| SCR 0247-6622 | 02 47 05.35 | -66 27 14.3 | 0.711  | 0.016         | 053.4    | 15.94| 13.79    | 12.15    | 10.63| 10.10| 9.78  | 3.16          | 31.3          |
| SCR 0252-7038 | 02 52 32.02 | -70 38 22.3 | 0.767  | 0.013         | 201.0    | 13.56| 11.66    | 10.86    | 10.73| 10.23| 10.04| 0.92          | 69.1          |
| SCR 0308-8212 | 03 08 54.56 | -82 12 30.6 | 0.507  | 0.009         | 027.3    | 17.80| 15.62    | 13.09    | 11.70| 11.15| 10.89| 3.92          | 38.9          |
| SCR 0342-6407 | 03 42 57.44 | -64 07 56.4 | 1.071  | 0.023         | 141.2    | 17.17| 15.13    | 12.34    | 11.32| 10.89| 10.58| 3.81          | 39.3          |
| SCR 0406-6735 | 04 06 06.79 | -67 35 28.9 | 0.608  | 0.007         | 150.2    | 17.29| 14.98    | 13.99    | 13.53| 13.06| 12.80| 1.45          | 239.4         |
| SCR 0411-854 | 04 11 38.07 | -85 54 09.8 | 0.557  | 0.006         | 046.5    | 17.83| 15.79    | 13.39    | 12.06| 11.53| 11.26| 3.73          | 51.3          |
| SCR 0420-7005 | 04 20 12.54 | -70 05 58.8 | 0.670  | 0.007         | 021.2    | 18.18| 15.68    | 12.58    | 11.19| 10.59| 10.25| 4.49          | 22.5          |
| SCR 0424-7243 | 04 24 33.63 | -72 43 04.8 | 0.563  | 0.006         | 033.5    | 16.43| 15.03    | 12.67    | 11.21| 10.67| 10.40| 3.82          | 38.0          |
| SCR 0433-7740 | 04 33 26.62 | -77 40 09.7 | 0.514  | 0.006         | 049.6    | 17.92| 15.86    | 14.76    | 14.05| 13.49| 13.36| 1.81          | 291.4         |
| SCR 0452-7321 | 04 52 06.87 | -73 21 56.7 | 0.554  | 0.008         | 053.6    | 17.98| 16.29    | 13.83    | 11.98| 11.44| 11.12| 4.31          | 39.1          |
| Name            | RA (J2000)     | DEC         | $\mu$  | $\sigma_\mu$ | $\theta$ | $B_J$ | $R_{50F}$ | $I_{1V}$ | $J$   | $H$   | $K_s$ | $R_{50F} - J$ | Est. Dist. | Notes |
|-----------------|----------------|-------------|--------|--------------|----------|-------|-----------|----------|-------|-------|-------|---------------|------------|-------|
| SCR 0623-6701   | 06 23 09 04   | -67 01 18.9 | 0.514  | 0.007        | 027.9    | ...   | 16.15     | 13.64    | 12.58 | 12.09 | 11.81 | 3.57          | 76.3       |       |
| SCR 0631-8811   | 06 31 31.28   | -88 11 36.8 | 0.516  | 0.006        | 349.9    | 16.96 | 14.67     | 11.46    | 10.04 | 9.46  | 9.07  | 4.63          | 12.8       |       |
| SCR 0634-5403   | 06 34 36.88   | -54 03 12.7 | 0.524  | 0.006        | 176.6    | 17.18 | 14.89     | 12.29    | 11.07 | 10.44 | 10.13 | 3.82          | 27.6       |       |
| SCR 0642-6707   | 06 42 27.15   | -67 07 19.9 | 0.811  | 0.008        | 120.4    | 17.00 | 14.69     | 11.60    | 10.61 | 10.15 | 9.81  | 4.08          | 24.1       |       |
| SCR 0702-6102   | 07 02 50.33   | -61 02 47.6 | 0.786  | 0.006        | 041.4    | 17.50 | 15.10     | 11.73    | 10.36 | 9.85  | 9.52  | 4.75          | 15.9       |       |
| SCR 0723-8015   | 07 23 59.65   | -80 15 17.8 | 0.828  | 0.006        | 330.4    | 18.68 | 16.44     | 13.27    | 11.30 | 10.82 | 10.44 | 5.14          | 19.3       |       |
| SCR 0725-8530   | 07 25 22.19   | -85 30 58.3 | 0.612  | 0.011        | 192.5    | 15.40 | 13.39     | 11.47    | 10.53 | 10.02 | 9.70  | 2.86          | 36.8       |       |
| SCR 0730-5707   | 07 30 11.11   | -57 07 42.4 | 0.505  | 0.007        | 082.7    | 15.08 | 13.03     | 11.23    | 10.23 | 9.73  | 9.47  | 2.80          | 33.8       |       |
| SCR 0730-7527   | 07 30 15.98   | -75 27 29.4 | 0.569  | 0.009        | 000.5    | 14.47 | 12.46     | 11.44    | 11.52 | 11.03 | 10.85 | 0.94          | 99.5       |       |
| SCR 0805-5912   | 08 05 46.18   | -59 12 50.6 | 0.637  | 0.007        | 155.0    | 15.76 | 13.76     | 11.33    | 10.07 | 9.52  | 9.22  | 3.69          | 20.4       |       |
| SCR 0816-7727   | 08 16 35.70   | -77 27 12.0 | 0.676  | 0.006        | 325.4    | 16.41 | 14.43     | 13.58    | 12.62 | 12.07 | 11.87 | 1.81          | 145.7      |       |
| SCR 0821-6703   | 08 21 26.67   | -67 03 20.4 | 0.758  | 0.005        | 327.6    | 16.44 | 15.08     | 14.61    | 13.79 | 13.57 | 13.34 | 1.28          | 267.6      | wd    |
| SCR 0829-6203   | 08 29 24.67   | -62 03 23.2 | 0.585  | 0.005        | 299.2    | 17.78 | 15.72     | 13.42    | 11.69 | 11.21 | 10.92 | 4.02          | 37.9       |       |
| SCR 0838-8148   | 08 38 20.47   | -81 48 46.1 | 0.625  | 0.005        | 009.4    | 17.50 | 15.37     | 13.55    | 12.32 | 11.82 | 11.57 | 3.06          | 77.9       |       |
| SCR 0852-6608   | 08 52 49.99   | -66 08 46.9 | 0.508  | 0.006        | 333.7    | 17.81 | 15.49     | 12.88    | 11.34 | 10.73 | 10.39 | 4.16          | 26.3       |       |
| SCR 0853-6123   | 08 53 03.11   | -61 23 48.4 | 0.587  | 0.006        | 145.7    | 17.93 | 15.73     | 12.96    | 11.82 | 11.27 | 10.91 | 3.91          | 40.3       |       |
| SCR 0912-8311   | 09 12 59.55   | -83 11 51.6 | 0.812  | 0.016        | 331.8    | 17.99 | 15.74     | 13.19    | 11.56 | 10.98 | 10.69 | 4.17          | 30.4       |       |
| SCR 0942-6428   | 09 42 17.90   | -64 28 43.5 | 0.531  | 0.011        | 307.3    | 14.76 | 12.59     | 12.04    | 11.96 | 11.33 | 11.18 | 0.63          | 111.3      |       |
| SCR 1057-5103   | 10 57 02.98   | -51 03 35.0 | 0.622  | 0.009        | 277.2    | 15.96 | 13.85     | 12.20    | 11.15 | 10.64 | 10.43 | 2.70          | 54.1       |       |
| SCR 1132-8446   | 11 32 21.98   | -84 46 28.4 | 0.650  | 0.006        | 279.9    | 17.64 | 15.87     | 13.94    | 12.22 | 11.76 | 11.51 | 3.65          | 62.7       |       |
| SCR 1138-7721   | 11 38 16.82   | -77 21 48.0 | 2.141  | 0.007        | 286.7    | 16.45 | 14.12     | 11.45    | 9.40  | 8.89  | 8.52  | 5.60          | 8.8        |       |
| SCR 1158-5103   | 11 58 38.90   | -51 03 31.8 | 0.521  | 0.005        | 294.2    | 18.27 | 16.16     | 14.11    | 13.17 | 12.68 | 12.44 | 2.98          | 123.6      |       |
| Name          | RA 12h          | DEC  deg        | $\mu$ | $\sigma_\mu$ | $\theta$ | $B_\alpha$ | $R_{50F}$ | $I_{1 VN}$ | $J$ | $H$ | $K_s$ | $R_{50F} - J$ | Est Dist | Notes |
|---------------|----------------|----------------|------|-------------|--------|-----------|-----------|-----------|-----|-----|------|-------------|----------|-------|
| SCR 1322-7254 | 13 22 27.37    | -72 54 36.6    | 0.572| 0.009       | 270.7  | 16.24     | 14.12     | 12.25     | 11.14| 10.55| 10.31| 2.97        | 44.1     |       |
| SCR 1328-7253 | 13 28 42.10    | -72 53 47.4    | 0.789| 0.005       | 247.2  | 17.91     | 15.97     | 13.77     | 12.47| 12.00| 11.69| 3.50        | 71.2     |       |
| SCR 1338-5622 | 13 38 48.13    | -56 22 20.6    | 0.547| 0.010       | 260.6  | 15.46     | 14.90     | 13.06     | 13.14| 12.57| 12.34| 1.75        | 170.7    |       |
| SCR 1345-5101 | 13 45 41.48    | -51 01 01.5    | 0.527| 0.006       | 168.4  | 16.61     | 14.51     | 12.17     | 10.91| 10.39| 10.12| 3.60        | 31.9     |       |
| SCR 1429-4808 | 14 29 41.38    | -48 08 31.2    | 0.791| 0.006       | 351.4  | 17.11     | 15.48     | 12.52     | 11.25| 10.78| 10.45| 4.24        | 32.8     |       |
| SCR 1442-4810 | 14 42 16.59    | -48 10 50.8    | 0.507| 0.008       | 248.0  | 16.92     | 14.33     | 14.13     | 12.98| 12.47| 12.29| 1.35        | 173.8    |       |
| SCR 1659-6958 | 16 59 27.99    | -69 58 18.7    | 0.749| 0.007       | 216.3  | 15.77     | 14.19     | 12.02     | 10.53| 9.99 | 9.70 | 3.65        | 27.9     |       |
| SCR 1726-8433 | 17 26 23.04    | -84 33 08.4    | 0.518| 0.008       | 134.8  | 15.42     | 13.31     | 11.16     | 9.87 | 9.33 | 9.02 | 3.44        | 20.1     |       |
| SCR 1735-7020 | 17 35 40.71    | -70 20 21.6    | 0.963| 0.005       | 190.1  | 18.19     | 16.14     | 14.04     | 12.82| 12.31| 12.10| 3.32        | 90.9     |       |
| SCR 1756-5927 | 17 56 27.94    | -59 27 18.0    | 0.537| 0.006       | 210.0  | 18.02     | 15.73     | 14.68     | 13.44| 12.89| 12.69| 2.29        | 170.6    |       |
| SCR 1808-8120 | 18 08 00.06    | -81 20 48.8    | 0.680| 0.009       | 200.0  | 17.32     | 15.45     | 13.19     | 11.36| 10.79| 10.52| 4.09        | 31.0     |       |
| SCR 1817-5318 | 18 17 06.43    | -53 18 04.8    | 0.617| 0.009       | 209.9  | 14.69     | 13.27     | 12.46     | 11.93| 11.43| 11.23| 1.34        | 114.6    |       |
| SCR 1835-8754 | 18 35 14.60    | -87 54 08.9    | 0.639| 0.006       | 199.5  | 18.18     | 16.02     | 15.10     | 14.11| 13.56| 13.29| 1.92        | 264.2    |       |
| SCR 1843-7849 | 18 43 35.71    | -78 49 02.6    | 0.745| 0.008       | 194.9  | 17.57     | 15.70     | 14.65     | 13.27| 12.74| 12.59| 2.43        | 168.4    |       |
| SCR 1845-6357 | 18 45 05.09    | -63 57 47.7    | 2.558| 0.012       | 074.8  | 16.33     | 12.53     | 9.54      | 8.97 | 8.51 | 6.78 | 3.5         | f        |       |
| SCR 1848-6855 | 18 48 21.14    | -68 55 34.5    | 1.287| 0.013       | 194.3  | 16.07     | 13.97     | 11.89     | 11.40| 11.10| 4.97 | 34.8        | g        |       |
| SCR 1855-6914 | 18 55 47.87    | -69 14 14.8    | 0.832| 0.011       | 145.3  | 18.01     | 15.63     | 12.20     | 10.47| 9.88 | 9.51 | 5.16        | 12.5     |       |
| SCR 1902-5044 | 19 02 47.53    | -50 44 00.6    | 0.510| 0.009       | 150.2  | 16.54     | 14.52     | 12.98     | 11.99| 11.48| 11.26| 2.53        | 86.7     |       |
| SCR 1946-4945 | 19 46 02.47    | -49 45 49.0    | 0.585| 0.006       | 210.2  | 17.34     | 15.39     | 14.53     | 13.51| 12.95| 12.78| 1.88        | 218.5    |       |
| SCR 1954-7356 | 19 54 06.43    | -73 56 50.8    | 0.535| 0.008       | 148.6  | 16.85     | 14.89     | 12.96     | 11.81| 11.31| 11.08| 3.08        | 64.3     |       |
| SCR 2012-5956 | 20 12 31.79    | -59 56 51.6    | 1.440| 0.011       | 165.6  | 16.66     | 15.63     | 15.13     | 14.93| 15.23| 15.41| 0.70        | 734.1    | wd, h |
| SCR 2035-6505 | 20 35 05.60    | -65 05 26.1    | 0.785| 0.011       | 166.0  | 17.22     | 15.07     | 13.18     | 12.23| 11.73| 11.51| 2.85        | 84.3     |       |
Table 3—Continued

| Name          | RA (J2000)     | DEC (J2000) | \(\mu\) | \(\sigma_\mu\) | \(\theta\) | \(B_J\) | \(R_{50F}\) | \(I_{1V/N}\) | \(J\) | \(H\) | \(K_s\) | \(R_{50F} - J\) | Est Dist | Notes                  |
|---------------|----------------|-------------|---------|----------------|---------|--------|-------------|-------------|-------|------|-------|---------------|-----------|------------------------|
| SCR 2040-5501 | 20 40 12.40   | –55 01 25.7 | 0.514   | 0.013          | 125.4   | 16.56  | 14.26       | 12.16       | 10.56 | 10.02| 9.69  | 3.70          | 22.9      |                        |
| SCR 2043-6501 | 20 43 10.43   | –65 01 17.6 | 0.533   | 0.013          | 170.0   | 16.18  | 14.04       | 12.04       | 11.25 | 10.76| 10.52 | 2.79          | 55.3      |                        |
| SCR 2101-5437 | 21 01 45.76   | –54 37 31.7 | 0.667   | 0.011          | 241.5   | 16.90  | 14.59       | 13.46       | 12.79 | 12.26| 12.08 | 1.80          | 157.0     |                        |
| SCR 2109-5226 | 21 09 02.56   | –52 26 18.1 | 0.791   | 0.012          | 176.5   | 18.00  | 15.97       | 14.93       | 13.76 | 13.29| 13.05 | 2.21          | 221.8     |                        |
| SCR 2128-5532 | 21 28 41.23   | –55 32 32.1 | 0.699   | 0.010          | 123.3   | 16.37  | 14.23       | 12.04       | 10.70 | 10.06| 9.78  | 3.53          | 26.4      |                        |
| SCR 2130-7710 | 21 30 07.07   | –77 10 37.5 | 0.589   | 0.007          | 118.0   | 18.28  | 15.93       | 13.44       | 11.29 | 10.67| 10.36 | 4.64          | 20.6      |                        |
| SCR 2235-7722 | 22 35 57.78   | –77 22 16.2 | 0.612   | 0.009          | 197.6   | 18.42  | 16.36       | ...         | 14.17 | 13.67| 13.46 | 2.19          | 285.9     |                        |
| SCR 2250-5726AB | 22 50 45.05   | –57 26 01.8 | 0.714   | 0.007          | 117.3   | 18.07  | 16.10       | 13.80       | 12.63 | 12.00| 11.81 | 3.48          | 73.7      |                        |
| SCR 2307-8452 | 23 07 19.88   | –84 52 03.8 | 0.613   | 0.011          | 097.2   | 16.33  | 14.16       | 11.83       | 10.36 | 9.81 | 9.47  | 3.80          | 20.6      |                        |
| SCR 2335-5020 | 23 35 52.96   | –50 20 18.9 | 0.661   | 0.010          | 127.0   | 16.54  | 15.17       | 13.97       | 13.14 | 12.69| 12.47 | 2.03          | 179.4     |                        |
| SCR 2352-6124 | 23 52 29.56   | –61 24 23.1 | 0.848   | 0.009          | 167.1   | 17.10  | 14.73       | 12.63       | 11.52 | 11.02| 10.82 | 3.21          | 50.3      | cpm with LHS 4031     |

SuperCOSMOS–RECONS sample with \(\mu\) between 0.4"/yr and 0.5"/yr
| Name                  | RA (J2000) | DEC      | \(\mu\) | \(\sigma_\mu\) | \(\theta\) | \(B_J\) | \(R_{50F}\) | \(I_{1V_N}\) | \(J\) | \(H\) | \(K_s\) | \(R_{50F} - J\) | Est Dist | Notes |
|-----------------------|------------|----------|---------|----------------|-----------|---------|------------|------------|-----|-----|-----|--------------|---------|------|
| SCR 0242-5935         | 02 42 26.34 | -59 35 02.4 | 0.466   | 0.007          | 185.2     | 16.04   | 15.02      | 14.04      | 13.55 | 13.00 | 12.78 | 1.46         | 228.9   |       |
| SCR 0252-7522         | 02 52 45.57 | -75 22 44.5 | 0.496   | 0.013          | 063.5     | 17.10   | 16.32      | 16.17      | 15.77 | 15.76 | 15.34 | 0.55         | 675.9   | wd   |
| SCR 0255-7242         | 02 55 05.52 | -72 42 42.1 | 0.439   | 0.013          | 051.7     | 17.52   | 15.44      | 14.26      | 13.74 | 13.23 | 13.01 | 1.70         | 254.4   |       |
| SCR 0303-7299         | 03 03 44.13 | -72 09 59.9 | 0.330   | 0.009          | 085.9     | 18.77   | 16.38      | 14.11      | 12.72 | 12.23 | 11.95 | 3.66         | 67.8    |       |
| SCR 0311-6215         | 03 11 21.26 | -62 15 15.9 | 0.416   | 0.015          | 083.3     | 15.68   | 16.05      | 16.13      | 16.13 | 16.31 | 16.50 | -0.08        | ⋯       | wd, j |
| SCR 0331-8251         | 03 31 41.78 | -82 51 10.5 | 0.447   | 0.007          | 050.8     | 18.24   | 16.43      | 14.66      | 13.21 | 12.69 | 12.46 | 3.22         | 115.2   |       |
| SCR 0525-7425         | 05 25 45.56 | -74 25 25.9 | 0.417   | 0.009          | 040.2     | 14.81   | 12.89      | 11.35      | 10.03 | 9.42  | 9.21  | 2.86         | 28.7    |       |
| SCR 0537-5612         | 05 37 53.75 | -56 12 17.4 | 0.402   | 0.009          | 122.7     | ⋯       | 14.89      | 13.12      | 12.34 | 11.85 | 11.57 | 2.56         | 96.9    |       |
| SCR 0615-5807         | 06 15 05.02 | -58 07 43.4 | 0.410   | 0.006          | 314.6     | 16.63   | 14.45      | 12.44      | 11.48 | 10.98 | 10.70 | 2.97         | 54.4    |       |
| SCR 0618-6704         | 06 18 26.01 | -67 04 00.3 | 0.436   | 0.009          | 031.4     | 14.59   | 12.67      | 10.74      | 10.40 | 9.88  | 9.60  | 2.27         | 45.7    |       |
| SCR 0629-6938         | 06 29 56.40 | -69 38 13.3 | 0.473   | 0.007          | 153.6     | 18.14   | 16.23      | 14.75      | 13.66 | 13.14 | 12.90 | 2.57         | 183.8   |       |
| SCR 0630-7643AB       | 06 30 46.63 | -76 43 09.2 | 0.483   | 0.008          | 356.8     | 15.78   | 13.56      | 10.74      | 8.89  | 8.27  | 7.92  | 4.67         | 6.9     | k    |
| SCR 0654-7358         | 06 54 06.34 | -73 58 04.0 | 0.467   | 0.008          | 020.2     | 18.19   | 16.24      | 15.11      | 13.99 | 13.47 | 13.28 | 2.25         | 246.7   |       |
| SCR 0740-7212         | 07 40 00.80 | -72 12 27.8 | 0.481   | 0.006          | 033.7     | 17.25   | 15.28      | 13.31      | 11.77 | 11.27 | 11.00 | 3.51         | 49.8    |       |
| SCR 0744-6941         | 07 44 35.21 | -69 41 58.1 | 0.441   | 0.007          | 001.2     | 17.14   | 15.05      | 13.38      | 12.18 | 11.69 | 11.41 | 2.87         | 78.8    |       |
| SCR 0756-5434         | 07 56 48.71 | -54 34 57.1 | 0.446   | 0.005          | 324.2     | 17.86   | 15.91      | 13.56      | 11.86 | 11.28 | 10.98 | 4.05         | 38.2    |       |
| SCR 0812-6402         | 08 12 23.36 | -64 02 24.0 | 0.409   | 0.005          | 340.0     | 17.08   | 15.52      | 13.26      | 11.80 | 11.32 | 11.03 | 3.43         | 54.4    |       |
| SCR 0824-6721         | 08 24 03.20 | -67 21 50.5 | 0.403   | 0.005          | 288.9     | 17.54   | 15.29      | 13.13      | 11.55 | 10.95 | 10.70 | 3.74         | 36.0    |       |
| SCR 0843-5154         | 08 43 11.02 | -51 54 03.4 | 0.402   | 0.008          | 310.7     | 16.10   | 13.94      | 12.36      | 11.77 | 11.22 | 10.97 | 2.18         | 84.6    |       |
| SCR 0843-5209         | 08 43 38.80 | -52 09 27.5 | 0.482   | 0.007          | 307.3     | 16.41   | 14.29      | 12.57      | 11.87 | 11.38 | 11.11 | 2.42         | 84.2    |       |
| SCR 0850-4934         | 08 50 24.90 | -49 34 23.7 | 0.469   | 0.006          | 295.5     | 17.42   | 15.60      | 13.46      | 12.22 | 11.77 | 11.52 | 3.38         | 72.3    |       |
| SCR 0956-8518         | 09 56 14.12 | -85 18 01.5 | 0.478   | 0.007          | 319.2     | 17.11   | 15.14      | 13.98      | 12.49 | 11.94 | 11.74 | 2.64         | 100.7   |       |
Table 3—Continued

| Name          | RA          | DEC         | \( \mu \) | \( \sigma_{\mu} \) | \( \theta \) | \( B_J \) | \( R_{29F} \) | \( I_{1V,N} \) | \( J \) | \( H \) | \( K_s \) | \( R_{29F} - J \) | Est Dist | Notes |
|---------------|-------------|-------------|-----------|----------------|-----------|---------|-------------|-------------|-------|-----|------|----------------|-----------|-------|
| SCR 1011-8106 | 10 11 12.37 | -81 06 42.0 | 0.450     | 0.008          | 112.4     | 16.54   | 14.50       | 12.53       | 10.81 | 10.24 | 9.93 | 3.68         | 26.7      |       |
| SCR 1054-5159 | 10 54 16.31 | -51 59 03.0 | 0.408     | 0.006          | 306.1     | 17.32   | 15.38       | 13.37       | 11.71 | 11.10 | 10.87 | 3.66         | 42.7      |       |
| SCR 1104-8352 | 11 04 51.06 | -83 52 25.2 | 0.440     | 0.015          | 256.7     | ...     | 13.47       | 12.23       | 10.53 | 9.96  | 9.67  | 2.94         | 29.1      |       |
| SCR 1143-7047 | 11 43 11.44 | -70 47 21.4 | 0.460     | 0.007          | 266.5     | 17.58   | 15.63       | 13.81       | 12.35 | 11.82 | 11.59 | 3.28         | 72.5      |       |
| SCR 1155-7904 | 11 55 00.07 | -79 04 13.1 | 0.401     | 0.006          | 297.3     | 18.17   | 16.23       | 14.99       | 13.30 | 12.66 | 12.44 | 2.94         | 119.6     |       |
| SCR 1211-6849 | 12 11 39.70 | -68 49 29.9 | 0.489     | 0.008          | 293.4     | 16.91   | 14.73       | 12.43       | 11.39 | 10.91 | 10.62 | 3.35         | 45.4      |       |
| SCR 1213-4820 | 12 13 07.11 | -48 20 07.9 | 0.480     | 0.006          | 268.0     | 16.51   | 14.24       | 11.96       | 11.25 | 10.72 | 10.45 | 2.99         | 47.9      |       |
| SCR 1239-4759 | 12 39 51.37 | -47 59 07.8 | 0.401     | 0.006          | 268.5     | 17.26   | 15.26       | 12.92       | 11.57 | 11.08 | 10.80 | 3.69         | 42.8      |       |
| SCR 1240-8116 | 12 40 56.05 | -81 16 31.1 | 0.492     | 0.006          | 279.8     | 15.15   | 13.12       | 11.25       | 9.73  | 9.16  | 8.89  | 3.39         | 19.2      |       |
| SCR 1240-8209 | 12 40 51.09 | -82 09 03.4 | 0.486     | 0.008          | 272.4     | 16.18   | 14.56       | 12.30       | 10.85 | 10.20 | 9.93  | 3.70         | 29.3      |       |
| SCR 1245-5506 | 12 45 52.60 | -55 06 49.9 | 0.412     | 0.011          | 107.0     | 14.84   | 12.82       | 10.34       | 8.99  | 8.43  | 8.12  | 3.83         | 11.5      |       |
| SCR 1257-5554A| 12 57 32.84 | -55 54 48.6 | 0.410     | 0.012          | 290.1     | 14.84   | 13.47       | 11.45       | 10.48 | 9.90  | 9.66  | 2.98         | 39.1      | 1        |
| SCR 1257-5554B| 12 57 33.08 | -55 54 38.0 | 0.403     | 0.006          | 293.2     | 17.30   | 16.94       | 16.82       | ...   | ...   | ...   | ...          | ...       | 1       |
| SCR 1320-7542 | 13 20 47.55 | -75 42 51.1 | 0.434     | 0.006          | 249.3     | 17.88   | 15.82       | 14.71       | 13.93 | 13.32 | 13.26 | 1.89         | 270.9     |       |
| SCR 1331-5138 | 13 31 06.82 | -51 38 02.8 | 0.484     | 0.007          | 294.9     | 16.07   | 14.10       | 11.95       | 10.99 | 10.50 | 10.27 | 3.11         | 44.5      |       |
| SCR 1409-5337 | 14 09 49.48 | -53 37 26.4 | 0.450     | 0.007          | 212.4     | 16.45   | 14.33       | 13.06       | 11.72 | 11.24 | 10.96 | 2.61         | 70.2      |       |
| SCR 1412-4954 | 14 12 43.89 | -49 54 32.4 | 0.420     | 0.012          | 212.9     | 15.86   | 13.82       | 12.25       | 11.66 | 11.12 | 10.89 | 2.16         | 83.9      |       |
| SCR 1420-5106 | 14 20 21.71 | -51 06 50.7 | 0.489     | 0.010          | 130.4     | 14.64   | 13.02       | 11.57       | 10.47 | 9.92  | 9.70  | 2.55         | 44.5      |       |
| SCR 1443-5502 | 14 43 25.99 | -55 02 53.0 | 0.477     | 0.017          | 277.5     | 15.08   | 13.22       | 11.57       | 10.28 | 9.71  | 9.49  | 2.94         | 32.4      |       |
| SCR 1445-5046 | 14 45 23.96 | -50 46 06.4 | 0.435     | 0.007          | 244.1     | 17.10   | 15.52       | 13.64       | 12.02 | 11.50 | 11.30 | 3.49         | 63.1      |       |
| SCR 1552-7052 | 15 52 46.95 | -70 52 02.4 | 0.468     | 0.006          | 216.0     | 16.33   | 14.18       | 11.92       | 10.81 | 10.28 | 10.07 | 3.37         | 34.5      |       |
| SCR 1627-7337 | 16 27 37.13 | -73 37 06.2 | 0.439     | 0.007          | 235.8     | 15.71   | 13.89       | 13.26       | 12.65 | 12.02 | 11.95 | 1.23         | 151.7     |       |
| Name           | RA (J2000) | DEC (J2000) | $\mu$   | $\sigma_\mu$ | $\theta$ | $B_J$ | $R_{59F}$ | $I_{IVN}$ | $J$ | $H$ | $K_s$ | $R_{59F} - J$ | Est Dist (pc) | Notes                  |
|----------------|------------|-------------|---------|--------------|-----------|-------|------------|-----------|------|------|------|-----------------|-----------------|------------------------|
| SCR 1717-6916  | 17 17 52.66 -69 16 43.2 | 0.466 | 0.005 | 320.9 | 17.45 | 15.04 | 12.86 | 11.48 | 10.94 | 10.67 | 3.56 | 38.4           |                  |                        |
| SCR 1724-5637  | 17 24 36.47 -56 37 02.9 | 0.421 | 0.008 | 154.5 | 15.18 | 13.11 | 11.42 | 10.39 | 9.86  | 9.63  | 2.72 | 37.2           |                  |                        |
| SCR 1739-8222  | 17 39 45.45 -82 22 02.3 | 0.465 | 0.008 | 211.8 | 17.06 | 15.04 | 14.21 | 12.90 | 12.38 | 12.19 | 2.14 | 151.7          |                  |                        |
| SCR 1740-5646  | 17 40 46.93 -56 46 57.9 | 0.448 | 0.005 | 229.5 | 18.48 | 15.90 | 14.44 | 13.83 | 13.33 | 13.19 | 2.07 | 232.9          |                  |                        |
| SCR 1748-7211  | 17 48 51.85 -72 11 53.1 | 0.428 | 0.008 | 191.0 | 16.99 | 14.85 | 12.88 | 11.57 | 10.99 | 10.75 | 3.28 | 46.9           |                  |                        |
| SCR 1811-5510  | 18 11 34.94 -55 10 37.9 | 0.482 | 0.006 | 197.9 | 17.39 | 15.16 | 12.87 | 11.62 | 11.06 | 10.78 | 3.54 | 42.6           |                  |                        |
| SCR 1821-5549  | 18 21 45.87 -55 49 17.5 | 0.424 | 0.007 | 181.0 | 16.97 | 14.63 | 12.61 | 11.57 | 11.00 | 10.74 | 3.06 | 50.2           |                  |                        |
| SCR 1912-5034  | 19 12 45.01 -50 34 34.4 | 0.447 | 0.005 | 233.7 | 18.24 | 16.03 | 13.70 | 12.19 | 11.67 | 11.35 | 3.84 | 48.3           |                  |                        |
| SCR 1926-5218  | 19 26 48.73 -52 18 17.4 | 0.494 | 0.007 | 191.2 | 16.97 | 15.22 | 14.39 | 13.54 | 12.97 | 12.87 | 1.68 | 299.7          |                  |                        |
| SCR 1931-5840  | 19 31 21.58 -58 40 37.2 | 0.402 | 0.007 | 135.7 | 16.83 | 14.69 | 13.32 | 12.18 | 11.67 | 11.44 | 2.51 | 91.7           |                  |                        |
| SCR 1948-5914  | 19 48 58.82 -59 14 23.3 | 0.415 | 0.008 | 151.7 | 16.60 | 14.63 | 12.39 | 11.11 | 10.58 | 10.28 | 3.52 | 35.9           |                  |                        |
| SCR 1958-5609  | 19 58 31.28 -56 09 10.6 | 0.494 | 0.007 | 161.9 | 17.60 | 15.55 | 14.41 | 13.30 | 12.77 | 12.52 | 2.25 | 169.1          |                  |                        |
| SCR 1959-5549  | 19 59 58.76 -55 49 29.6 | 0.413 | 0.011 | 169.9 | 16.19 | 13.95 | 11.82 | 10.47 | 9.88  | 9.63  | 3.48 | 25.0           |                  |                        |
| SCR 2009-6005  | 20 09 23.44 -60 05 43.3 | 0.414 | 0.010 | 154.3 | 18.17 | 15.87 | 13.71 | 12.11 | 11.58 | 11.27 | 3.76 | 46.5           |                  |                        |
| SCR 2016-7945  | 20 16 49.73 -79 45 53.0 | 0.434 | 0.007 | 128.4 | 16.75 | 16.09 | 15.75 | 15.11 | 15.03 | 14.64 | 0.99 | 482.5          |                  |                        |
| SCR 2018-4836  | 20 18 13.66 -48 36 51.9 | 0.410 | 0.007 | 147.2 | 17.38 | 15.20 | 13.33 | 12.08 | 11.62 | 11.37 | 3.12 | 69.0           |                  |                        |
| SCR 2018-6606  | 20 18 28.69 -66 06 44.5 | 0.462 | 0.008 | 193.1 | 17.72 | 17.56 | 14.71 | 13.68 | 13.14 | 12.99 | 2.08 | 228.0          |                  |                        |
| SCR 2104-5229  | 21 04 00.61 -52 29 43.4 | 0.400 | 0.009 | 233.7 | 17.60 | 15.42 | 14.42 | 13.44 | 12.94 | 12.76 | 1.98 | 207.2          |                  |                        |
| SCR 2151-8604  | 21 51 37.56 -86 04 33.4 | 0.454 | 0.012 | 192.7 | 16.57 | 14.48 | 13.57 | 12.74 | 12.23 | 12.03 | 1.74 | 160.6          |                  |                        |
| SCR 2155-7330  | 21 55 47.55 -73 30 24.5 | 0.459 | 0.011 | 202.0 | 15.78 | 13.97 | 11.85 | 10.60 | 10.05 | 9.78  | 3.38 | 31.6           |                  | cpm with HIP 108158 |
| SCR 2212-7337  | 22 12 05.47 -73 37 17.2 | 0.419 | 0.008 | 122.9 | 17.43 | 15.32 | 12.90 | 11.39 | 10.85 | 10.48 | 3.92 | 31.6           |                  |                        |
| SCR 2249-6324  | 22 49 47.16 -63 24 37.7 | 0.454 | 0.009 | 174.0 | 18.26 | 16.28 | 15.50 | 14.69 | 14.04 | 13.95 | 1.58 | 393.6          |                  |                        |
| Name          | RA          | DEC         | μ   | σμ  | θ  | B_J | R_{50F} | I_{1V,N} | J   | H   | K_s | R_{50F} - J | Est Dist | Notes                       |
|--------------|-------------|-------------|-----|-----|----|-----|---------|----------|-----|-----|-----|------------|----------|-----------------------------|
| SCR 2254-8712| 22 54 21.45 | -87 12 51.7| 0.401| 0.011| 115.6| 16.11| 14.13 | 12.30 | 11.10| 10.54| 10.29| 3.03 | 44.2 | a first reported in Hambly et al. 2004; 38.1 ± 7.8 pc in Henry et al. 2004 |
| SCR 2305-7729| 23 05 01.97 | -77 29 12.8 | 0.429| 0.007| 193.7| 17.31| 15.73| 14.89 | 13.82| 13.30| 13.18| 1.91 | 238.7 | b 15.4 ± 2.6 pc in Henry et al. 2004 |
| SCR 2317-5140| 23 17 08.89 | -51 40 19.4 | 0.446| 0.007| 192.1| 17.04| 15.02| 13.71 | 12.82| 12.25| 12.04| 2.19 | 139.4 | c 10.8 ± 2.1 pc in Henry et al. 2004 |
| SCR 2329-8758| 23 29 02.47 | -87 58 06.2 | 0.429| 0.006| 111.6| 15.79| 14.48| 13.44 | 12.70| 12.12| 11.97| 1.77 | 144.5 | d 17.2 ± 3.1 pc in Henry et al. 2004 |

a first reported in Hambly et al. 2004; 38.1 ± 7.8 pc in Henry et al. 2004
b 15.4 ± 2.6 pc in Henry et al. 2004
c 10.8 ± 2.1 pc in Henry et al. 2004
d 17.2 ± 3.1 pc in Henry et al. 2004
e first reported in Hambly et al. 2004; 9.4 ± 1.7 pc in Henry et al. 2004
f first reported in Hambly et al. 2004; 4.6 ± 0.8 pc in Henry et al. 2004
g first reported in Hambly et al. 2004; 37.0 ± 9.4 pc in Henry et al. 2004
h first reported in Hambly et al. 2004; 17.4 ± 3.5 pc in Henry et al. 2004; K_s suspect
i separation 2.3" at PA 28°
j all colors too blue for distance relations
k 7.0 ± 1.2 pc in Henry et al. 2004, binary with separation ~1.0"
l separation 11.0" at PA 16°
not detected during automated search due to faint limit but noticed to be a common proper motion companion during the visual inspection; R is $ESO - R, R_{59F}$ blended