

# Classification of 831 Two-Micron Sky Survey sources south of $+5^\circ$

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Eight hundred thirty-one infrared sources located south of  $+5^\circ$  have been selected from the Two-Micron Sky Survey (IRC), and studied in an objective-prism survey. The set consists of all 551 sources which were not identified in the IRC, 97 sources whose identification in the IRC is questionable, and 183 sources identified by their variable-star catalog name, but for which no classification is given in the IRC. The great majority (89%) of the sources studied are M stars, but 49 carbon stars and seven S stars as well as 17 peculiar stars with emission near  $8600 \text{ \AA}$  have also been identified. If available, recent classifications or identifications from other investigators are included.

## INTRODUCTION

SINCE the publication of the Two-Micron Sky Survey (Neugebauer and Leighton 1969; henceforth referred to as IRC), there have been several studies aimed at identifying or classifying sources for which no identification was provided in the IRC. These number about 20% of the 5612 IRC sources. The studies fall into four groups: (1) comparison with star catalogs not already considered in the compilation of the IRC (Grasdalen and Gaustad 1971; Lockwood and Zinter 1973; Lockwood 1974; Baumert 1974); (2) photometry of objects appearing peculiar on the Palomar Sky Survey prints (Cohen and Dewhurst 1970; Cohen 1971; Schultz and Wiemer 1972); (3) spectral classification (Vogt 1973; Hansen and Blanco 1973); and (4) individual studies of sources by a variety of observers and techniques.

The purpose of this work is to provide a comprehensive, southern hemisphere supplement to the IRC, classifying all unidentified or apparently misidentified IRC sources south of  $+5^\circ$ . The apparently misidentified sources that are discussed here total 97. The list was compiled on the basis of inconsistency between ( $I-K$ ) color and the spectral type claimed in the identification. Some members of this group may be correctly identified in the IRC and the abnormal color attributed to unusually high interstellar extinction. Many of the disagreements between color and spectral class involve early-type stars, which are so bright as to dominate the field. However, the majority of such stars turn out to be misidentified, the infrared source being usually a faint M star near a brighter early-type star. In addition to the 551 previously unidentified sources and the 97 sources whose colors do not agree with previously identified objects, we have included 183 sources identified in the IRC by their variable-star designation but not otherwise classified by type, making a total of 831 sources.

## I. OBSERVATIONS

A set of  $252, 5^\circ \times 5^\circ$ , objective-prism plates was taken between 1973 and 1975 with the Curtis Schmidt telescope at the Cerro Tololo Inter-American Observatory. The emulsion was Kodak IN exposed first for 10 min, then for 1 min at a slightly offset position, through an RG8 filter. The objective-prism apex angle was  $4^\circ$ . Twenty-seven of the plates formed the basis of a previous survey along the galactic plane (Hansen and Blanco 1973). The entire plate collection (Table I) covers approximately 40% of the sky area between declinations  $+5^\circ$  and  $-33^\circ$ , with heavy concentration along the galactic plane. These plates are available at CTIO for use by other investigators, and reach near-infrared magnitude 10.

The spectral classification technique used here was developed by J. J. Nassau and various collaborators (Nassau and Velghe 1964). The relationship between M-type classes obtained in this manner and other M-type classifications has been studied by Blanco (1964). The technique is very useful for the classification of faint stars of type M, C, and S, and within each of these three general types the later the spectral class, the easier is the classification. Only temperature classifications are possible with this technique, but simple arguments based on the frequency with which such stars are observed and their galactic coordinate distribution indicate that the number of dwarfs among the red stars classified in this manner must be negligible.

A random check on about 100 sources which appeared on more than one plate indicates that our classification is consistent to within one subtype having an average difference of  $\pm 0.56$  subtype. Comparing our results with those of Vogt (1973) in the region of overlap yields an average difference of  $\pm 1.35$  subtype. Part of this larger difference may be accounted for by spectral variability since plate material for the two surveys was gathered more than two years apart. A comparison of our spectral types with those derived photometrically by Lockwood (1974) was possible for 22 IRC sources. Excellent agreement was found.

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TABLE I. Plate centers (1950).

| Plate No. | R.A.   | Dec.   | Plate No. | R.A.    | Dec.   | Plate No. | R.A.    | Dec.   | Plate No. | R.A.    | Dec.    |
|-----------|--------|--------|-----------|---------|--------|-----------|---------|--------|-----------|---------|---------|
| 001       | 0 5.1  | 1 4    | 064       | 7 28.8  | - 4 50 | 127       | 15 44.8 | -30 18 | 190       | 18 58.0 | -30 47  |
| 002       | 0 16.1 | -10 50 | 065       | 7 46.3  | - 4 25 | 128       | 15 22.5 | -23 2  | 191       | 19 12.8 | -32 22  |
| 003       | 0 23.0 | - 8 20 | 066       | 7 12.5  | 2 0    | 129       | 15 27.0 | -16 50 | 192       | 19 10.5 | -24 10  |
| 004       | 0 19.2 | -20 20 | 067       | 7 29.8  | 2 10   | 130       | 15 47.2 | -19 55 | 193       | 19 9.0  | -20 38  |
| 005       | 0 7.2  | -25 20 | 068       | 7 12.6  | -30 20 | 131       | 16 .5   | -23 33 | 194       | 19 23.9 | -21 15  |
| 006       | 1 3.1  | -31 57 | 069       | 7 27.0  | -24 8  | 132       | 16 12.2 | -22 22 | 195       | 19 19.4 | -17 42  |
| 007       | 1 40.1 | -18 30 | 070       | 7 28.4  | -20 0  | 133       | 15 16.2 | -10 10 | 196       | 19 11.1 | -16 32  |
| 008       | 1 33.2 | 0 30   | 071       | 7 36.1  | -15 56 | 134       | 15 44.8 | -11 17 | 197       | 19 45.8 | -29 52  |
| 009       | 1 52.0 | 4 27   | 072       | 7 53.0  | -13 24 | 135       | 15 55.7 | -13 57 | 198       | 20 0.0  | -25 50  |
| 010       | 2 20.3 | - 1 50 | 073       | 7 50.2  | -20 56 | 136       | 15 27.7 | 3 34   | 199       | 19 57.5 | -20 40  |
| 011       | 2 11.7 | -22 12 | 074       | 7 44.8  | -28 40 | 137       | 15 43.6 | 1 30   | 200       | 20 4.0  | -16 17  |
| 012       | 2 30.3 | -16 56 | 075       | 7 53.1  | -31 3  | 138       | 15 34.3 | - 2 50 | 201       | 20 18.3 | -16 44  |
| 013       | 2 34.4 | -27 50 | 076       | 8 8.5   | -29 35 | 139       | 15 59.5 | - 2 45 | 202       | 20 22.0 | -20 18  |
| 014       | 2 53.7 | - 6 13 | 077       | 8 22.6  | -30 52 | 140       | 16 17.2 | - 2 45 | 203       | 20 29.8 | -28 11  |
| 015       | 3 1.4  | -14 24 | 078       | 8 11.7  | -16 12 | 141       | 16 35.4 | - 2 45 | 204       | 19 51.8 | - 7 50  |
| 016       | 3 13.0 | -22 55 | 079       | 8 15.3  | -20 46 | 142       | 16 50.9 | - 2 45 | 205       | 20 11.4 | - 7 25  |
| 017       | 3 31.9 | -15 30 | 080       | 8 35.6  | -16 35 | 143       | 16 18.7 | - 7 35 | 206       | 19 57.2 | - 2 20  |
| 018       | 3 38.9 | -11 15 | 081       | 8 19.5  | - 9 30 | 144       | 16 14.0 | -31 30 | 207       | 20 7.0  | 4 30    |
| 019       | 3 5.7  | 2 50   | 082       | 8 17.5  | 2 55   | 145       | 16 28.4 | -29 18 | 208       | 20 16.7 | 0 15    |
| 020       | 3 17.6 | 2 27   | 083       | 8 43.4  | - 2 0  | 146       | 16 32.4 | -24 51 | 209       | 20 37.1 | 1 0     |
| 021       | 3 28.1 | - 2 6  | 084       | 8 50.0  | 2 15   | 147       | 16 30.7 | -20 40 | 210       | 20 46.4 | - 3 9   |
| 022       | 3 55.2 | 1 0    | 085       | 9 7.7   | - 2 10 | 148       | 16 42.8 | -18 12 | 211       | 20 37.7 | - 6 2   |
| 023       | 4 9.4  | - 9 0  | 086       | 9 7.4   | -14 8  | 149       | 16 49.7 | -11 15 | 212       | 20 42.5 | -10 14  |
| 024       | 4 19.4 | - 3 48 | 087       | 9 0.4   | -19 30 | 150       | 16 57.6 | - 8 52 | 213       | 21 13.5 | - 6 8   |
| 025       | 4 36.2 | - 1 26 | 088       | 8 49.2  | -24 32 | 151       | 17 11.7 | -11 14 | 214       | 21 4.7  | 1 20    |
| 026       | 4 36.2 | - 6 40 | 089       | 9 3.2   | -27 7  | 152       | 17 12.2 | -16 0  | 215       | 22 9.6  | 0 56    |
| 027       | 4 54.0 | - 6 8  | 090       | 9 20.0  | -31 0  | 153       | 17 8.6  | -22 13 | 216       | 22 15.9 | -21 4   |
| 028       | 5 4.1  | 0 28   | 091       | 9 17.3  | -23 22 | 154       | 16 58.6 | -31 12 | 217       | 22 54.4 | -20 36  |
| 029       | 4 10.8 | -24 30 | 092       | 9 42.9  | -22 47 | 155       | 17 17.5 | -27 19 | 218       | 22 52.1 | -26 0   |
| 030       | 4 16.7 | -17 48 | 093       | 9 48.9  | -29 39 | 156       | 17 27.8 | -23 23 | 219       | 23 4.2  | -30 36  |
| 031       | 4 40.2 | -13 30 | 094       | 10 6.3  | -32 21 | 157       | 17 30.9 | -19 48 | 220       | 23 20.1 | -11 5   |
| 032       | 4 43.1 | -23 57 | 095       | 9 43.9  | - 5 48 | 158       | 17 38.2 | -15 50 | 221       | 22 57.6 | 0 39    |
| 033       | 5 17.7 | -17 55 | 096       | 10 8.3  | -13 35 | 159       | 17 47.6 | -12 57 | 222       | 23 41.5 | 0 6     |
| 034       | 5 15.1 | -11 0  | 097       | 10 35.4 | -11 45 | 160       | 17 59.5 | -11 18 | 223       | 23 59.4 | - 6 17  |
| 035       | 5 36.6 | -14 4  | 098       | 10 44.2 | - 7 38 | 161       | 17 16.0 | - 2 46 | 224       | 23 39.1 | -20 1   |
| 036       | 5 38.2 | - 8 30 | 099       | 10 25.6 | -21 8  | 162       | 17 30.0 | - 2 3  | 225       | 23 58.1 | -31 25  |
| 037       | 5 26.8 | - 5 48 | 100       | 10 25.0 | -25 17 | 163       | 17 43.7 | - 3 0  | 226       | 17 20.0 | -32 54* |
| 038       | 5 41.0 | - 2 45 | 101       | 10 48.9 | -28 21 | 164       | 17 28.2 | - 6 34 | 227       | 17 36.7 | -35 27  |
| 039       | 5 49.5 | 1 40   | 102       | 10 58.1 | -18 3  | 165       | 17 45.7 | - 7 18 | 228       | 17 47.5 | -31 25  |
| 040       | 5 51.0 | -30 45 | 103       | 11 37.8 | -29 58 | 166       | 18 8.7  | - 6 30 | 229       | 17 40.0 | -30 7   |
| 041       | 5 40.0 | -22 15 | 104       | 11 57.8 | - 9 54 | 167       | 17 13.9 | 4 46   | 230       | 17 25.8 | -29 0   |
| 042       | 5 57.7 | -21 5  | 105       | 12 22.0 | - 4 45 | 168       | 17 41.2 | 2 47   | 231       | 17 37.4 | -25 19  |
| 043       | 6 2.7  | -16 45 | 106       | 12 22.7 | 1 2    | 169       | 18 1.0  | 2 5    | 232       | 17 57.8 | -27 44  |
| 044       | 5 53.2 | -10 45 | 107       | 12 44.8 | 4 24   | 170       | 18 26.9 | 2 48   | 233       | 18 0.2  | -24 18  |
| 045       | 6 2.0  | - 4 53 | 108       | 12 40.3 | -18 8  | 171       | 18 44.0 | 2 52   | 234       | 18 7.8  | -23 49  |
| 046       | 6 16.4 | 3 35   | 109       | 12 41.1 | -28 50 | 172       | 18 54.5 | 0 10   | 235       | 17 53.3 | -21 25  |
| 047       | 6 21.3 | - 2 4  | 110       | 13 15.7 | -32 17 | 173       | 19 1.6  | 3 2    | 236       | 17 47.2 | -21 28  |
| 048       | 6 34.2 | 0 26   | 111       | 13 20.5 | -18 4  | 174       | 19 20.4 | 3 14   | 237       | 17 56.1 | -17 30  |
| 049       | 6 48.8 | 1 40   | 112       | 13 36.0 | -21 55 | 175       | 18 10.2 | -29 50 | 238       | 18 3.1  | -17 30  |
| 050       | 6 53.8 | - 2 40 | 113       | 13 8.3  | - 9 0  | 176       | 18 27.8 | -27 18 | 239       | 18 17.0 | -19 43  |
| 051       | 6 31.7 | - 6 10 | 114       | 13 19.9 | - 3 30 | 177       | 18 26.4 | -23 7  | 240       | 18 26.0 | -15 45  |
| 052       | 6 23.4 | -11 5  | 115       | 13 56.3 | -13 42 | 178       | 18 41.7 | -24 20 | 241       | 18 8.6  | -13 46  |
| 053       | 6 35.0 | -13 25 | 116       | 14 9.7  | -17 40 | 179       | 18 34.3 | -19 23 | 242       | 18 4.0  | -13 26  |
| 054       | 6 11.4 | -30 56 | 117       | 13 51.3 | -29 17 | 180       | 18 48.3 | -20 8  | 243       | 18 13.1 | - 9 50  |
| 055       | 6 19.8 | -25 28 | 118       | 14 1.5  | -31 13 | 181       | 18 43.1 | -15 38 | 244       | 18 17.5 | - 9 42  |
| 056       | 6 32.3 | -30 54 | 119       | 14 19.8 | -30 23 | 182       | 18 51.6 | -12 50 | 245       | 18 33.8 | -11 51  |
| 057       | 6 57.2 | -23 13 | 120       | 14 46.1 | -23 40 | 183       | 19 7.3  | -11 10 | 246       | 18 42.3 | - 7 57  |
| 058       | 6 43.4 | -20 30 | 121       | 14 50.4 | -20 35 | 184       | 18 54.5 | - 8 38 | 247       | 18 37.5 | - 6 42  |
| 059       | 7 0.0  | -15 58 | 122       | 14 29.8 | 4 22   | 185       | 19 12.0 | - 6 0  | 248       | 18 26.8 | - 5 42  |
| 060       | 7 11.7 | -17 36 | 123       | 14 49.8 | - 2 0  | 186       | 19 22.1 | - 9 42 | 249       | 18 23.7 | - 5 40  |
| 061       | 7 5.0  | -13 11 | 124       | 15 1.0  | 0 43   | 187       | 19 26.3 | - 6 14 | 250       | 18 34.7 | - 1 50  |
| 062       | 7 10.3 | - 9 5  | 125       | 15 12.7 | -29 22 | 188       | 19 20.7 | - 1 22 | 251       | 18 46.2 | - 3 54  |
| 063       | 7 30.7 | - 9 16 | 126       | 15 23.7 | -27 10 | 189       | 19 39.5 | 1 32   | 252       | 18 50.7 | - 3 56  |

\* Galactic plane set which includes plates 226-252. These plates are rotated to lie parallel to galactic plane.

## II. RESULTS

The 831 IRC sources studied here are listed by their IRC number in Table II. Columns 2, 3, and 4, respectively, show the  $K$ ,  $I-K$ , and  $V$  magnitudes as given in the IRC. Column 5 contains the type and class of

those sources whose IRC identification we challenge on the basis of their observed color. Column 6 shows the star name of those variable stars included in the program for their lack of classification. Column 7 contains our classification based on objective-prism

## CLASSIFICATION OF SOUTHERN IRC SOURCES

1013

TABLE II. Classification of Southern IRC Sources.

| IRC<br>Num-<br>bers | K     | I-K  | V    | IRC<br>Classi-<br>fication | Vari-<br>able<br>star | Present<br>work | Rela-<br>tive<br>bright-<br>ness | Comments                                   |
|---------------------|-------|------|------|----------------------------|-----------------------|-----------------|----------------------------------|--------------------------------------------|
| -30001              | 1.63  | 3.57 |      |                            |                       | ?               | nt                               |                                            |
| -30002              | 2.85  | 6.01 |      |                            | SY Scl                | M8:             | f                                |                                            |
| -30013              | 1.58  | 4.93 |      |                            |                       | M9              | mf                               | LZ, CSVS 119.                              |
| -30021              | 1.30  | 5.42 |      |                            | R For                 | C               | b                                | S103, Ne                                   |
| -30023              | 1.11  | 5.22 |      |                            |                       | M9              | b                                |                                            |
| -30025              | 1.71  | 3.75 |      |                            | ST For                | M6              | b                                |                                            |
| -30032              | 2.34  | 2.56 | 6.83 | K5                         |                       | M1              | vb                               |                                            |
| -30033              | 1.89  | 5.20 |      |                            | W Eri                 | M9              | b                                |                                            |
| -30049              | 2.10  | 5.03 |      |                            | S Col                 | M8              | b                                |                                            |
| -30050              | 2.31  | 4.38 |      |                            |                       | M7              | mb                               | LZ, CSVS 1689.                             |
| -30051              | 2.71  | 3.74 |      |                            | R Col                 | M7              | b                                |                                            |
| -30054              | 2.94  | 3.78 |      |                            |                       | M8              | b                                |                                            |
| -30055              | 0.70  | 3.59 |      |                            |                       | M4              | vb                               |                                            |
| -30056              | 2.23  | 4.22 | 9.40 | B9                         |                       | M8              | b                                |                                            |
| -30057              | 2.73  | 3.75 |      |                            | U CMa                 | M7              | b                                |                                            |
| -30060              | 2.41  | 3.73 |      |                            |                       | late C          | b                                | S507, N + A5V.                             |
| -30067              | 2.75  | 4.02 |      |                            |                       | M7              | vb                               | LZ, FH CMa.                                |
| -30074              | 2.87  | 3.41 |      |                            |                       | M6              | mb                               |                                            |
| -30080              | 2.89  | 3.22 |      |                            |                       | M0              | b                                |                                            |
| -30086              | 2.96  | 4.21 |      |                            |                       | M6              | mb                               |                                            |
| -30088              | 2.28  | 3.71 | 9.10 | A2                         |                       | M6              | b                                |                                            |
| -30089              | 2.29  | 4.44 |      |                            |                       | M7              | mb                               |                                            |
| -30097              | 2.25  | 4.19 |      |                            |                       | late C          | b                                | S846, N:C5,3.                              |
| -30099              | 2.43  | 1.39 | 3.96 | A3 II                      |                       | not M,?         | vb                               |                                            |
| -30100              | 1.96  | 3.71 | 8.60 | A0                         |                       | M1              | b                                |                                            |
| -30102              | 2.87  | 3.93 |      |                            |                       | M0              | mb                               |                                            |
| -30104              | 2.79  | 3.47 | 6.51 | A2 II                      |                       | M8              | b                                |                                            |
| -30106              | 2.66  | 3.49 |      |                            |                       | M1              | mb                               | S956, C. We have late C, mf, 8'W.          |
| -30108              | 1.16  | 3.73 |      | A0 II                      |                       | M7              | b                                |                                            |
| -30110              | 2.55  | 3.38 |      |                            |                       | M6              | mb                               |                                            |
| -30111              | 2.58  | 3.48 | 8.90 |                            |                       | M5              | b                                | 1'N                                        |
| -30114              | 2.30  | 4.30 |      |                            |                       | M7              | b                                | 1'NW, S1019.                               |
| -30120              | 2.62  | 3.70 |      |                            |                       | M3              | b                                |                                            |
| -30121              | 1.93  | 4.74 |      |                            |                       | M7              | b                                | LZ, CSVS 1260.                             |
| -30125              | 2.80  | 3.72 |      |                            |                       | M6              | b                                | 2'NW, See Cohen (1971); Lockwood, M6-M6.5. |
| -30126              | 2.38  | 3.44 |      |                            |                       | M6              | b                                | LZ, 100969.                                |
| -30127              | 0.98  | 3.93 |      |                            |                       | M6              | vb                               |                                            |
| -30129              | 2.81  | 3.74 |      |                            |                       | M8              | mf                               |                                            |
| -30132              | 2.40  | 4.85 |      |                            |                       | late C          | mf                               | 2'W, S1277.                                |
| -30137              | 2.73  | 3.86 |      |                            |                       | M4              | b                                |                                            |
| -30141              | 2.85  | 4.17 |      |                            |                       | M6              | b                                |                                            |
| -30144              | 2.61  | 3.88 |      |                            |                       | M4              | b                                | LZ, CSVS 1419.                             |
| -30148              | 2.32  | 4.35 |      |                            |                       | M7              | b                                |                                            |
| -30149              | 0.77  | 3.92 |      |                            |                       | M6              | vb                               |                                            |
| -30152              | 2.00  | 4.24 |      |                            | SX Ant                | M6              | b                                |                                            |
| -30156              | 1.42  | 4.18 |      |                            | W Ant                 | M6              | vb                               |                                            |
| -30160              | 2.27  | 3.30 |      |                            |                       | M5              | vb                               | LZ, CSVS 1573.                             |
| -30165              | 2.80  | 5.57 |      |                            | CZ Hya                | late C          | b                                | S1681, Ne.                                 |
| -30169              | 2.65  | 4.21 |      |                            | RS Hya                | M7              | b                                |                                            |
| -30180              | 2.91  | 4.54 |      |                            |                       | M7              | mb                               |                                            |
| -30192              | 2.44  | 3.80 |      |                            |                       | M5              | b                                | LZ, CSVS 1897.                             |
| -30196              | 2.78  | 4.34 |      |                            | CM Hya                | M7              | mb                               |                                            |
| -30201              | 2.83  | 3.66 |      |                            |                       | M5              | b                                |                                            |
| -30202              | 2.60  | 4.24 |      |                            |                       | M7              | b                                |                                            |
| -30205              | 2.98  | 3.69 |      |                            |                       | M6              | b                                | LZ, CSVS 2036.                             |
| -30207              |       |      | 7.10 | M8e                        |                       | M7              | vb                               |                                            |
| -30210              | 1.99  | 4.67 |      |                            | TW Cen                | M6              | b                                |                                            |
| -30211              | 2.64  | 3.50 | 9.12 | K0                         |                       | M4              | b                                |                                            |
| -30214              | 2.48  | 4.20 |      |                            | V681 Cen              | M6              | b                                |                                            |
| -30217              | 2.75  | 5.20 |      |                            |                       | M7              | b                                |                                            |
| -30219              | 2.53  | 3.83 |      |                            |                       | M7              | mb                               |                                            |
| -30222              | -0.50 | 4.21 | 7.70 | M2                         |                       | M7              | vb                               |                                            |
| -30223              | 2.78  | 4.08 |      |                            |                       | M6              | mb                               |                                            |
| -30230              | 2.86  | 4.26 |      |                            |                       | M7              | mb                               |                                            |
| -30232              | 2.52  | 4.83 |      |                            | AR Lib                | M8              | mb                               |                                            |
| -30233              | 2.51  | 3.89 | 8.70 | K0                         |                       | M6              | b                                |                                            |
| -30236              | 1.89  | 5.45 |      |                            | SV Lib                | ≥M8             | f                                |                                            |
| -30241              | 2.88  | 2.89 |      |                            |                       | M6              | b                                |                                            |
| -30245              | 2.52  | 4.33 |      |                            |                       | M7              | b                                |                                            |
| -30249              | 2.51  | 3.66 | 8.60 | A2                         |                       | M6              | b                                |                                            |
| -30254              | 2.51  | 3.68 | 9.28 | G5                         |                       | M6              | b                                |                                            |
| -30257              | 1.79  | 4.09 |      |                            |                       | M7              | b                                | LZ, CSVS 2612.                             |
| -30258              | 2.81  | 3.55 |      |                            | KR Sco                | M8              | b                                | 1'W.                                       |
| -30262              | 2.99  | 3.82 |      |                            |                       | M6              | b                                |                                            |
| -30263              | 2.35  | 4.55 |      |                            |                       | S               | b                                |                                            |
| -30264              | 2.09  | 4.19 |      |                            | WW Sco                | M9              | f                                |                                            |
| -30267              | 2.71  | 2.79 | 7.00 | K5                         |                       | M1              | vb                               |                                            |

TABLE II. Classification of Southern IRC Sources (continued).

| IRC<br>Num-<br>bers | K    | I-K  | V    | IRC<br>Classi-<br>fication | Vari-<br>able<br>star | Present<br>work | Rela-<br>tive<br>bright-<br>ness | Comments                                |
|---------------------|------|------|------|----------------------------|-----------------------|-----------------|----------------------------------|-----------------------------------------|
| -30270              | 2.03 | 4.37 |      |                            |                       | M7              | mb                               |                                         |
| -30272              | 2.97 | 4.47 |      |                            |                       | M7              | mf                               |                                         |
| -30273              | 2.49 | 4.08 |      |                            | EW Sco                | M5              | mb                               |                                         |
| -30276              | 2.21 | 5.23 |      |                            |                       | M8              | mb                               |                                         |
| -30277              | 2.81 | 4.23 |      |                            |                       | C               | mb                               | LZ, CSVS 2899, Ne. S2388, Ne.           |
| -30279              | 2.75 | 4.52 |      |                            |                       | M9              | f                                | LZ, TU Sco, M7IIe.                      |
| -30280              | 2.34 | 4.58 |      |                            | V459 Sco              | M7              | mb                               |                                         |
| -30281              | 2.00 | 5.71 |      |                            |                       | M8              | mf                               |                                         |
| -30283              | 2.83 | 4.51 |      |                            |                       | M7              | mb                               |                                         |
| -30284              | 2.56 | 5.29 |      |                            |                       | M7              | mf                               |                                         |
| -30285              | 3.10 | 5.29 |      |                            |                       | ?               | nt                               | ?                                       |
| -30286              | 2.58 | 4.63 |      |                            |                       | M6              | mf                               |                                         |
| -30289              | 2.54 | 4.66 |      |                            |                       | M7              | mf                               |                                         |
| -30290              | 2.97 | 3.95 |      |                            |                       | M1              | b                                |                                         |
| -30292              | 0.72 | 4.42 |      |                            | V521 Oph              | M5              | b                                |                                         |
| -30293              | 1.83 | 4.54 |      |                            |                       | late C          | mb                               | S2438, N.                               |
| -30294              | 1.59 | 4.92 |      |                            |                       | M6              | b                                |                                         |
| -30295              | 2.58 | 4.01 |      |                            |                       | M5              | b                                |                                         |
| -30297              | 1.18 | 4.22 | 8.56 | K0                         |                       | M2              | b                                | Reddened.                               |
| -30298              | 2.53 | 4.34 |      |                            | V479 Sco              | M6              | mf                               |                                         |
| -30300              | 2.34 | 5.86 |      |                            |                       | ≥M8:            | t                                |                                         |
| -30301              | 1.54 | 6.47 |      |                            |                       | ≥M7:            | mf                               |                                         |
| -30302              | 2.82 | 5.04 |      |                            |                       | M7              | mb                               |                                         |
| -30303              | 2.77 | 6.35 |      |                            |                       | M0:             | mb                               | Possible supergiant. Close to NGC 6405. |
| -30304              | 2.65 | 4.73 |      |                            |                       | M2:             | f                                | Possible supergiant. Close to NGC 6405. |
| -30305              | 2.51 | 5.97 |      |                            |                       | M1:             | f                                | Possible supergiant. Close to NGC 6405. |
| -30306              | 2.72 | 5.54 |      |                            |                       | M0:             | f                                | Peculiar; emission near 8600Å.          |
| -30308              | 2.71 | 6.74 |      |                            |                       | M7:             | mf                               | Lockwood, M7.8-8.7.                     |
| -30309              | 2.85 | 4.48 | 9.28 | K5                         |                       | M2              | b                                |                                         |
| -30310              | 2.84 | 4.83 |      |                            |                       | M6              | b                                |                                         |
| -30311              | 2.99 | 6.24 |      |                            |                       | M0:             | mb                               | Peculiar; emission near 8600 Å.         |
| -30312              | 1.70 | 6.56 |      |                            |                       | M:              | mf                               | Possible supergiant. Close to NGC 6405. |
| -30314              | 2.19 | 5.95 |      |                            |                       | M:              | mb                               | Peculiar; emission near 8600 Å.         |
| -30315              | 2.09 | 4.44 |      |                            |                       | M3              | mb                               |                                         |
| -30316              | 2.20 | 5.38 |      |                            |                       | M1:             | f                                | Peculiar; emission near 8600 Å.         |
| -30318              | 2.70 | 5.88 |      |                            |                       | M:              | mf                               | Peculiar; emission near 8600 Å.         |
| -30319              | 1.91 | 3.97 | 8.80 | K2                         |                       | M2              | mb                               | Reddened.                               |
| -30320              | 2.96 | 5.06 | 9.10 | A2                         |                       | ?               | nt                               | ?                                       |
| -30321              | 2.78 | 4.63 |      |                            |                       | ?               | nt                               | ?                                       |
| -30322              | 2.97 | 4.73 | 8.50 | K0                         |                       | ≤M0             | f                                | Very reddened.                          |
| -30323              | 2.67 | 4.43 | 9.00 | A0                         |                       | ≤M0             | f                                | Reddened.                               |
| -30328              | 2.59 | 4.61 |      |                            |                       | M7              | f                                |                                         |
| -30329              | 2.70 | 4.58 |      |                            |                       | M7              | mf                               |                                         |
| -30330              | 2.92 | 4.35 |      |                            |                       | ≥M8:            | f                                |                                         |
| -30331              | 1.77 | 3.95 |      |                            | V776 Sgr              | M1              | mb                               | Reddened.                               |
| -30332              | 2.87 | 4.03 |      |                            | V745 Sgr              | late M          | t                                |                                         |
| -30333              | 2.09 | 5.20 |      |                            | V781 Sgr              | C               | mf                               | S2499.                                  |
| -30334              | 2.71 | 5.17 |      |                            |                       | M:              | t                                | Peculiar; emission near 8600 Å.         |
| -30335              | 2.89 | 5.34 |      |                            |                       | M: C:           | f                                | Early M or possibly C.                  |
| -30336              | 2.19 | 4.50 |      |                            | V1716 Sgr             | M6              | mf                               |                                         |
| -30337              | 1.36 | 4.48 |      |                            |                       | M6              | mb                               |                                         |
| -30338              | 3.00 | 4.85 |      |                            |                       | M7              | mf                               |                                         |
| -30339              | 2.74 | 4.03 |      |                            |                       | M5:             | vb                               | 2M5 stars within 2 arcmin.              |
| -30340              | 2.55 | 4.45 | 9.10 | K5                         |                       | ≤M0             | f                                |                                         |
| -30342              | 2.73 | 4.99 |      |                            |                       | ?               | t                                |                                         |
| -30343              | 2.91 | 5.58 |      |                            | V1725 Sgr             | -               | -                                | Missed by survey.                       |
| -30344              | 2.35 | 3.95 |      |                            |                       | M4              | b                                |                                         |
| -30345              | 2.93 | 4.03 |      |                            |                       | M5              | b                                |                                         |
| -30347              | 2.90 | 4.36 | 8.80 | K0                         |                       | M6              | mf                               |                                         |
| -30348              | 2.22 | 4.38 | 8.80 | A2                         |                       | M6              | mf                               |                                         |
| -30349              | 2.28 | 4.55 | 9.40 | B8                         |                       | ?               | nt                               | ?                                       |
| -30350              | 2.07 | 4.47 |      |                            | V1804 Sgr             | M9              | mf                               |                                         |
| -30352              | 2.84 | 3.54 |      |                            |                       | M5              | b                                |                                         |
| -30354              | 2.45 | 4.98 |      |                            |                       | ≥M8:            | f                                |                                         |
| -30355              | 2.52 | 4.22 |      |                            |                       | M6              | mf                               |                                         |
| -30356              | 1.65 | 4.19 |      |                            |                       | M6              | b                                |                                         |
| -30357              | 2.92 | 4.61 | 9.10 | G5                         |                       | late M          | t                                |                                         |
| -30361              | 3.15 | 5.21 | 9.38 | B9                         |                       | M9              | mf                               |                                         |
| -30362              | 2.98 | 3.74 |      |                            | V1822 Sgr             | M5              | b                                |                                         |
| -30363              | 2.33 | 4.97 | 8.80 | K5                         |                       | late M          | t                                |                                         |
| -30364              | 2.38 | 3.33 |      |                            |                       | late C          | mf                               | S2535                                   |
| -30365              | 2.38 | 5.26 |      |                            |                       | C               | mf                               | LZ, V1280 Sgr, C. S2540, N.             |
| -30368              | 2.92 | 3.77 |      |                            |                       | M6              | b                                |                                         |
| -30372              | 2.91 | 5.44 |      |                            |                       | M8              | mf                               |                                         |
| -30375              | 2.77 | 4.67 |      |                            |                       | M7              | mf                               |                                         |
| -30377              | 2.79 | 4.13 |      |                            |                       | M5              | b                                |                                         |
| -30384              | 2.83 | 5.03 |      |                            | HO Sgr                | M:              | f                                | ?, 3 faint M stars within 1'.           |
| -30385              | 2.47 | 4.68 |      |                            | LP Sgr                | M7              | mb                               |                                         |

## CLASSIFICATION OF SOUTHERN IRC SOURCES

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TABLE II. Classification of Southern IRC Sources (continued).

| IRC<br>Num-<br>bers | K     | I-K  | V    | IRC<br>Classi-<br>fication | Vari-<br>able<br>star | Present<br>work | Rela-<br>tive<br>bright-<br>ness | Comments                                                  |
|---------------------|-------|------|------|----------------------------|-----------------------|-----------------|----------------------------------|-----------------------------------------------------------|
| -30387              | 2.69  | 4.75 |      |                            |                       | M6              | b                                |                                                           |
| -30391              | 2.92  | 4.48 |      |                            |                       | M7              | mb                               | LZ, V2010Sgr.                                             |
| -30392              | 1.45  | 4.45 |      |                            |                       | M6              | b                                | L                                                         |
| -30393              | 2.13  | 4.36 |      |                            |                       | M6              | b                                | LZ, V2608,Sgr, M3.                                        |
| -30395              | 2.99  | 3.97 | 9.16 | F5                         |                       | ≤M0             | b                                |                                                           |
| -30398              | 1.90  | 6.81 |      |                            |                       | M9              | mf                               | LZ, CSVS 4465.                                            |
| -30403              | 2.88  | 5.11 |      |                            | AG Sgr                | M7              | b                                |                                                           |
| -30404              | 1.19  | 5.96 |      |                            | V342 Sgr              | M9              | b                                |                                                           |
| -30407              | 2.91  | 1.80 | 4.86 | dF5                        |                       | ≤M0             | vb                               |                                                           |
| -30408              | 2.74  | 4.08 |      |                            | SW Sgr                | M8              | mf                               |                                                           |
| -30415              | 2.85  | 3.99 |      |                            |                       | M6              | b                                |                                                           |
| -30417              | 2.73  | 3.98 |      |                            |                       | M7              | b                                |                                                           |
| -30419              | 0.75  | 4.96 | 8.30 | A2                         |                       | M9              | vb                               |                                                           |
| -30423              | 0.71  |      | 4.46 | M4 III                     |                       | ?               | vb                               | Overexposed.                                              |
| -30430              | -1.56 | 4.25 | 7.10 | M6e                        |                       | M6:M7           | vb                               | Overexposed.                                              |
| -30433              | 2.91  | 4.85 |      |                            |                       | M7              | b                                |                                                           |
| -30455              | 1.35  | 4.38 |      |                            |                       | M8              | b                                | LZ, CSVS 5621, Mc.                                        |
| -30459              | 2.10  | 3.42 |      |                            |                       | M5              | b                                |                                                           |
| -30463              | 2.75  | 4.28 |      |                            |                       | M7              | mb                               | 1'NW                                                      |
| -30470              | 2.70  | 3.66 |      |                            |                       | M5              | b                                |                                                           |
| -20004              | 1.76  | 4.05 |      |                            |                       | M6              | b                                |                                                           |
| -20007              | 0.85  |      | 5.20 | M5II                       |                       | M5              | vb                               |                                                           |
| -20015              | 3.13  | 4.03 |      |                            |                       | M7              | mf                               | LZ, CSVS 154.                                             |
| -20019              | 2.52  | 3.79 |      |                            |                       | M5              | mb                               |                                                           |
| -20029              | 2.10  | 4.01 |      |                            |                       | M6              | b                                |                                                           |
| -20031              | 2.60  | 3.34 |      |                            | RY Cet                | M7              | b                                |                                                           |
| -20034              | 2.52  | 3.68 |      |                            |                       | M5              | b                                |                                                           |
| -20039              | 2.62  | 3.96 |      |                            | TW Eri                | M7              | b                                |                                                           |
| -20041              | -1.25 |      | 3.67 | gM3                        |                       | M:              | vb                               |                                                           |
| -20043              | 0.11  | 5.65 |      |                            | RT Eri                | M7              | b                                |                                                           |
| -20052              | 1.43  | 4.17 |      |                            | RS Eri                | M7              | vb                               |                                                           |
| -20055              | 2.00  | 2.78 |      |                            | AV Eri                | M2              | vb                               |                                                           |
| -20056              | 2.34  | 3.85 |      |                            |                       | M6              | b                                |                                                           |
| -20062              | 2.91  | 4.03 | 9.10 | K2                         |                       | M8              | b                                | In small cluster of early stars. Not in NGC.              |
| -20069              | 1.65  | 4.14 |      |                            |                       | M7              | b                                |                                                           |
| -20076              | 1.92  | 4.17 |      |                            |                       | M5              | mb                               |                                                           |
| -20077              | 1.77  | 5.09 |      |                            | RT Lep                | M9              | mb                               |                                                           |
| -20083              | 2.90  | 3.57 |      |                            |                       | M6              | mb                               |                                                           |
| -20084              | 1.67  | 2.59 | 4.92 | A2                         |                       | M1              | vb                               |                                                           |
| -20094              | 2.33  | 4.17 |      |                            |                       | M5              | vb                               |                                                           |
| -20099              | 2.70  | 4.00 |      |                            |                       | M6              | vb                               | 1'NE                                                      |
| -20101              | 2.54  | 4.05 |      |                            |                       | late C          | b                                | 1'N, LZ, CSVS 836.                                        |
| -20102              | 2.07  | 4.01 |      |                            |                       | M7              | vb                               | LZ, CSVS 842.                                             |
| -20106              | 2.69  | 3.50 |      |                            |                       | M7              | vb                               |                                                           |
| -20107              | 1.23  | 3.47 | 8.80 | K0                         |                       | M7              | vb                               |                                                           |
| -20110              | 2.51  | 4.67 |      |                            |                       | M7              | vb                               | LZ, DL Cma.                                               |
| -20111              | 2.99  | 4.32 |      |                            |                       | M7              | b                                | 1.5'NW                                                    |
| -20113              | 1.62  | 4.43 |      |                            |                       | M7              | b                                | LZ, CSVS 912.                                             |
| -20114              | 0.80  | 3.82 |      |                            | X Cma                 | M7              | b                                |                                                           |
| -20116              | 2.83  | 4.12 |      |                            |                       | M5              | b                                |                                                           |
| -20117              | 2.93  | 4.83 |      |                            |                       | M8:             | vf                               | LZ, Y Cma.                                                |
| -20119              | 1.67  | 3.60 |      |                            |                       | M5              | b                                | 1'N                                                       |
| -20122              | 1.89  | 5.53 |      |                            | S X Cma               | M7              | b                                |                                                           |
| -20126              | 2.77  | 3.55 |      |                            |                       | M4              | b                                |                                                           |
| -20127              | 2.75  | 3.89 |      |                            |                       | M7              | vb                               | LZ, DU Cma, M6.5.                                         |
| -20130              | 2.73  | 2.92 |      |                            |                       | M1              | b                                | 2'N, also M5, b, 8'S.                                     |
| -20131              | 2.70  | 6.08 |      |                            |                       | late C          | mb                               | S 776.                                                    |
| -20133              | 1.77  | 5.71 |      |                            | Z Pup                 | M9              | mb                               |                                                           |
| -20134              | 2.19  | 5.21 |      |                            | DU Pup                | late M          | vf                               | 1'W, also M5, mb, and M6, within 17'.                     |
| -20135              | 2.60  | 4.74 |      |                            |                       | M7              | mb                               |                                                           |
| -20136              | 2.66  | 3.78 |      |                            | GG Pup                | S               | b                                | 2'W                                                       |
| -20143              | 2.27  | 3.61 |      |                            |                       | M4              | vb                               |                                                           |
| -20149              | 2.95  | 3.78 |      |                            |                       | M5              | vb                               | LZ, HV Pup, possible member of small cluster. Not in NGC. |
| -20150              | 2.59  | 1.15 | 4.20 | F8 II                      |                       | ?               | vb                               | Neither M nor C. Within small cluster. Not in NGC.        |
| -20151              | 2.62  | 4.08 |      |                            |                       | M6              | b                                |                                                           |
| -20155              | 2.56  | 3.66 |      |                            |                       | M5              | vb                               |                                                           |
| -20159              | 2.66  | 4.62 |      |                            | DP Pup                | M8              | b                                |                                                           |
| -20161              | 2.62  | 3.98 |      |                            |                       | M6              | vb                               |                                                           |
| -20163              | 2.23  | 3.92 |      |                            |                       | M7              | vb                               | LZ, CSVS 1269.                                            |
| -20165              | 2.71  | 4.24 |      |                            | AC Pup                | late C          | vb                               | S 1147, N.                                                |
| -20169              | 2.44  | 4.21 |      |                            | SZ Pyx                | S               | mb                               |                                                           |
| -20170              | 2.89  | 3.51 |      |                            |                       | M6              | mb                               | 2'N                                                       |
| -20171              | 1.65  | 3.68 |      |                            | W Pyx                 | M7              | mb                               |                                                           |
| -20176              | 1.34  | 4.33 |      |                            |                       | M6              | b                                |                                                           |
| -20177              | 1.96  | 4.27 |      |                            |                       | M7              | mb                               |                                                           |
| -20181              | 1.73  | 4.12 |      |                            |                       | M6              | b                                |                                                           |
| -20183              | 2.41  | 3.68 | 8.70 | G0                         |                       | M5              | b                                | 1.5'W                                                     |

TABLE II. Classification of Southern IRC Sources (continued).

| IRC<br>Num-<br>bers | K     | I-K  | V    | IRC<br>Classi-<br>fication | Vari-<br>able<br>star | Present<br>work | Rela-<br>tive<br>bright-<br>ness | Comments                            |
|---------------------|-------|------|------|----------------------------|-----------------------|-----------------|----------------------------------|-------------------------------------|
| -20184              | 2.45  | 4.48 |      |                            |                       | late C          | b                                | S 1404, Ne.                         |
| -20185              | 2.07  | 4.85 |      |                            |                       | M7              | b                                |                                     |
| -20188              | 2.74  | 5.19 |      |                            |                       | M9              | f                                |                                     |
| -20196              | 2.86  | 3.66 |      |                            | RR Hya                | M8              | mb                               |                                     |
| -20197              | 1.46  | 6.17 |      |                            |                       | M9              | f                                |                                     |
| -20198              | 2.50  | 4.09 |      |                            | AZ Hya                | M6              | b                                |                                     |
| -20211              | 2.63  | 3.02 | 9.10 | G0                         |                       | M3              | b                                |                                     |
| -20212              | 1.79  | 4.00 |      |                            |                       | M5              | b                                | LZ, CSVS 1615.                      |
| -20222              | -1.23 | 4.81 | 9.80 | M2                         |                       | M7              | vb                               |                                     |
| -20242              | 2.31  | 5.48 |      |                            | T Crv                 | M6              | mb                               |                                     |
| -20243              | 2.30  | 3.78 | 9.20 | F5                         |                       | M5              | b                                |                                     |
| -20245              | 2.50  | 3.89 |      |                            | X Crv                 | M5              | b                                |                                     |
| -20251              | 2.05  | 4.04 |      |                            |                       | M5              | b                                |                                     |
| -20254              |       |      | 4.98 | gM7                        |                       | M6:             | vb                               |                                     |
| -20259              | 2.52  | 4.71 |      |                            |                       | M6              | mb                               |                                     |
| -20263              | 2.75  | 4.21 |      |                            |                       | M6              | b                                | LZ, CSVS 2104.                      |
| -20266              | 0.65  | 4.14 |      |                            |                       | M6              | b                                |                                     |
| -20269              | 2.83  | 4.06 |      |                            |                       | M6              | mb                               |                                     |
| -20272              | 2.22  | 3.81 | 8.80 | F5                         |                       | M6              | b                                |                                     |
| -20274              | 2.95  | 4.28 |      |                            | EG Lib                | M5              | b                                |                                     |
| -20276              | 2.90  | 3.00 |      |                            |                       | M2              | b                                |                                     |
| -20284              | 2.34  | 4.08 |      |                            |                       | M7              | b                                | LZ, CSVS, 2318.                     |
| -20285              | 2.34  | 4.41 |      |                            |                       | M7              | b                                |                                     |
| -20286              | 0.28  | 5.20 |      |                            | RS Lib                | M8              | b                                |                                     |
| -20289              | 2.64  | 4.01 |      |                            | RU Lib                | M5              | b                                |                                     |
| -20290              | 2.66  | 4.26 |      |                            |                       | M7              | mb                               |                                     |
| -20293              | 2.00  | 5.00 |      |                            |                       | M7              | mb                               | Lockwood, M7.9.                     |
| -20298              | 1.36  | 3.78 |      |                            |                       | M5              | b                                |                                     |
| -20300              | 2.89  | 4.14 |      |                            | RR Lib                | M8              | mf                               |                                     |
| -20302              | 2.21  | 4.42 | 8.10 | A2                         |                       | M7              | b                                |                                     |
| -20306              | 1.56  | 4.23 |      |                            | Z Sco                 | M6              | b                                |                                     |
| -20307              | 2.53  | 1.90 |      |                            |                       | M6              | b                                |                                     |
| -20310              | 2.92  | 4.31 |      |                            |                       | M7              | mb                               |                                     |
| -20311              | 1.57  | 1.86 | 4.53 | A5 II                      |                       | ≤M0             | vb                               |                                     |
| -20313              | 2.96  | 4.76 |      |                            |                       | M4              | mb                               |                                     |
| -20314              | 2.20  | 5.94 |      |                            |                       | M7              | mf                               |                                     |
| -20317              | 2.34  | 5.95 |      |                            | Y Sco                 | M8              | f                                |                                     |
| -20320              | 1.88  | 4.12 |      |                            |                       | M6              | b                                | LZ, KV Sco.                         |
| -20321              | 1.58  | 5.24 |      |                            |                       | M6              | mb                               |                                     |
| -20322              | 1.19  | 4.90 |      |                            |                       | M6              | mb                               |                                     |
| -20324              | 1.29  | 5.05 |      |                            |                       | M7              | mb                               |                                     |
| -20328              | 2.77  | 4.87 |      |                            |                       | M7              | mf                               |                                     |
| -20330              | 2.09  | 4.01 |      |                            |                       | M5              | mb                               |                                     |
| -20333              | 2.91  | 4.31 |      |                            | RR Oph                | M7              | mf                               |                                     |
| -20341              | 2.94  |      |      |                            |                       | M9              | vf                               |                                     |
| -20343              | 3.28  | 4.35 |      |                            |                       | M7              | mf                               | LZ, V 1281 Oph.                     |
| -20346              | 2.88  | 4.28 |      |                            |                       | M7              | mb                               | LZ, CSVS 2953.                      |
| -20347              | 0.83  | 4.70 | 6.00 | M5e                        |                       | M6              | b                                |                                     |
| -20349              | 2.95  | 5.03 |      |                            |                       | M7              | mf                               |                                     |
| -20350              | 1.53  | 5.35 |      |                            |                       | M8              | b                                | LZ, V 1699 Oph.                     |
| -20352              | 2.78  | 4.71 | 8.90 | A2                         |                       | M8              | mf                               |                                     |
| -20356              | 2.76  | 4.59 |      |                            |                       | M4              | mb                               |                                     |
| -20359              | 2.20  | 5.21 |      |                            |                       | M6              | mf                               |                                     |
| -20360              | 2.96  | 4.00 |      |                            |                       | M6              | b                                |                                     |
| -20361              | 2.91  | 2.64 | 7.63 | G5                         |                       | ≤M0             | b                                | Within group.                       |
| -20362              | 2.83  | 3.93 |      |                            |                       | M3              | b                                |                                     |
| -20364              | 0.26  | 4.43 |      |                            | TW Oph                | late C          | vb                               | S 2449.                             |
| -20365              | 2.49  | 5.49 |      |                            |                       | M7              | mf                               |                                     |
| -20367              | 2.46  | 4.16 |      |                            |                       | M5              | b                                |                                     |
| -20368              | 2.52  | 6.47 |      |                            |                       | late M          | t                                |                                     |
| -20369              | 1.42  | 3.99 | 8.20 | K5                         |                       | M2              | b                                | Very reddened.                      |
| -20370              | 1.58  | 5.10 |      |                            |                       | M7              | b                                |                                     |
| -20371              | 2.02  | 4.88 | 8.50 | B9                         |                       | M7              | mb                               |                                     |
| -20372              | 2.29  | 4.12 |      |                            |                       | M6              | b                                |                                     |
| -20374              | 2.69  | 6.28 |      |                            |                       | M8              | mb                               | LZ, CgVS 3315, Lockwood, M 6.5-7.5. |
| -20375              | 2.14  | 4.09 | 9.00 | K5                         |                       | M6              | b                                |                                     |
| -20376              | 2.25  | 5.97 |      |                            | V548 Oph              | M7              | mb                               |                                     |
| -20377              | 2.34  | 5.28 |      |                            | BG Oph                | M9              | mf                               |                                     |
| -20378              | 3.00  | 4.97 |      |                            |                       | M8              | f                                |                                     |
| -20379              | 2.26  | 5.01 |      |                            |                       | M7              | mb                               |                                     |
| -20380              | 2.38  | 5.24 |      |                            |                       | M7              | mb                               |                                     |
| -20381              | 2.90  | 3.70 | 9.20 | A0                         |                       | M3              | mb                               |                                     |
| -20383              | 3.06  | 4.81 |      |                            | FK Sgr                | M7              | mf                               |                                     |
| -20385              | 2.21  | 5.23 |      |                            |                       | ≥M8:            | mb                               | See Wing <i>et al.</i> (1973).      |
| -20386              | 2.69  | 4.10 |      |                            |                       | M7              | mf                               |                                     |
| -20387              | 2.84  | 4.14 |      |                            |                       | M5              | f                                |                                     |
| -20389              | 2.99  | 5.59 |      |                            |                       | M7:             | f                                |                                     |
| -20390              | 2.87  | 5.23 |      |                            |                       | M7:             | f                                |                                     |

## CLASSIFICATION OF SOUTHERN IRC SOURCES

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TABLE II. Classification of Southern IRC Sources (continued).

| IRC<br>Num-<br>bers | K    | I-K  | V    | IRC<br>Classi-<br>fication | Vari-<br>able<br>star | Present<br>work | Rela-<br>tive<br>bright-<br>ness | Comments                                          |
|---------------------|------|------|------|----------------------------|-----------------------|-----------------|----------------------------------|---------------------------------------------------|
| -20391              | 2.71 | 4.81 |      |                            |                       | M6              | mf                               |                                                   |
| -20392              | 2.17 | 4.18 |      |                            |                       | M6              | mf                               |                                                   |
| -20394              | 2.96 | 6.27 |      |                            |                       | M8              | mf                               |                                                   |
| -20396              | 2.55 | 4.36 |      |                            |                       | M6              | mb                               |                                                   |
| -20397              | 1.21 | 4.40 |      |                            | V774 Sgr              | M5              | mb                               |                                                   |
| -20398              | 2.82 | 3.96 |      |                            |                       | M0:M1           | mb                               | Peculiar; emission near 8600 Å.                   |
| -20399              | 2.91 | 6.09 |      |                            |                       | M7              | mf                               | Lockwood, M7.0-7.5.                               |
| -20400              | 2.97 | 5.04 |      |                            |                       | ≥M8             | t                                |                                                   |
| -20401              | 2.88 | 4.75 |      |                            |                       | M6              | mf                               |                                                   |
| -20402              | 2.89 | 4.93 |      |                            |                       | M5              | mb                               |                                                   |
| -20403              | 1.97 | 4.12 |      |                            | VV Sgr                | M3              | mb                               |                                                   |
| -20404              | 3.00 | 9.99 |      |                            |                       | M7              | mf                               |                                                   |
| -20406              | 2.94 | 4.80 |      |                            |                       | M:              | f                                | Several M stars within 2'.                        |
| -20407              | 2.70 | 5.06 |      |                            |                       | ≥M8:            | f                                |                                                   |
| -20408              | 2.59 | 4.47 |      |                            |                       | M5              | mb                               |                                                   |
| -20409              | 1.81 | 4.33 |      |                            |                       | M1:M2:          | mb                               | Albers (1973) classifies as M3.                   |
| -20412              | 2.82 | 4.81 |      |                            |                       | M3              | mb                               |                                                   |
| -20415              | 1.95 | 2.75 | 6.31 | K3 III                     |                       | M3:             | mf                               | Possibly early C.                                 |
| -20416              | 2.42 | 3.37 | 5.73 | B0 II                      |                       | M3              | b                                |                                                   |
| -20417              | 2.26 | 5.04 |      |                            |                       | ?               | nt                               | ?                                                 |
| -20418              | 1.89 | 6.83 |      |                            |                       | M:              | mf                               | Peculiar; emission near 8600 Å. Poss. supergiant. |
| -20420              | 2.70 | 4.52 |      |                            |                       | C               | mb                               | S 2521, N0.                                       |
| -20421              | 2.56 | 3.00 | 7.28 | F5                         |                       | early M         | f                                | See Cohen (1971).                                 |
| -20422              | 2.73 | 4.10 |      |                            |                       | M4              | mb                               |                                                   |
| -20423              | 2.35 | 6.50 |      |                            |                       | ?               | nt                               | ?                                                 |
| -20424              | 0.90 | 6.31 |      |                            |                       | ≥M8:            | f                                |                                                   |
| -20425              | 1.82 | 4.02 |      |                            |                       | M5              | mf                               |                                                   |
| -20427              | 2.58 | 4.79 |      |                            |                       | M1:             | mb                               | 1.5', Albers (1973) classifies as M4.             |
| -20429              | 2.86 | 3.97 |      |                            |                       | M0              | b                                |                                                   |
| -20431              | 0.37 | 4.76 | 8.50 | B5                         |                       | M5              | b                                |                                                   |
| -20432              | 2.58 | 4.97 |      |                            |                       | ≥M7:            | mf                               |                                                   |
| -20433              | 2.43 | 5.40 |      |                            |                       | M7:M8:          | f                                |                                                   |
| -20434              | 2.80 | 2.53 |      |                            | AX Sgr                | early M         | mb                               | Reddened.                                         |
| -20436              | 2.99 | 5.72 |      |                            |                       | M7              | mf                               |                                                   |
| -20437              | 1.66 | 3.94 | 9.30 | A0                         |                       | M5              | mb                               |                                                   |
| -20439              | 2.11 | 4.59 |      |                            |                       | M2              | b                                |                                                   |
| -20440              | 2.95 | 4.59 |      |                            | Sy Sgr                | late M          | t                                |                                                   |
| -20441              | 1.85 | 3.71 |      |                            |                       | M2              | b                                |                                                   |
| -20442              | 2.85 | 4.41 |      |                            |                       | M2              | b                                |                                                   |
| -20444              | 1.69 | 4.77 |      |                            |                       | ≥M8:            | f                                |                                                   |
| -20445              | 1.94 | 4.28 |      |                            |                       | M1              | b                                |                                                   |
| -20447              | 2.82 | 4.17 | 9.20 | B                          |                       | M6              | mf                               |                                                   |
| -20448              | 2.97 | 5.08 |      |                            |                       | ?               | nt                               | ?                                                 |
| -20449              | 2.81 | 3.72 |      |                            |                       | ≥M8             | f                                | Also M1, 1.5' away.                               |
| -20452              | 2.94 | 4.76 | 9.40 | K2                         |                       | M6              | f                                | 2'S                                               |
| -20453              | 2.38 | 3.32 |      |                            |                       | M0              | b                                |                                                   |
| -20454              | 0.87 | 5.22 |      |                            |                       | M7              | f                                |                                                   |
| -20455              | 2.38 | 5.02 |      |                            |                       | M0:M1:          | b                                |                                                   |
| -20457              | 2.70 | 5.00 |      |                            |                       | M2              | b                                |                                                   |
| -20461              | 1.23 | 5.02 |      |                            |                       | M2              | b                                |                                                   |
| -20462              | 2.68 | 3.57 |      |                            |                       | M1:             | mb                               | Peculiar;emission near 8600 Å.                    |
| -20463              | 2.48 | 4.52 |      |                            |                       | M0:             | b                                | Peculiar;emission near 8600 Å.                    |
| -20469              | 2.99 | 4.26 |      |                            |                       | M7              | mb                               |                                                   |
| -20470              | 2.36 | 5.53 |      |                            |                       | M7              | mb                               |                                                   |
| -20479              | 2.39 | 4.56 |      |                            |                       | M6              | f                                | LZ, V1982 Sgr, M6.                                |
| -20480              | 2.31 | 5.17 |      |                            |                       | M7              | mb                               | LZ, V1984 Sgr, M6.                                |
| -20481              | 2.84 | 4.32 | 8.50 | A                          |                       | M5:             | f                                |                                                   |
| -20482              | 2.43 | 4.92 |      |                            |                       | C               | mb                               |                                                   |
| -20483              | 2.89 | 4.18 |      |                            | V1661 Sgr             | M5              | b                                |                                                   |
| -20484              | 2.69 | 5.41 |      |                            |                       | late M          | f                                | LZ, AK Sgr, M7e.                                  |
| -20486              | 1.98 | 3.71 |      |                            |                       | M1              | mf                               | Reddened.                                         |
| -20487              | 1.35 | 4.78 |      |                            |                       | M8              | mb                               |                                                   |
| -20488              | 2.59 | 3.90 |      |                            | SS Sgr                | C               | mf                               | S 2595, N:R3.                                     |
| -20489              | 2.81 | 4.10 |      |                            |                       | M7              | b                                |                                                   |
| -20491              | 3.22 | 4.89 |      |                            | V1902 Sgr             | late M          | f                                |                                                   |
| -20492              | 2.68 | 5.03 |      |                            | V1680 Sgr             | M7              | mb                               |                                                   |
| -20493              | 2.29 | 4.55 |      |                            |                       | M1              | b                                | LZ, V2003 Sgr, S.                                 |
| -20494              | 2.85 | 5.24 |      |                            |                       | M8              | b                                |                                                   |
| -20496              | 2.66 | 4.66 | 8.90 | G5                         |                       | M8              | mb                               |                                                   |
| -20498              | 3.11 | 1.90 |      |                            |                       | Cluster         | ?                                | ?, within NGC 6656. See Cohen (1971).             |
| -20500              | 1.89 | 3.97 |      |                            |                       | M5              | b                                |                                                   |
| -20503              | 2.67 | 4.23 |      |                            |                       | M6              | b                                |                                                   |
| -20504              | 2.48 | 4.06 |      |                            |                       | M7              | b                                |                                                   |
| -20506              | 2.75 | 4.70 |      |                            |                       | M7              | b                                |                                                   |
| -20507              | 2.71 | 5.10 |      |                            |                       | M7              | f                                |                                                   |
| -20509              | 2.88 | 4.67 |      |                            |                       | M7              | mf                               |                                                   |
| -20512              | 2.85 | 4.22 |      |                            |                       | M5              | b                                |                                                   |
| -20513              | 1.98 | 3.86 |      |                            |                       | M5              | b                                |                                                   |
| -20514              | 2.04 | 4.75 |      |                            |                       | M9              | mf                               | LZ, CSVS 4350.                                    |

TABLE II. Classification of Southern IRC Sources (continued).

| IRC<br>Num-<br>bers | K     | I-K  | V    | IRC<br>Classi-<br>fication | Vari-<br>able<br>star | Present<br>work | Rela-<br>tive<br>bright-<br>ness | Comments                              |
|---------------------|-------|------|------|----------------------------|-----------------------|-----------------|----------------------------------|---------------------------------------|
| -20517              | 2.69  | 4.65 | 9.10 | A0                         |                       | M5              | mb                               |                                       |
| -20518              | 2.69  | 4.53 |      |                            | NR Sgr                | C               | b                                | S 2657.                               |
| -20521              | 2.27  | 4.88 |      |                            |                       | M6              | b                                |                                       |
| -20524              | 1.76  | 6.01 |      |                            |                       | M8              | f                                | LZ, V 2059 Sgr.                       |
| -20529              | 2.93  | 3.57 |      |                            |                       | M4              | b                                |                                       |
| -20535              | 2.61  | 4.50 |      |                            |                       | M6              | b                                |                                       |
| -20538              | 1.60  | 5.55 |      |                            | FQ Sgr                | M8              | vb                               |                                       |
| -20540              | 2.22  | 6.05 |      |                            |                       | M8:             | f                                |                                       |
| -20541              | 2.11  | 4.37 |      |                            |                       | M7              | vb                               |                                       |
| -20544              | 2.86  | 3.50 |      |                            |                       | M5              | b                                |                                       |
| -20545              | 2.91  | 5.06 |      |                            | V1111 Sgr             | M8              | b                                |                                       |
| -20547              | 2.80  | 4.91 |      |                            | RX Sgr                | M6              | b                                |                                       |
| -20548              | 1.43  | 3.49 |      |                            | T Sgr                 | S               | b                                |                                       |
| -20551              | 1.85  | 3.33 |      |                            |                       | M4              | b                                |                                       |
| -20552              | 2.85  | 3.76 |      |                            |                       | M6              | b                                |                                       |
| -20555              | 1.71  | 5.06 |      |                            | Z Sgr                 | M9              | mb                               |                                       |
| -20557              | 2.70  | 3.65 |      |                            |                       | M5              | b                                | LZ, V 2139 Sgr.                       |
| -20558              | 2.58  | 2.00 | 4.61 | A                          |                       | ≤M0             | vb                               |                                       |
| -20562              | 2.82  | 5.43 |      |                            |                       | M8              | b                                | LZ, AN Sgr.                           |
| -20563              | 0.87  | 5.13 |      |                            |                       | M8              | b                                |                                       |
| -20565              | 2.70  | 2.99 |      |                            |                       | M2              | b                                |                                       |
| -20567              | 2.11  | 4.06 |      |                            |                       | M5              | b                                |                                       |
| -20577              | 2.62  | 4.52 |      |                            |                       | M5              | b                                |                                       |
| -20578              | 2.12  | 4.63 |      |                            |                       | M7              | vb                               |                                       |
| -20579              | 2.35  | 4.29 |      |                            |                       | M7              | b                                |                                       |
| -20580              | 2.78  | 5.23 |      |                            |                       | M7              | b                                |                                       |
| -20581              | 2.89  | 4.33 |      |                            |                       | M6              | b                                |                                       |
| -20583              | 2.89  | 3.52 |      |                            | TU Cap                | M5              | vb                               |                                       |
| -20584              | 2.16  | 3.72 |      |                            |                       | M5              | b                                |                                       |
| -20585              | 0.55  | 3.84 |      |                            | RT Cap                | C               | vb                               | S 2882, N.                            |
| -20588              | 2.62  | 3.84 |      |                            |                       | M7              | b                                |                                       |
| -20590              | 2.84  | 4.73 |      |                            | RU Cap                | M9              | mf                               |                                       |
| -20616              | 2.96  | 2.92 |      |                            |                       | M6              | mb                               | 5'S.                                  |
| -20624              | 2.80  | 4.54 | 8.00 | M4e                        |                       | M4              | b                                |                                       |
| -20639              | 2.66  | 3.08 |      |                            |                       | M3:M4           | vb                               |                                       |
| -10004              | 2.41  | 3.64 |      |                            |                       | M5              | vb                               |                                       |
| -10008              | 2.77  | 4.05 |      |                            |                       | M6              | b                                |                                       |
| -10009              | 0.25  | 4.50 | 9.10 | Ma                         |                       | M7              | vb                               |                                       |
| -10042              | 2.36  | 4.75 |      |                            |                       | M6              | b                                |                                       |
| -10044              | 2.70  | 3.63 |      |                            | UW Eri                | M5              | b                                |                                       |
| -10049              | 2.13  | 3.52 |      |                            | VY Eri                | M6              | b                                |                                       |
| -10060              | 2.20  | 4.06 |      |                            | RV Eri                | M7              | b                                |                                       |
| -10065              | 2.79  | 3.62 |      |                            |                       | M6              | b                                |                                       |
| -10066              | 2.67  | 3.64 |      |                            | RW Eri                | M6              | b                                |                                       |
| -10072              | 2.09  | 3.78 |      |                            |                       | M7              | b                                |                                       |
| -10075              | 0.50  | 4.41 |      |                            | BX Eri                | M7              | vb                               | 0.5'E.                                |
| -10076              | 2.45  | 4.89 |      |                            | VZ Eri                | M7              | b                                |                                       |
| -10077              | 2.00  | 4.00 |      |                            |                       | M6              | b                                |                                       |
| -10079              | 2.90  | 5.21 |      |                            | UV Eri                | M7              | b                                |                                       |
| -10084              | -1.26 |      | 5.68 | gM6                        |                       | M7              | vb                               |                                       |
| -10087              | 2.97  | 3.89 |      |                            |                       | M5              | b                                | LZ, CSVS 6169.                        |
| -10090              | 2.64  | 3.54 |      |                            |                       | M6              | b                                |                                       |
| -10093              | 1.58  | 1.72 |      |                            |                       | ?               | t                                | Obscured by nebula. Trapezium region. |
| -10094              | 0.68  | 4.80 |      |                            | RW Lep                | M8              | b                                |                                       |
| -10095              | 2.70  | 5.72 |      |                            |                       | late C          | mb                               |                                       |
| -10096              | 2.86  | 5.14 |      |                            |                       | M7              | mb                               |                                       |
| -10100              | 2.66  | 5.72 |      |                            |                       | M6              | mb                               |                                       |
| -10104              | 2.39  | 3.95 |      |                            |                       | early C         | b                                |                                       |
| -10105              | 2.80  | 3.90 |      |                            |                       | M6              | b                                |                                       |
| -10107              | 2.78  | 2.56 | 7.17 | M0                         |                       | M1              | vb                               |                                       |
| -10109              | 2.80  | 9.99 |      |                            |                       | M8              | f                                | 1'N.                                  |
| -10116              | 2.74  | 5.37 |      |                            |                       | M8              | b                                |                                       |
| -10117              | 2.38  | 4.06 |      |                            |                       | M7              | b                                |                                       |
| -10123              | 2.54  | 4.36 |      |                            |                       | M6              | b                                |                                       |
| -10129              | 2.73  | 4.17 |      |                            |                       | M8              | mf                               |                                       |
| -10130              | 2.89  | 4.51 |      |                            |                       | M6              | b                                |                                       |
| -10131              | 0.02  | 4.06 |      |                            | GL Mon                | M4              | vb                               | 1'NW                                  |
| -10133              | 2.89  | 4.51 |      |                            |                       | late C          | mf                               | S 542, N.                             |
| -10138              | 1.25  | 4.19 |      |                            | DY CMa                | M7              | b                                |                                       |
| -10144              | 2.49  | 3.76 |      |                            | RV CMa                | M6              | b                                |                                       |
| -10147              | 2.51  | 5.43 |      |                            | HN Mon                | M8              | b                                |                                       |
| -10148              | 2.11  | 5.25 |      |                            |                       | M7              | b                                | Lockwood, M6.0-6.5.                   |
| -10149              | 1.09  | 3.88 |      |                            | RY Mon                | late C          | vb                               | S 670, N.                             |
| -10150              | 2.55  | 3.25 | 8.80 | M1                         |                       | M0              | b                                | 1'E.                                  |
| -10151              | 2.94  | 4.61 |      |                            |                       | M8              | f                                | Cluster 10'NE. (NGC 2343).            |
| -10153              | 3.16  | 4.86 |      |                            | AM Mon                | M9              | vf                               |                                       |
| -10156              | 2.96  | 4.03 |      |                            |                       | M1              | b                                | LZ, CSVS 6566.                        |

## CLASSIFICATION OF SOUTHERN IRC SOURCES

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TABLE II. Classification of Southern IRC Sources (continued).

| IRC    | K    | I-K  | V    | IRC<br>Classi-<br>fication | Vari-<br>able<br>star | Present<br>work | Rela-<br>tive<br>bright-<br>ness | Comments                                             |
|--------|------|------|------|----------------------------|-----------------------|-----------------|----------------------------------|------------------------------------------------------|
| -10162 | 1.90 | 4.20 |      |                            |                       | M7              | b                                | Near NGC 2368. See Cohen (1971); Lockwood, M7.5-7.8. |
| -10163 | 2.31 | 3.04 |      |                            | TT Mon                | M8              | vb                               | 2'W.                                                 |
| -10164 | 2.75 | 3.53 |      |                            | NR Mon                | M6              | vb                               |                                                      |
| -10165 | 2.86 | 3.25 |      |                            |                       | M5              | vb                               | 1'SW                                                 |
| -10167 | 2.59 | 3.65 |      |                            |                       | M6              | b                                | 1'SW, LZ, KO Mon, M6.                                |
| -10172 | 2.87 | 3.30 | 9.00 | B8                         |                       | M3              | vb                               |                                                      |
| -10173 | 2.55 | 3.90 |      |                            |                       | M6              | vb                               |                                                      |
| -10177 | 2.81 | 4.60 |      |                            |                       | late C          | b                                | LZ, GO Pup, N. S 897 N.                              |
| -10183 | 2.80 | 3.95 |      |                            |                       | M4              | b                                | 1'N.                                                 |
| -10184 | 1.91 | 5.18 |      |                            | U Pup                 | M8              | b                                |                                                      |
| -10185 | 2.17 | 4.22 |      |                            | DX Pup                | M6              | b                                |                                                      |
| -10186 | 2.96 | 4.95 |      |                            |                       | M7              | mf                               |                                                      |
| -10192 | 2.87 | 3.85 | 9.40 | GO                         |                       | M7              | mb                               | 1'E.                                                 |
| -10202 | 3.11 | 4.59 |      |                            |                       | M8              | mf                               |                                                      |
| -10211 | 2.70 | 3.98 |      |                            |                       | M5              | b                                |                                                      |
| -10224 | 2.70 | 3.41 |      |                            |                       | M4              | vb                               |                                                      |
| -10229 | 2.87 | 3.66 |      |                            |                       | M5              | b                                | LZ, CSVS 1546.                                       |
| -10236 | 2.61 | 5.18 |      |                            |                       | late C          | vf                               |                                                      |
| -10243 | 0.69 | 3.74 |      |                            | FF Hya                | M6              | vb                               |                                                      |
| -10245 | 2.13 | 4.33 |      |                            |                       | M7              | b                                |                                                      |
| -10246 | 2.77 | 3.84 |      |                            |                       | M9              | mb                               | LZ, CSVS 1653.                                       |
| -10260 | 3.12 | 3.94 |      |                            |                       | M4              | b                                | LZ, SV Vir, M4e.                                     |
| -10278 | 2.71 | 3.71 |      |                            |                       | M5              | b                                |                                                      |
| -10281 | 2.68 | 4.83 |      |                            |                       | M7              | mb                               |                                                      |
| -10296 | 2.14 | 4.31 |      |                            |                       | M6              | b                                |                                                      |
| -10316 | 2.83 | 3.79 |      |                            |                       | M5              | b                                |                                                      |
| -10318 | 2.29 | 3.95 |      |                            |                       | M6              | b                                |                                                      |
| -10324 | 2.98 | 4.16 |      |                            |                       | M7              | b                                |                                                      |
| -10325 | 2.81 | 3.09 | 7.80 | K5                         |                       | M3              | b                                |                                                      |
| -10326 | 2.07 | 4.96 |      |                            |                       | M7              | b                                |                                                      |
| -10327 | 2.66 | 4.06 |      |                            | SW Lib                | M7              | mf                               |                                                      |
| -10329 | 2.68 | 5.67 |      |                            |                       | late M          | vf                               | LZ, FS Lib; Lockwood, M8.1-9.0.                      |
| -10337 | 2.65 | 5.43 |      |                            | W Oph                 | M8              | mb                               |                                                      |
| -10347 | 0.74 | 5.87 |      |                            | V446 Oph              | M8              | mt                               |                                                      |
| -10348 | 1.53 | 5.20 |      |                            |                       | M8              | mb                               |                                                      |
| -10350 | 2.84 | 5.53 |      |                            |                       | M9              | f                                |                                                      |
| -10352 | 1.94 | 4.86 |      |                            |                       | M6              | mb                               |                                                      |
| -10353 | 2.75 | 5.24 |      |                            |                       | M8              | mb                               | LZ. V1055 Oph, gMe.                                  |
| -10354 | 2.71 | 4.53 |      |                            |                       | M6              | mb                               |                                                      |
| -10355 | 2.91 | 5.53 |      |                            |                       | late M          | t                                |                                                      |
| -10356 | 2.66 | 4.30 |      |                            | V850 Oph              | M8              | mb                               |                                                      |
| -10357 | 2.72 | 3.92 |      |                            |                       | M4              | b                                |                                                      |
| -10358 | 2.71 | 3.70 |      |                            |                       | M5              | b                                |                                                      |
| -10359 | 0.33 | 4.87 |      |                            |                       | M7              | b                                |                                                      |
| -10360 | 2.63 | 4.86 |      |                            |                       | M5              | b                                |                                                      |
| -10361 | 2.75 | 4.95 |      |                            | V505 Oph              | M7              | mb                               |                                                      |
| -10362 | 3.22 | 4.80 |      |                            | RV Ser                | M8              | f                                |                                                      |
| -10363 | 3.00 | 4.18 |      |                            |                       | M5              | b                                |                                                      |
| -10364 | 2.83 | 4.55 |      |                            |                       | M6              | mb                               |                                                      |
| -10365 | 2.10 | 4.69 |      |                            |                       | S               | b                                | LZ, CSVS 3125, S.                                    |
| -10366 | 1.85 | 4.47 |      |                            | AB Ser                | M7              | b                                |                                                      |
| -10367 | 2.59 | 4.10 |      |                            |                       | M2              | b                                |                                                      |
| -10368 | 2.73 | 4.67 |      |                            | AK Oph                | M6              | b                                |                                                      |
| -10369 | 0.24 | 5.16 |      |                            |                       | M6:             | vb                               |                                                      |
| -10370 | 2.10 | 4.10 |      |                            |                       | M1              | vb                               |                                                      |
| -10372 | 1.94 | 4.41 |      |                            |                       | M7              | b                                | LZ, CSVS 3285.                                       |
| -10375 | 2.23 | 5.72 |      |                            |                       | M7              | mb                               |                                                      |
| -10376 | 2.82 | 4.63 | 8.80 | Bp                         |                       | M1              | b                                |                                                      |
| -10377 | 2.93 | 3.91 |      |                            |                       | M5              | b                                |                                                      |
| -10380 | 2.23 | 4.25 |      |                            |                       | M5              | b                                |                                                      |
| -10381 | 2.29 | 6.88 |      |                            |                       | M9              | mf                               |                                                      |
| -10382 | 2.73 | 2.21 | 6.10 | F8 II                      |                       | ≤M0             | vb                               |                                                      |
| -10383 | 2.70 | 5.20 |      |                            |                       | M7              | f                                |                                                      |
| -10384 | 2.53 | 5.41 |      |                            |                       | M7              | mf                               |                                                      |
| -10385 | 2.55 | 4.96 |      |                            |                       | M8              | mf                               |                                                      |
| -10386 | 2.64 | 4.90 |      |                            |                       | M6              | b                                |                                                      |
| -10390 | 2.66 | 4.23 |      |                            |                       | M5              | b                                |                                                      |
| -10392 | 2.81 | 4.55 |      |                            |                       | M6              | mb                               |                                                      |
| -10393 | 2.42 | 3.90 |      |                            |                       | M2              | b                                | Reddened.                                            |
| -10394 | 1.87 | 4.70 |      |                            |                       | M7              | b                                |                                                      |
| -10395 | 2.07 | 6.78 |      |                            |                       | M8              | b                                | Lockwood, M8.1-8.8.                                  |
| -10396 | 2.44 | 7.50 |      |                            |                       | late M          | t                                |                                                      |
| -10397 | 2.98 | 4.75 |      |                            |                       | C               | mb                               | S 2530.                                              |
| -10400 | 2.94 | 5.90 |      |                            |                       | M8              | f                                |                                                      |
| -10401 | 2.19 | 5.87 |      |                            |                       | ≥M8:            | vf                               |                                                      |
| -10402 | 1.84 | 5.43 |      |                            |                       | M6              | b                                |                                                      |
| -10403 | 2.80 | 4.49 |      |                            |                       | M5              | b                                |                                                      |
| -10404 | 2.96 | 5.17 |      |                            |                       | M5              | mb                               |                                                      |
| -10405 | 2.32 | 4.23 |      |                            |                       | ≥M8:            | f                                | Early M nearby.                                      |

TABLE II. Classification of Southern IRC Sources (continued).

| IRC<br>Num-<br>bers | K    | I-K  | V    | IRC<br>Classi-<br>fications | Vari-<br>able<br>star | Present<br>work | Rela-<br>tive<br>bright-<br>ness | Comments                                        |
|---------------------|------|------|------|-----------------------------|-----------------------|-----------------|----------------------------------|-------------------------------------------------|
| -10406              | 2.52 | 5.26 |      |                             |                       | M5              | mf                               |                                                 |
| -10407              | 2.83 | 5.78 |      |                             |                       | M5              | mf                               |                                                 |
| -10409              | 1.70 | 4.49 | 8.80 | B8                          |                       | M5              | mf                               | 3'W, S 2563, N.                                 |
| -10410              | 1.61 | 4.81 |      |                             |                       | M3              | mb                               |                                                 |
| -10411              | 1.99 | 6.22 |      |                             |                       | ?               | mf                               | Peculiar; emission near 8600 Å.                 |
| -10412              | 2.44 | 5.88 |      |                             |                       | ?               | nt                               | ?                                               |
| -10413              | 2.91 | 5.72 |      |                             |                       | M8              | f                                |                                                 |
| -10414              | 0.78 | 5.19 |      |                             |                       | M8              | f                                |                                                 |
| -10415              | 2.15 | 5.07 |      |                             | FR Sct                | M3:C?           | mb                               |                                                 |
| -10416              | 2.63 | 5.19 |      |                             |                       | M5              | mb                               |                                                 |
| -10417              | 2.43 | 1.57 |      |                             |                       | ≤M0             | b                                |                                                 |
| -10418              | 2.96 | 2.78 |      |                             |                       | ≥M8:            | f                                |                                                 |
| -10419              | 2.58 | 4.83 |      |                             |                       | M2              | b                                |                                                 |
| -10420              | 2.36 | 4.61 |      |                             |                       | M5              | mb                               |                                                 |
| -10421              | 2.70 | 5.25 |      |                             |                       | M5              | mb                               |                                                 |
| -10422              | 0.96 | 4.54 |      |                             | UY Cet                | early M         | mf                               | Reddened                                        |
| -10423              | 2.84 | 5.47 |      |                             |                       | M6:             | f                                |                                                 |
| -10424              | 2.10 | 4.55 |      |                             |                       | M4              | b                                |                                                 |
| -10425              | 2.04 | 5.13 |      |                             |                       | M5              | mb                               |                                                 |
| -10426              | 2.73 | 6.21 |      |                             |                       | ?               | nt                               | ?                                               |
| -10427              | 2.64 | 5.41 |      |                             |                       | M7:             | f                                |                                                 |
| -10428              | 2.37 | 5.49 |      |                             |                       | M7              | mf                               |                                                 |
| -10429              | 2.84 | 5.09 |      |                             |                       | M6:             | f                                |                                                 |
| -10430              | 2.03 | 4.71 |      |                             |                       | M4              | b                                |                                                 |
| -10431              | 2.24 | 4.99 |      |                             | BP Sct                | early M         | f                                | Reddened.                                       |
| -10432              | 2.29 | 4.36 |      |                             | VW Sct                | M7              | f                                |                                                 |
| -10433              | 1.02 | 2.67 | 5.88 | gK5                         |                       | early C         | b                                |                                                 |
| -10434              | 2.47 | 6.36 |      |                             |                       | M7:             | t                                |                                                 |
| -10437              | 2.82 | 4.71 |      |                             |                       | M0:             | b                                | Peculiar; emission near 8600 Å.                 |
| -10440              | 2.73 | 4.29 |      |                             |                       | M2              | b                                |                                                 |
| -10441              | 1.74 | 4.48 |      |                             | RX Sct                | C               | b                                | S 2620, N.                                      |
| -10442              | 2.57 | 4.09 | 8.20 | K0                          |                       | ≤M0             | b                                | 3'N.                                            |
| -10443              | 1.79 | 4.82 |      |                             |                       | M6              | mf                               |                                                 |
| -10444              | 2.52 | 5.22 |      |                             |                       | M7              | b                                |                                                 |
| -10445              | 2.71 | 4.23 |      |                             |                       | M2              | mb                               |                                                 |
| -10447              | 2.80 | 5.98 |      |                             |                       | ?               | t                                |                                                 |
| -10448              | 3.00 | 6.58 |      |                             |                       | M0              | mb                               | Peculiar; emission near 8600 Å.                 |
| -10450              | 2.94 | 6.39 |      |                             |                       | M:              | f                                | 4 faint M stars within 1.5'.                    |
| -10451              | 2.86 | 3.21 | 8.50 | K0                          |                       | ≤M0             | b                                |                                                 |
| -10452              | 2.90 | 3.90 |      |                             |                       | M6              | mf                               |                                                 |
| -10453              | 2.83 | 5.37 |      |                             |                       | M:              | vf                               |                                                 |
| -10454              | 2.02 | 5.24 |      |                             |                       | M2              | mb                               |                                                 |
| -10459              | 2.73 | 4.35 |      |                             | AA Sct                | M4              | mf                               |                                                 |
| -10460              | 2.56 | 4.17 |      |                             | CE Sct                | early M         | t                                | 1'S, reddened.                                  |
| -10461              | 2.05 | 2.36 | 4.70 | GO II                       |                       | ≤M0             | b                                |                                                 |
| -10463              | 2.07 | 4.80 |      |                             |                       | M6              | b                                |                                                 |
| -10464              | 2.88 | 4.89 |      |                             |                       | M8              | mb                               | LZ, CSVS 7956, M5.                              |
| -10466              | 2.79 | 5.62 |      |                             |                       | ?               | t                                | LZ, GZ Sct, M6.5:                               |
| -10469              | 2.87 | 4.78 |      |                             | AI Sct                | late C          | b                                | S 2669, C8, 2e.                                 |
| -10470              | 2.99 | 5.04 |      |                             |                       | M6              | mb                               |                                                 |
| -10471              | 1.47 | 3.94 | 9.00 | Ma                          |                       | M5              | b                                |                                                 |
| -10472              | 3.13 | 4.79 |      |                             |                       | M7              | mf                               |                                                 |
| -10473              | 2.98 | 3.77 |      |                             |                       | M0:             | b                                | 1', peculiar; emission near 8600 Å.             |
| -10474              | 2.97 | 3.79 |      |                             | UV Sct                | M3              | b                                |                                                 |
| -10475              | 2.78 | 4.37 |      |                             | T Sct                 | late C          | b                                | S 2678, N3.                                     |
| -10476              | 2.86 | 4.34 |      |                             |                       | M6              | b                                |                                                 |
| -10478              | 2.89 | 4.07 |      |                             |                       | M6              | b                                |                                                 |
| -10481              | 2.86 | 5.26 |      |                             | FQ Sct                | M7              | b                                |                                                 |
| -10482              | 1.02 | 4.47 |      |                             | ST Sgr                | ?               | nt                               | ?                                               |
| -10484              | 2.95 | 5.10 |      |                             |                       | M7              | mb                               |                                                 |
| -10487              | 2.28 | 4.14 | 8.50 | B8                          |                       | M7              | b                                |                                                 |
| -10488              | 2.72 | 4.82 |      |                             | AE Sgr                | M9              | mf                               |                                                 |
| -10489              | 2.94 | 5.40 |      |                             | AH Sgr                | M7              | b                                |                                                 |
| -10490              | 2.92 | 3.72 |      |                             |                       | M5              | b                                | See Cohen (1971); Lockwood, M5.0-5.5.           |
| -10491              | 2.98 | 3.83 |      |                             |                       | M5              | b                                |                                                 |
| -10492              | 2.79 | 4.75 |      |                             |                       | M7              | mb                               |                                                 |
| -10495              | 2.18 | 4.69 |      |                             |                       | M7              | b                                |                                                 |
| -10496              | 2.73 | 4.42 |      |                             |                       | M6              | b                                |                                                 |
| -10499              | 2.89 | 4.05 |      |                             |                       | M5              | b                                |                                                 |
| -10502              | 1.99 | 6.09 |      |                             |                       | ≤M0             | f                                | Group of 3 faint stars. Trace of very red star. |
| -10504              | 2.51 | 4.79 |      |                             |                       | M8              | b                                |                                                 |
| -10508              | 2.77 | 4.18 |      |                             |                       | M7              | mb                               |                                                 |
| -10509              | 2.83 | 3.74 |      |                             |                       | M5              | mb                               |                                                 |
| -10510              | 2.80 | 4.65 |      |                             |                       | M6              | mb                               |                                                 |
| -10514              | 2.96 | 3.86 |      |                             |                       | M5              | b                                |                                                 |
| -10515              | 2.72 | 4.14 |      |                             | DN Aql                | M6              | mb                               |                                                 |
| -10517              | 2.94 | 4.66 |      |                             |                       | M6              | b                                |                                                 |
| -10524              | 0.07 | 4.57 |      |                             | GY Aql                | M8              | mb                               |                                                 |

## CLASSIFICATION OF SOUTHERN IRC SOURCES

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TABLE II. Classification of Southern IRC Sources (continued).

| IRC Num-<br>bers | K     | I-K  | V    | IRC Classi-<br>fication | Vari-<br>able<br>star | Present<br>work | Rela-<br>tive<br>bright-<br>ness | Comments                                                                     |
|------------------|-------|------|------|-------------------------|-----------------------|-----------------|----------------------------------|------------------------------------------------------------------------------|
| -10527           | 2.01  | 5.36 |      |                         | RS Aql                | M8              | mf                               |                                                                              |
| -10529           | 2.65  | 6.77 |      |                         |                       | M:              | f                                |                                                                              |
| -10532           | 2.52  | 4.41 |      |                         | V499 Aql              | M6              | b                                |                                                                              |
| -10533           | 2.88  | 4.33 |      |                         | EQ Aql                | M6              | b                                |                                                                              |
| -10541           | 1.53  | 4.77 |      |                         |                       | M6              | b                                |                                                                              |
| -10543           | 2.46  | 3.99 |      |                         |                       | M6              | b                                |                                                                              |
| -10545           | 2.35  | 4.62 |      |                         |                       | M7              | b                                |                                                                              |
| -10546           | 1.82  | 4.31 |      |                         | Y Aqr                 | M9              | b                                |                                                                              |
| -10550           | 1.90  | 4.18 |      |                         | BX Aqr                | M7              | b                                |                                                                              |
| -10556           | 2.61  | 3.74 |      |                         | BK Aqr                | M5              | b                                |                                                                              |
| -10563           | 3.00  | 4.22 |      |                         | RZ Aqr                | M9              | f                                | 0.6'NW.                                                                      |
| -10598           | 1.04  | 4.56 |      |                         | SV Aqr                | M8              | b                                |                                                                              |
| -10608           | 0.30  |      | 4.70 | M3 IV                   |                       | M2              | vb                               |                                                                              |
| 00001            | 2.73  | 3.53 |      |                         |                       | M6              | vb                               |                                                                              |
| 00020            | 2.75  | 3.01 | 8.20 | K0                      |                       | M3              | b                                |                                                                              |
| 00022            | 2.31  | 3.97 |      |                         | SW Cet                | M5              | b                                |                                                                              |
| 00028            | 1.88  | 4.80 |      |                         |                       | M7              | b                                | Lockwood, M7.9.                                                              |
| 00030            |       |      | 8.71 | gM6                     |                       | M7              | vb                               |                                                                              |
| 00032            | 3.04  | 4.54 | 7.00 | M4e                     |                       | M9              | mb                               |                                                                              |
| 00038            | -1.70 |      | 2.52 | M2 III                  |                       | M:              | vb                               |                                                                              |
| 00043            | 2.02  | 3.86 | 8.90 | F5                      |                       | M6              | b                                | Dearborn 534, M6.                                                            |
| 00045            | 2.44  | 4.21 |      |                         |                       | M7              | b                                | 1'E.                                                                         |
| 00046            | 1.76  | 4.05 |      |                         |                       | M6              | b                                |                                                                              |
| 00049            | 2.46  | 5.19 |      |                         |                       | M7              | mb                               | Vogt, M8; Lockwood, M7-7.5.                                                  |
| 00052            | 1.93  | 4.48 |      |                         |                       | M8              | b                                |                                                                              |
| 00058            | 2.98  | 3.45 |      |                         |                       | M5              | b                                |                                                                              |
| 00062            | 1.98  | 4.42 |      |                         | BD Eri                | M9              | mb                               |                                                                              |
| 00063            | 2.93  | 4.36 |      |                         |                       | M8              | mb                               |                                                                              |
| 00067            | 1.55  | 3.54 |      |                         | V430 Ori              | M6              | b                                |                                                                              |
| 00071            | 2.27  | 3.83 |      |                         |                       | M4              | b                                | LZ, V 535 Ori, (M4).                                                         |
| 00080            | 1.55  | 5.68 |      |                         | X Ori                 | M9              | mb                               |                                                                              |
| 00082            | 2.48  | 4.80 |      |                         | Y Ori                 | M5              | b                                |                                                                              |
| 00085            | 2.10  | 4.35 | 9.00 | F5                      |                       | M4              |                                  | Vogt, M8.                                                                    |
| 00086            | 2.57  | 4.03 |      |                         |                       | M6              | b                                | Vogt, M8.                                                                    |
| 00087            | 2.75  | 5.88 |      |                         |                       | M5              | b                                | Vogt, M7; Lockwood, M5.0-5.5.                                                |
| 00092            | 2.08  | 4.20 |      |                         |                       | M3              | b                                |                                                                              |
| 00097            | 2.80  | 3.92 |      |                         |                       | M5              | b                                |                                                                              |
| 00099            | 1.96  | 4.90 |      |                         |                       | M8              | b                                | Vogt, M8.                                                                    |
| 00102            | 3.51  | 6.59 |      |                         |                       | ?               | nt                               | ?, Vogt, M10.                                                                |
| 00103            | 1.58  | 4.08 |      |                         | FU Mon                | early C         | b                                |                                                                              |
| 00105            | 2.45  | 4.12 |      |                         |                       | M7              | b                                | Vogt, M7.                                                                    |
| 00106            | 2.09  | 5.04 |      |                         |                       | M7              | b                                | Vogt, M7.                                                                    |
| 00107            | 2.89  | 3.47 |      |                         |                       | M3              | b                                |                                                                              |
| 00109            | 2.97  | 3.17 |      |                         |                       | M4              | b                                |                                                                              |
| 00110            | 2.99  | 3.79 |      |                         |                       | M6              | b                                | LZ, CQ Mon, M6.                                                              |
| 00114            | 2.94  | 4.38 |      |                         |                       | M6              | mb                               | Vogt, M8. LZ, V485 Mon                                                       |
| 00116            | 2.60  | 3.45 |      |                         |                       | M4              | b                                | LZ, V492, Mon, (M4).                                                         |
| 00118            | 2.71  | 4.12 |      |                         | CX Mon                | ≤M0             | mb                               |                                                                              |
| 00119            | 1.51  | 5.08 |      |                         | SY Mon                | M9              | b                                |                                                                              |
| 00121            | 1.88  | 4.04 |      |                         |                       | M6              | b                                | LZ, CY Mon, M5?                                                              |
| 00122            | 2.64  | 4.27 |      |                         |                       | M7              | b                                |                                                                              |
| 00123            | 2.91  | 4.12 |      |                         | V372 Mon              | early C         | mb                               |                                                                              |
| 00125            | 2.76  | 4.07 |      |                         | CZ Mon                | late C          | b                                | 1'E, S 573, N5.                                                              |
| 00127            | 2.97  | 4.46 | 8.80 | A2                      |                       | late C          | mb                               | 2'W, Dearborn 1767, N. LZ, DF Mon, N.S584, N. See Schultz and Wiemer (1972). |
| 00129            | 2.79  | 4.06 |      |                         |                       | M6              | mb                               |                                                                              |
| 00130            | 2.58  | 3.68 |      |                         |                       | M3              | b                                | LZ, DI Mon, M6.                                                              |
| 00131            | 2.81  | 4.55 |      |                         |                       | C               | f                                | S 589.                                                                       |
| 00132            | 2.40  | 3.90 |      |                         |                       | M2              | b                                | LZ, V517 Mon, M2.                                                            |
| 00135            | 2.75  | 4.23 |      |                         | EG Mon                | M7              | mf                               |                                                                              |
| 00137            | 1.96  | 3.76 |      |                         | QR Mon                | M7              | b                                |                                                                              |
| 00138            | 2.89  | 3.31 |      |                         |                       | M5              | b                                | 2'S                                                                          |
| 00140            | 1.91  | 4.59 |      |                         | AZ Mon                | M9              | mb                               |                                                                              |
| 00144            | 2.54  | 4.50 |      |                         | MV Mon                | M7              | b                                |                                                                              |
| 00148            | 2.82  | 4.47 |      |                         | XX Cmi                | M7              | b                                |                                                                              |
| 00153            | 2.36  | 3.65 |      |                         | RR Mon                | M10             | mb                               | Class defined by Nassau and Velghe (1964).                                   |
| 00156            | 2.95  | 4.33 |      |                         | RX Mon                | M9              | mf                               |                                                                              |
| 00158            | 2.83  | 3.93 |      |                         |                       | late C          | b                                | LZ, CSVS 1089, (R). S 815, C5,5 (K-M).                                       |
| 00161            | 1.82  | 3.94 |      |                         |                       | M6              | vb                               | Vogt, M8.                                                                    |
| 00162            | 2.80  | 5.15 |      |                         |                       | S+C?            | mb                               | Vogt, C. S 918, C. Also M3, mb, 2'W, La0 7900 Strong.                        |
| 00172            | 2.14  | 4.53 |      |                         | RY Hya                | C               | vb                               | S 1123, Ne: C 5,4.                                                           |
| 00177            | 2.13  | 4.33 |      |                         |                       | M6              | b                                |                                                                              |
| 00179            | 0.21  | 4.37 | 9.00 | M5                      |                       | M7              | vb                               |                                                                              |
| 00180            | 1.42  | 4.24 |      |                         |                       | M6              | vb                               |                                                                              |
| 00182            | 2.92  | 3.69 |      |                         |                       | M6              | vb                               | LZ, HT Hya, M3.                                                              |
| 00184            | 2.72  | 4.00 |      |                         |                       | M6              | b                                |                                                                              |

TABLE II. Classification of Southern IRC Sources (continued).

| IRC<br>Num-<br>bers | K    | I-K  | V    | IRC<br>Classi-<br>fication | Vari-<br>able<br>star | Present<br>work | Rela-<br>tive<br>bright-<br>ness | Comments                                  |
|---------------------|------|------|------|----------------------------|-----------------------|-----------------|----------------------------------|-------------------------------------------|
| 00216               | 2.72 | 4.05 |      |                            |                       | M6              | b                                | Vogt, M8.                                 |
| 00217               | 0.73 | 3.57 |      |                            | SS Vir                | C               | b                                | S 1999, Ne: C6,3(K-M).                    |
| 00224               | 2.38 | 5.24 |      |                            | RU Vir                | C               | b                                | S 2032, R3e:N.                            |
| 00233               | 1.95 | 3.85 |      |                            |                       | M6              | b                                |                                           |
| 00243               | 1.48 | 4.96 |      |                            | RS Vir                | M8              | b                                |                                           |
| 00246               | 2.24 | 3.78 |      |                            | CR Vir                | M5              | b                                |                                           |
| 00250               | 2.81 | 3.39 |      |                            |                       | M5              | b                                |                                           |
| 00255               | 2.86 | 3.66 |      |                            |                       | M6              | b                                |                                           |
| 00260               | 1.98 | 3.88 |      |                            |                       | M6              | b                                |                                           |
| 00266               | 3.34 | 5.45 |      |                            |                       | late M          | f                                |                                           |
| 00267               | 2.88 | 4.11 |      |                            |                       | M7              | mb                               |                                           |
| 00268               | 1.75 | 4.36 |      |                            | WW Ser                | M8              | b                                |                                           |
| 00269               | 0.36 | 5.33 |      |                            | BG Ser                | M7              | b                                |                                           |
| 00270               | 2.69 | 2.73 |      |                            |                       | M7              | b                                |                                           |
| 00271               | 2.70 | 3.32 |      |                            |                       | M5              | b                                |                                           |
| 00274               | 2.22 | 4.15 |      |                            |                       | M6              | mb                               | Vogt, M8                                  |
| 00277               | 1.47 | 4.06 |      |                            |                       | M6              | b                                | Vogt, M8. LZ, DX Ser, M.                  |
| 00281               | 2.23 | 4.83 |      |                            |                       | M7              | mb                               | Lockwood, M7.8-7.9.                       |
| 00284               | 2.99 | 4.13 |      |                            | V707 Oph              | M7              | mf                               |                                           |
| 00288               | 2.74 | 4.11 | 8.80 | GO                         |                       | M6              | b                                | Dearborn, 4081, M4.                       |
| 00289               | 2.98 | 3.96 |      |                            |                       | M6              | b                                |                                           |
| 00290               | 2.95 | 3.94 |      |                            |                       | M5              | b                                | Vogt, M8. LZ, CSVS 2794.                  |
| 00292               | 2.32 | 4.59 |      |                            |                       | M7              | b                                |                                           |
| 00293               | 2.88 | 4.66 |      |                            | SS Oph                | M5              | mb                               | Lockwood, M8-8.1.                         |
| 00296               | 2.69 | 4.96 |      |                            |                       | M7              | mf                               | Lockwood, M7.9-8.8                        |
| 00297               | 2.57 | 4.72 |      |                            |                       | M9              | mf                               | Vogt, M5.                                 |
| 00298               | 2.52 | 4.75 |      |                            | UY Oph                | M8              | mf                               |                                           |
| 00303               | 2.75 | 5.84 |      |                            | AH Oph                | M7              | mb                               |                                           |
| 00307               | 1.74 | 4.57 | 8.90 | KO                         |                       | M7              | vb                               | Dearborn 4308, M0.                        |
| 00308               | 2.92 | 5.85 |      |                            |                       | M8              | b                                | Vogt, M8.                                 |
| 00309               | 2.85 | 3.89 |      |                            |                       | M6              | b                                |                                           |
| 00310               | 2.26 | 4.02 |      |                            |                       | M6              | b                                |                                           |
| 00311               | 2.35 | 4.12 |      |                            | SU Oph                | M6              | b                                |                                           |
| 00316               | 2.16 | 4.46 |      |                            |                       | M6              | b                                |                                           |
| 00318               | 2.36 | 5.54 |      |                            |                       | M7              | mf                               | Vogt, M8. LZ, V 935 Oph.                  |
| 00321               | 2.90 | 3.72 |      |                            | V561 Oph              | M5              | b                                |                                           |
| 00324               | 2.06 | 4.40 |      |                            |                       | M6              | mb                               |                                           |
| 00328               | 2.99 | 3.90 |      |                            |                       | M7              | mb                               | Vogt, M6.                                 |
| 00334               | 2.95 | 4.56 |      |                            |                       | M6              | mb                               | LZ, V 482, Oph, S.                        |
| 00336               | 2.33 | 3.82 |      |                            | V574 Oph              | M5              | b                                |                                           |
| 00337               | 2.19 | 5.57 |      |                            |                       | M8              | mf                               |                                           |
| 00348               | 2.77 | 6.31 |      |                            |                       | late M          | t                                | 1'W.                                      |
| 00349               | 2.35 | 5.90 |      |                            |                       | M8              | mb                               | Vogt, M9. LZ, CSVS 4075.                  |
| 00351               | 2.25 | 6.01 |      |                            |                       | C               | mb                               | S 2586.                                   |
| 00353               | 1.80 | 4.67 |      |                            | TY Oph                | C               | b                                | S 2602, N.                                |
| 00355               | 2.62 | 5.12 |      |                            |                       | M4              | f                                |                                           |
| 00356               | 2.79 | 5.27 |      |                            | AG Ser                | M6              | mb                               |                                           |
| 00357               | 1.95 | 5.91 |      |                            |                       | M6              | f                                | Vogt, M6.                                 |
| 00358               | 2.72 | 5.41 |      |                            |                       | M7:             | vf                               | Vogt, M8.                                 |
| 00359               | 1.04 | 4.69 |      |                            | CZ Ser                | M6              | b                                |                                           |
| 00360               | 2.66 | 3.33 | 7.18 | KO                         |                       | early M:        | f                                | Dearborn 4969, M1. Reddened.              |
| 00361               | 2.82 | 4.92 |      |                            |                       | M8              | mf                               | Vogt, M8.                                 |
| 00362               | 2.41 | 5.84 |      |                            |                       | M7              | mb                               | Vogt, M8.                                 |
| 00363               | 2.06 | 4.94 |      |                            |                       | ≤M0:            | mf                               | Reddened.                                 |
| 00364               | 2.16 | 6.41 |      |                            |                       | M8:             | t                                | Vogt, M4; Lockwood, M5.5-8.2.             |
| 00365               | 2.67 | 5.31 |      |                            |                       | ?               | nt                               | ?, S 2642.                                |
| 00366               | 2.84 | 4.81 |      |                            | DE Ser                | M8              | f                                |                                           |
| 00367               | 2.83 | 4.22 |      |                            |                       | early M         | mb                               | Reddened.                                 |
| 00369               | 2.82 | 4.97 |      |                            |                       | M2:             | mb                               | Reddened.                                 |
| 00370               | 2.16 | 5.25 |      |                            |                       | M6              | f                                | 1'W, Vogt, M7.                            |
| 00371               | 2.84 | 3.71 |      |                            |                       | M2:             | mb                               | Vogt, M3. Reddened.                       |
| 00373               | 2.95 | 5.13 |      |                            | BY Ser                | M6              | mb                               |                                           |
| 00374               | 2.98 | 4.67 |      |                            |                       | ≤M0             | mb                               | Vogt, ≤M2. Reddened.                      |
| 00375               | 2.70 | 5.12 |      |                            |                       | M7              | f                                |                                           |
| 00377               | 2.48 | 4.15 |      |                            | AB Aql                | M5              | mb                               |                                           |
| 00379               | 2.84 | 6.64 |      |                            |                       | ?               | nt                               | ?, Vogt, C; Lockwood, M5.5-7.8.           |
| 00381               | 1.82 | 5.21 |      |                            |                       | M6              | b                                |                                           |
| 00382               | 2.90 | 6.62 |      |                            |                       | M7              | f                                | Vogt, M8.                                 |
| 00383               | 2.88 | 4.24 |      |                            |                       | M5              | mf                               |                                           |
| 00384               | 2.83 | 4.66 |      |                            |                       | M3              | mb                               | Vogt, ≥M6. Possible cluster member.       |
| 00386               | 2.06 | 5.77 |      |                            |                       | M8:             | vf                               | Vogt, M8.                                 |
| 00387               | 3.43 | 6.29 | 9.10 | K2                         |                       | ?               | nt                               | ?, Vogt, M9.                              |
| 00388               | 2.98 | 5.81 |      |                            |                       | Pec.            | f                                | Vogt, M9. Peculiar; emission near 8600 Å. |
| 00389               | 2.26 | 5.53 |      |                            |                       | ?               | nt                               | ?                                         |
| 00390               | 2.99 | 4.86 |      |                            |                       | M5              | b                                |                                           |
| 00391               | 2.73 | 6.03 |      |                            |                       | M7              | f                                | Vogt, M9; Lockwood, M7.0-7.8.             |
| 00392               | 2.82 | 7.79 |      |                            |                       | Pec.            | f                                | Vogt, M5. Peculiar; emission near 8600 Å. |

## CLASSIFICATION OF SOUTHERN IRC SOURCES

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TABLE II. Classification of Southern IRC Sources (continued).

| IRC<br>Num-<br>bers | K    | I-K  | V    | IRC<br>Classi-<br>fication | Vari-<br>able<br>star | Present<br>work | Rela-<br>tive<br>bright-<br>ness | Comments                                                                   |
|---------------------|------|------|------|----------------------------|-----------------------|-----------------|----------------------------------|----------------------------------------------------------------------------|
| 00395               | 2.83 | 4.76 |      |                            |                       | M6              | mb                               | Vogt, $\geq$ M7.                                                           |
| 00396               | 2.72 | 5.81 |      |                            |                       | Pec. or M       | f                                | Peculiar star with emission near 8600 Å at 1.5'NE.<br>Also faint M at 1'S. |
| 00398               | 2.01 | 3.95 |      |                            | UW Aq1                | M2              | vb                               |                                                                            |
| 00400               | 2.86 | 5.32 |      |                            |                       | M5              | mb                               | Vogt, M7.                                                                  |
| 00402               | 1.65 | 5.42 |      |                            |                       | C               | mb                               |                                                                            |
| 00403               | 2.73 | 5.50 |      |                            | V802 Aq1              | M6              | f                                |                                                                            |
| 00404               | 2.78 | 5.01 |      |                            |                       | early C         | mf                               | LZ, VX Aq1, C. S 2687, C 9,1.                                              |
| 00406               | 2.48 | 4.15 |      |                            |                       | M6              | mb                               |                                                                            |
| 00407               | 2.54 | 5.82 |      |                            |                       | M7              | f                                | Vogt, M8.                                                                  |
| 00408               | 2.91 | 5.78 |      |                            |                       | M8              | f                                | Vogt, M8.                                                                  |
| 00413               | 2.71 | 5.83 |      |                            |                       | M7:             | mb                               | Vogt, M9. Two M7 stars 1.5'NW and 1.5'SE.                                  |
| 00414               | 2.99 | 3.88 |      |                            |                       | M7              | f                                | Vogt, M9.                                                                  |
| 00419               | 2.62 | 4.46 |      |                            |                       | M6              | b                                |                                                                            |
| 00420               | 2.69 | 3.90 |      |                            |                       | M5              | b                                |                                                                            |
| 00422               | 2.75 | 5.47 | 9.00 | KO                         |                       | M8              | f                                |                                                                            |
| 00423               | 2.71 | 4.37 |      |                            | ER Aq1                | S               | mf                               |                                                                            |
| 00424               | 2.99 | 3.86 |      |                            | CY Aq1                | M8              | mb                               |                                                                            |
| 00426               | 2.13 | 4.54 |      |                            |                       | M6              | b                                |                                                                            |
| 00427               | 3.35 | 5.50 |      |                            |                       | ?               | t                                | Vogt, M9. Trace of red star.                                               |
| 00428               | 2.34 | 4.75 |      |                            |                       | M7              | mb                               |                                                                            |
| 00430               | 3.12 | 4.59 | 8.30 | A2                         |                       | M8              | f                                |                                                                            |
| 00432               | 2.94 | 4.37 |      |                            |                       | M7              | mb                               |                                                                            |
| 00433               | 2.36 | 5.87 |      |                            | TU Aq1                | M9              | mf                               |                                                                            |
| 00434               | 2.43 | 4.33 |      |                            |                       | M5              | b                                |                                                                            |
| 00436               | 1.74 | 4.48 |      |                            |                       | M5              | b                                | LZ, V 858 Aq1, M4.                                                         |
| 00438               | 2.67 | 6.23 |      |                            | V374 Aq1              | C               | b                                | S 2737, Ne.                                                                |
| 00442               | 2.14 | 4.91 |      |                            |                       | M6              | b                                |                                                                            |
| 00444               | 2.31 | 4.17 |      |                            |                       | M6              | b                                | LZ, V 1263 Aq1. (M3).                                                      |
| 00445               | 2.91 | 5.51 |      |                            | V607 Aq1              | M9              | mf                               |                                                                            |
| 00446               | 2.23 | 6.04 |      |                            |                       | M8              | b                                | Vogt, M8; Lockwood, M8.2-8.5.                                              |
| 00447               | 2.96 | 3.57 |      |                            |                       | M4              | b                                | LZ, V 1279 Aq1, M5.                                                        |
| 00449               | 2.94 | 3.39 |      |                            |                       | M5              | b                                |                                                                            |
| 00450               | 2.62 | 5.90 | 8.80 | FO                         |                       | M9              | f                                | Vogt, M9.                                                                  |
| 00451               | 1.27 | 4.95 |      |                            |                       | M7              | b                                |                                                                            |
| 00452               | 2.97 | 4.72 |      |                            |                       | M7              | mb                               | LZ, V 541 Aq1, (M5).                                                       |
| 00453               | 1.64 | 4.07 |      |                            | WX Aq1                | M6              | b                                |                                                                            |
| 00456               | 1.98 | 3.97 |      |                            |                       | M5              | vb                               | LZ, V 1051, Aq1, M4.                                                       |
| 00458               | 0.66 | 4.73 |      |                            | RR Aq1                | M7:             | vb                               |                                                                            |
| 00460               | 2.59 | 5.33 |      |                            |                       | M7              | b                                | Vogt, M8.                                                                  |
| 00461               | 2.48 | 4.97 |      |                            |                       | M7              | b                                | LZ, V 568 Aq1, M7.                                                         |
| 00465               | 2.62 | 3.68 |      |                            |                       | M5              | b                                | LZ, CSVS 5006, (M4).                                                       |
| 00466               | 2.92 | 3.62 |      |                            |                       | M4              | b                                |                                                                            |
| 00470               | 1.67 | 3.97 |      |                            |                       | M5              | b                                | LZ, CSVS 8460, (M5).                                                       |
| 00471               | 2.25 | 4.05 |      |                            | WZ Aq1                | M4              | b                                |                                                                            |
| 00474               | 1.52 | 3.92 |      |                            | V865 Aq1              | M6              | vb                               |                                                                            |
| 00481               | 2.62 | 3.67 |      |                            |                       | M5              | b                                | LZ, CSVS 5204, (M6).                                                       |
| 00482               | 2.97 | 3.35 |      |                            |                       | M2              | b                                |                                                                            |
| 00487               | 2.03 | 4.27 |      |                            |                       | M6              | b                                | LZ, 103015, (M4).                                                          |
| 00489               | 1.73 | 5.09 |      |                            | W Aqr                 | M6              | vb                               |                                                                            |
| 00490               | 1.58 | 6.20 |      |                            |                       | M7              | b                                | Vogt, M8.                                                                  |
| 00496               | 2.69 | 4.80 |      |                            | TV Aqr                | M7              | mb                               |                                                                            |
| 00499               | 1.46 | 6.22 |      |                            | RV Aqr                | C               | mb                               | S 2968, Ne.                                                                |
| 00501               | 2.43 | 3.94 |      |                            |                       | M6              | mb                               |                                                                            |
| 00514               | 2.63 | 4.41 |      |                            | UW Aqr                | M5              | b                                |                                                                            |
| 00516               | 2.30 | 3.65 |      |                            | UW Peg                | M7              | mb                               |                                                                            |
| 00525               | 2.47 | 4.08 |      |                            |                       | M6              | b                                | LZ, CSVS 8811, M; Lockwood, M6.0-7.0.                                      |
| 00531               | 2.47 | 4.37 |      |                            |                       | M7              | b                                | Vogt, M6. LZ, CSVS 5784.                                                   |

spectra. Column 8 gives a subjective estimate of the source brightness as it appears on the 10-min-exposure plates. The following abbreviations have been used: very bright (vb), bright (b), medium bright (mb), medium faint (mf), faint (f), very faint (vf), trace (t), and no trace (nt). Column 9 is used for various comments including the actual position of the source relative to that given by the IRC. A missing entry implies that the IRC position is accurate to better than 0.5 arcmin, which is almost always the case. Exceptions to this could be the few cases in which no trace of the source was found near the stated position. In addition,

recent identifications or classifications by other workers are presented. Some comments occur in similar form so frequently as to necessitate standard abbreviations as follow.

Dearborn 534, M6: Grasdalen and Gaustad (1971) have identified IRC+00043 with Dearborn 534, an M6 star according to that catalog (Lee *et al.* 1947).

LZ, TU Sco, M7 IIe: Lockwood and Zinter (1973) have identified IRC -30279 with TU Sco in the *General Catalog of Variable Stars* (Kukarkin *et al.* 1969, 1971), in which it is listed as an M7 IIe star.

TABLE III. Objects for further study.

| IRC    | Comment <sup>a</sup> | IRC    | Comment        |
|--------|----------------------|--------|----------------|
| -30001 | nt                   | -20548 | S              |
| -30263 | S                    | -10365 | S              |
| -30285 | nt                   | -10411 | Pec. emission  |
| -30306 | Pec. emission        | -10412 | nt             |
| -30311 | Pec. emission        | -10426 | nt             |
| -30314 | Pec. emission        | -10437 | Pec. emission  |
| -30316 | Pec. emission        | -10448 | Pec. emission  |
| -30318 | Pec. emission        | -10466 | t              |
| -30320 | nt                   | -10472 | Pec. emission  |
| -30321 | nt                   | -10482 | nt             |
| -30334 | Pec. emission        | 00102  | nt             |
| -30342 | t                    | 00162  | S+C: La O 7900 |
| -30349 | nt                   | 00365  | nt             |
| -20136 | S                    | 00379  | nt             |
| -20169 | S                    | 00387  | nt             |
| -20398 | Pec. emission        | 00388  | Pec. emission  |
| -20417 | nt                   | 00389  | nt             |
| -20418 | Pec. emission        | 00392  | Pec. emission  |
| -20423 | nt                   | 00396  | Pec. emission  |
| -20448 | nt                   | 00423  | S              |
| -20462 | Pec. emission        | 00427  | t              |
| -20463 | Pec. emission        |        |                |

<sup>a</sup> nt: no trace; t: trace but impossible to classify; S: S-class; Pec. emission: peculiar star with apparent emission near 8600 Å. See also Table II.

LZ, CSVS 2899, Ne: Lockwood and Zinter (1973) have identified IRC -30277 with star 2899 in the *Catalog of Suspected Variable Stars* (Kukarkin *et al.* 1951, 1965) in which it is listed as an Ne star.

S 846, N: C5, 3: Baumert (1974) has identified IRC -30097 with star 846 in the *General Catalog of Cool Carbon Stars* (Stephenson 1973), in which are listed two different classifications, N and C5, 3.

TABLE IV. Summary of classifications.

| Distribution of our classification |     | Distribution of previously classified M stars (IRC) | Total IRC distribution of M stars south of +5° |
|------------------------------------|-----|-----------------------------------------------------|------------------------------------------------|
| Not M, C, or S                     | 2   | ...                                                 | ...                                            |
| Too bright                         | 2   | ...                                                 | ...                                            |
| No trace                           | 16  | ...                                                 | ...                                            |
| Trace but unclassifiable           | 5   | ...                                                 | ...                                            |
| M; Subtype doubtful                | 32  | ...                                                 | ...                                            |
| M0 or earlier                      | 18  | ...                                                 | ...                                            |
| M0                                 | 12  | 207                                                 | 219                                            |
| M1                                 | 20  | 71                                                  | 91                                             |
| M2                                 | 25  | 96                                                  | 121                                            |
| M3                                 | 20  | 179                                                 | 199                                            |
| M4                                 | 30  | 41                                                  | 71                                             |
| M5                                 | 108 | 54                                                  | 162                                            |
| M6                                 | 169 | 10                                                  | 179                                            |
| M7                                 | 184 | 7                                                   | 191                                            |
| M7 or later                        | 2   | ...                                                 | ...                                            |
| M8                                 | 81  | 8                                                   | 89                                             |
| M8 or later                        | 9   | ...                                                 | ...                                            |
| M9                                 | 36  | 0                                                   | 36                                             |
| M10                                | 1   | 0                                                   | 1                                              |
| Peculiar                           | 17  | ...                                                 | ...                                            |
| Early C                            | 5   | ...                                                 | ...                                            |
| Late C                             | 21  | ...                                                 | ...                                            |
| C                                  | 20  | ...                                                 | ...                                            |
| Possibly C                         | 3   | ...                                                 | ...                                            |
| S                                  | 7   | ...                                                 | ...                                            |

Vogt, M8: Vogt (1973) has classified this star as an M8.

As each listed author or catalog makes additional comments about individual stars, the reader should refer to the original work for more complete information.

Sources which may warrant further work have been extracted and listed in Table III. This includes sources which showed no trace at the stated position or which were otherwise unclassifiable, as well as S stars and other peculiar objects. The peculiar objects appear to have emission near 8600 Å. They were discussed by Hansen and Blanco (1973) and references therein [see also Ciatti *et al.* (1974)].

The distribution of M stars classified by us (Table IV) increases dramatically between classes earlier than M4 and those of class M5 or later. This may at least in part be explained by noting that the distribution of previously classified M stars in the IRC decreases sharply beyond M3. The total distribution of all M-type stars in the IRC south of declination +5° appears smooth except for dips at M1 and M4 which are attributed to heterogeneity in previous classifications. For example, the old HD classification M<sub>a</sub>, M<sub>b</sub>, M<sub>c</sub> can not be readily converted to decimal subclasses. Nevertheless, it is worth pointing out that among the sources identified with stars of type M5 or later, a marked increase in frequency is found with advancing subclass. This is the opposite of what is observed to be the case for giant M stars selected according to apparent magnitude or by volume (Blanco 1965). Since supergiants are rare among late M stars, the observed distribution indicates that among giant M stars, the frequency of infrared sources is greater the later the spectral type. Among the early M-type stars which are IRC sources, one can expect a combination of nearby giants and more distant supergiants.

It should also be pointed out that among the IRC sources identified as carbon stars, the preponderant majority are of N type for these are much easier to pick out in spectral surveys such as the one described here.

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