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MULTICOLOR PHOTOMETRY OF STELLAR AGGREGATES

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ABSTRACT

We have made multicolor photometric observations over the range of wavelength from 0.36 microns in the ultraviolet to 5.0 microns in the infrared, on 1063 stars in the regions of h and x Persei, Pleiades, Hyades, Orion, Praesepe M 67, Scorpio-Centaurus, Coma Berenices and Ursa Major stellar aggregates.

Standard relations between V—R and the other colors are obtained by using the UBVRI photometry. These observations also have been used to derive photometric distances. The range in distance covered is over a factor of 100, from nearly 22 parsecs (Ursa Major-nucleus) to nearly 2300 parsecs (double cluster in Perseus). The same photometric results are also used to define a zero-age main sequence for visual absolute magnitudes. The range in V—R is from —0.15 mag. to +1.00 mag. and the range in absolute magnitude is from, approximately, —4.0 to +7.43.

SUMARIO

Hemos obtenido fotometría multicolor que cubre el intervalo de longitud de onda entre 0.36 micrones en el ultravioleta y 5.0 micrones en el infrarrojo de mil setenta y tres estrellas de las regiones donde se encuentran localizados los siguientes agregados estelares: h y x de Perseo, Pléyades, Hyadas, Orión, Praesepe, M67, Escorpio-Centauro, Coma Berenices y Ursa Major.

Utilizando sólo la fotometría correspondiente a los filtros UBVRI hemos obtenido relaciones estandar entre el color V—R y los demás colores; estas relaciones se basaron en ocho de los nueve agregados estelares anteriores, dándosele mayor importancia al cúmulo de las Hyadas. También la anterior fotometría la hemos usado para derivar distancias fotométricas de todos los nueve agregados estelares. Entre los resultados encontramos que el más cercano (núcleo de Ursa Major) está a 70 años luz y el más lejano (cúmulo doble en Perseo) se encuentra a 7500 años luz, aproximadamente. Los mismos resultados fotométricos los hemos utilizado para definir una secuencia principal de edad cero para magnitudes absolutas visuales; quedando definida para V—R entre —0.15 y +1.00, y para magnitudes absolutas entre —4.0 (aproximadamente) y +7.43.

I. Introduction

Multicolor photometry of T Tauri-like stars (Mendoza, 1966 and 1968) shows that this kind of stars show excesses in practically all the wavelength intervals from 0.3 μ to 5.0 μ. Their smallest excess occurs in the V—R color. Multicolor photometry of Be stars (Mendoza, 1958; Johnson, 1967) indicates that these stars also show excesses in the blue and in the infrared. Unreddened late M and S type long period variables have a range in B—V less than half a magnitude, yet they range in V—R over six magnitudes (see Mendoza, 1967b).

We have made multicolor photometry of the following stellar aggregates: h and χ Persei, Pleiades, Hyades, Orion, Praesepe, M 67 Scorpio-Centaurus, Coma Berenices, and Ursa Major. All the observations were made between 1963 and 1966 with the photometric equipment as described by Johnson and Mitchell (1962), and by Low and Johnson (1964) attached to the 40-inch of the Observatorio Astronómico Nacional, University of Mexico, and to the 28-inch and 60-inch photometric telescopes of the Lunar and Planetary Laboratory University of Arizona.

II. The observations

The observational data on the UBVRIJKLM photometric system defined by Johnson (1964, 1966; see also Mendoza, 1963, 1967b) are listed in Tables 1 through 17. The columns of Tables 1,3,5, 7,9,11,12,14 and 16 contain, first, the name of the star (see below); second through sixth, the photometric data (UBVRI), and lastly the MK type. The columns of Tables 2,4,6,8,10,13,15 and 17 contain, first, the name of the star (see below); second to last, the photometric data (VJKLM). Altogether, 1063 stars were measured nearly 5000 times in the wavelength range from 0.36 μ to 5.0 μ, using nine different filters. A part of the observations by this author has been published earlier (Mendoza, 1963, 1966, 1967a; Johnson, 1966; Johnson and Mendoza, 1964, and 1966; Iriarte, Johnson, Mitchell and Wisniewski, 1965; and Johnson, Mitchell, Iriarte and Wisniewski, 1966).

The great majority of the measurements in BVRI is obtained at Tonantzintla; while most of the infrared work is obtained at Catalina. Practically the totality of the observations presented here were made by the author. The exceptions are: a considerable number of ultraviolet measurements, the great majority of the stars of the Orion stellar aggregate, and several stars brighter than 5.0 mag., in V.

h and χ Persei. 72 stars are presented with UBVRI photometry and 26 with JKLM observations (see Tables 1 and 2). The star designation is that of the Henry Draper Catalogue, HD or HDE; Bright Star Catalogue, BS; Bonner Durchmusterung, BD; and Oosterhoff (1937), Oo. The U-magnitudes

not observed by us are taken from Johnson and Morgan (1955). The spectral types are taken from Johnson and Mendoza (1966).

Pleiades. 150 stars are presented with UBVRI photometry and 12 with JKL observations (see Tables 3 and 4). The star designation is that of Hertzsprung (1947), Hz II; and Trumpler (1922), TR or TS. The U-magnitudes not obtained by us are taken from Johnson and Mitchell (1958), MK types from Mendoza (1956).

Hyades. 164 stars are presented with UBVRI photometry and 5 with JKL observations (see Tables 5 and 6). The star designation is that of van Bueren (1952), VB. The U-magnitudes are from Johnson and Knuckles (1955) and Johnson, Mitchell, and Iriarte (1962). The spectral types are taken from Morgan and Hiltner (1965).

Orion. Practically all the data listed in Tables 7 and 8 (208 stars with UBVRI and 51 with JKLM) are taken from Lee (1966).

Praesepe. 143 stars are presented with UBVRI photometry and 4 with JKL observations (see Tables 9 and 10). The star designation is that of Vanderlinden (1935), VL. The spectral classification is Bidelman's (1956). The U-magnitudes not observed by us are from Johnson (1952).

M 67. 40 stars are given in the UBVRI system (see Table 11). The star designation is that of Fagerholm (1906), FJS. The spectral types are from Popper (1953), and Pesch (1967). The U-magnitudes are from Johnson and Sandage (1955), and from Eggen and Sandage (1964).

Scorpio-Centaurus. 112 stars are presented with UBVRI photometry and 7 with JKL observations (see Tables 12 and 13). The star designation is that of the Bright Star Catalogue, BS. Most of the data comes from Mendoza (1967a).

Coma Berenices. 54 stars are presented with UBVRI photometry and 1 with JKL observations (see Tables 14 and 15). The star designation is that of Trumpler (1938), T or A. The data of Mendoza (1963) has been transformed to the UBVRI system and new UBVRI observations obtained in Catalina have been added to make Table 14. The spectral types are also from Mendoza (1963).

Ursa Major. 120 stars are presented with UBVRI photometry and 20 with JKLM observations (see Tables 16 and 17). The star designation is that of the Henry Draper Catalogue, HD. The data for several bright stars not observed by us, are taken from Johnson, Mitchell, Iriarte, and Wisniewski (1965). A few U-magnitudes are from Johnson and Knuckles (1957). The spectral types are from Johnson, *et al.* (1965), the Bright Star Catalogue, and Miczaika (1954).

The probable error of a single observation at 1.0 air mass, for the observed magnitudes and colors, is given in Table 18. The last column of this Table lists the range of validity. In this column, the symbols $>$ and $\leqslant$ should be read as fainter, and brighter than or equal to, respectively. Also in this column, V and K cover the UBVRI and JKL photometries, respectively.

III. Photometric characteristics

In section I we mentioned that some stars exhibit anomalous colors. It appears that the V–R color is the least affected by interstellar or circumstellar matter, by the presence of shells and of dust clouds. Therefore it seems reasonable to use the V–R instead of B–V in the two-color diagrams. However, it should be noted (see Table 18) that V–R is less accurate than B–V, by only a small amount, fortunately.

Figures 1-9 illustrate graphically the "standard" relations between the colors V–R (abscissae) and U–B, U–V, U–R U–I, B–V, B–R, B–I, V–I and R–I (ordinates), respectively. These relationships, correspond approximately to a standard main sequence and they are constructed with the aid of the stars listed in Tables 3, 5, 7, 9, 11, 12, 14, and 16. The data used belong to 8 stellar aggregates. Heavier weight is given to the Hyades cluster in the construction of these relations. For comparison, the Hyades stars are plotted in Figures 1-9 as open circles.

In the standard relations there exist scatter from cluster to cluster: these differences may be due to age, chemical composition, luminosity effects and interstellar extinction. In most cases the stellar aggregates lie near the standard relationship.

Also from Figures 1-9 we notice that the hydrogen dip is more pronounced in the relations involving the ultraviolet-band (see Figs. 1-4). In a few of the color diagrams the hydrogen dip is not manifested and as a result the relationship is, practically, linear (see for example Fig. 6).

On the average, h and χ Persei association appears to be more affected by interstellar extinction than the other stellar aggregates listed above. Thus, it is not used to construct the standard relations shown graphically in Figures 1-9. The stars of the double cluster in Perseus lie far above and to the right, in all the standard relations which involve the ultraviolet band. This effect is most

pronounced on the (V−R, U−B) and least in the (V−R, U−I)-relationships. On (V−R, B−V) and (V−R, B−R)-diagrams also the stars of h and χ Persei fall above of the standard relation by a small amount. Only on the (V−R, B−I)-plot do they lie exactly on the corresponding standard relation. On the remaining two graphs (V−R, V−I) and (V−R, R−I) the stars of the double cluster start falling below the corresponding standard relations.

It is interesting to mention that the solar type stars of the Hyades, Coma Berenices, Ursa Major cluster are not redder than the Sun and perhaps sligthly bluer ($\sim$ 0.01 mag.). A possible interpretation of this is that there does not exist a cloud around the solar system; since its presence would make the solar type stars in all directions redder than the Sun.

IV. Hertzsprung-Russell diagram

Another important application of the UBVRI photometry of clusters and stellar associations is the study of the Hertzsprung-Russell diagram.

Figure 10 is a plot of the observed V−R *versus* the derived M_v for the Hyades cluster. Individual distance moduli of a large number of members of this cluster are from Bergedorf proper motions (Heckmann and Johnson, 1956). Figure 11 represents the plot of the observed V−R *versus* the derived M_v for the Ursa Major Stream. The absolute magnitudes are determined directly from the trigonometric parallaxes (Jenkins, 1952 and 1963). In this Figure open circles represent nucleus stars (Eggen, 1965). In Figures 12-20 we plot the observed V−R *versus* the observed V-magnitude of the nine stellar aggregates under study.

The above can be used to obtain the zero-age main sequence (the locus of hydrogen burning stars with internal constitution unchanged as yet by thermo-nuclear reactions, hence unevolved) using the procedure described by Johnson (1957). It assumes that all our stellar aggregates have, practically, a unique zero-age main sequence.

To determine accurate distances for individual clusters, we must know the absorption for each cluster. This is pretty well known for the Pleiades and the double cluster in Perseus.

The data listed in Tables 1 and 3 indicate an average excess in V−R of 0.05 mag. for the Pleiades and 0.4 mag. for h and χ Persei. If we assume that this excess is caused solely by interstellar extinction, we can then apply the results of Mendoza (1965) and Johnson and Mendoza (1966) to derive the total absorption, A_v, in the V-magnitude. The results are:

$$A_v = 0.2 \text{ mag. for the Pleiades cluster and}$$

$$A_v = 1.64 \text{ for h and } \chi \text{ Persei.}$$

Now we are ready to obtain the zero-age main sequence and the photometric distances of the stellar aggregates listed in Tables 1 - 17.

To obtain the photometric distances of Praesepe, Coma Berenices and Ursa Major (nucleus) clusters, it suffices to fit their main sequences to that of the Hyades cluster, say, between $+0.35$ mag. $<$ V−R $<$ $+0.60$ mag. To determine the distance of the Orion association we use only its unreddened members and fit its main sequence with that of the Pleiades, say, around V−R $= +0.25$ mag. To estimate the distance of the Scorpio-Centaurus association and h and χ Persei we fit their main sequences to that of the Orion Association, say, in V−R $<$ 0.15 mag.

To determine the zero-age main sequence we can again start with the Hyades main sequence taking into account the binary stars (see Heckmann and Johnson, 1956) and noting that the brightest stars of this cluster are not in the zero-age main sequence. We can extend this zero-age main sequence to early type stars as before, namely, with the aid of the Pleiades cluster, the Orion and Scorpio-Centaurus associations.

The results of the zero-age main sequence for visual absolute magnitudes are given in Table 19. The range in V−R is from -0.15 mag. to $+1.00$ mag; the resulting absolute magnitudes are from, approximately, -4.0 mag to $+7.43$ mag. This zero-age main sequence is shown graphically in Figure 21, together with the positions in this HR diagram of h and χ Persei, Pleiades, Coma Berenices, Hyades, and Praesepe stellar aggregates. These new determinations agree well with those of Johnson and Iriarte (1958) and Blaauw (1963).

The results of the photometric distances are listed in Table 20. These newly derived distances agree well with previous determinations. The largest difference is obtained for Coma Berenices which turns out to be farther away than our previous value (Mendoza, 1963). Note that for M67 we can obtain only a lower limit to its distance, because we did not observe stars of its zero-age main sequence.

V. Conclusion

We have presented preliminary results based on UBVRIJKLM photometry, covering the wavelength range from 0.36 μ to 5.0 μ of 1063 stars in nine stellar aggregates. In this work we do not discuss the JKLM photometry.

The UBVRI measurements are used to derive photometric distances and the zero-age main sequence. These observations are also used to study the photometric characteristics of standard relations, based on 8 stellar aggregates.

The results indicate that the clusters and associations under study may differ from one another in chemical composition and certainly in age. Perhaps the assumption of a unique zero-age main sequence is not valid. However, the results given above indicate that the distances will not be very much affected by these differences, if any. The only exception might be Coma Berenices.

Because of the higher reliability of V—R over B—V the results given in Tables 19 and 20, probably are better than those based only on B—V.

We are indebted to Dr. T. A. Lee for a copy of his observations in Orion far earlier than their publication; to Dr. H. L. Johnson for instrumental facilities, to the authorities of the Electronic Computer Center of the Universidad Nacional de México and Instituto Politécnico Nacional for computing facilities; to Dr. P. Pishmish for her friendly criticism; and to Miss T. Gómez for typing the manuscript and inking the Figures.

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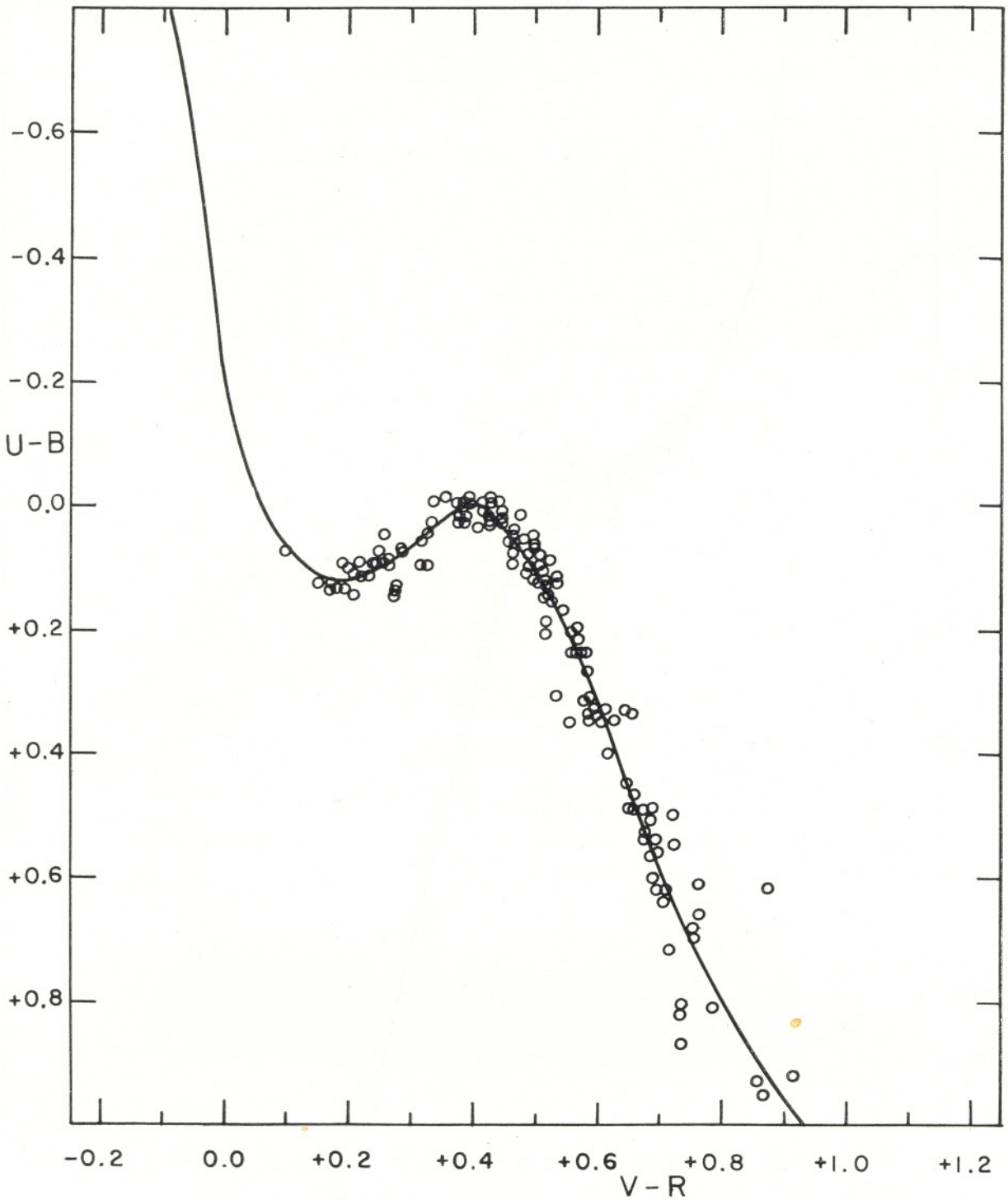

Fig. 1.—*The standard relation between V—R and U—B. The circles represent the Hyades cluster stars.*

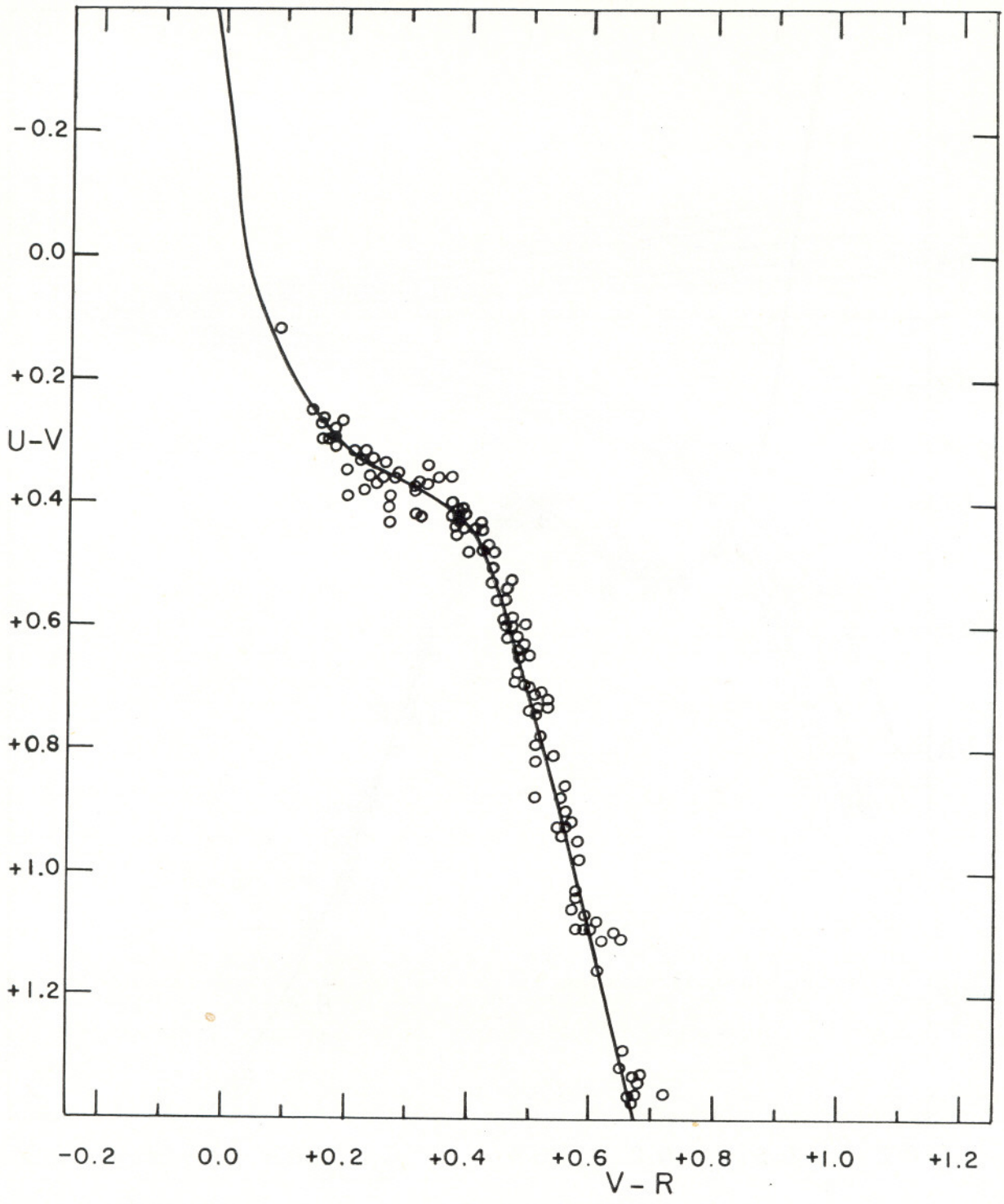

Fig. 2.—*The standard relation between V—R and U—V. The circles represent the Hyades cluster stars.*

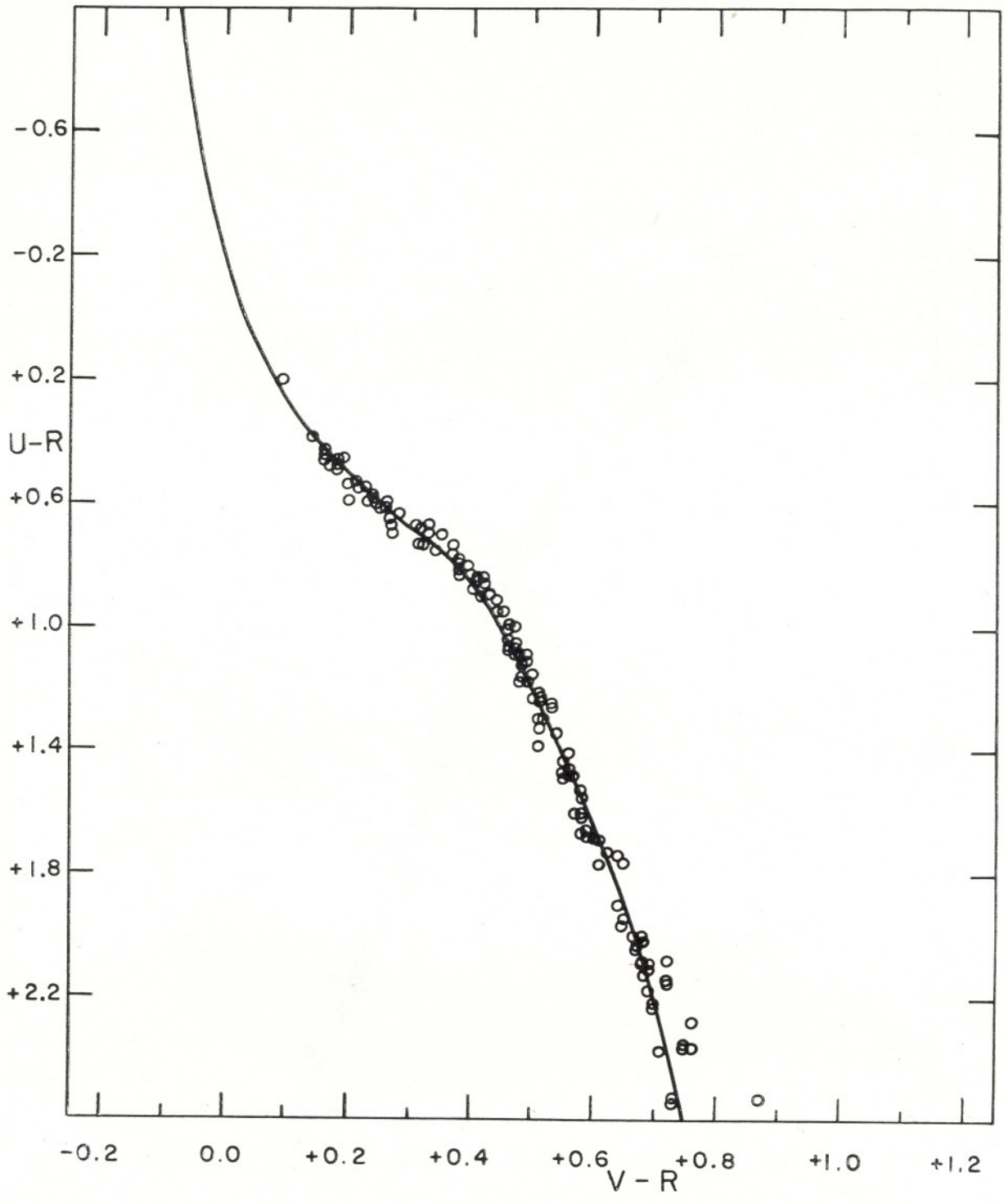

Fig. 3.—*The standard relation between V−R and U−R. The circles represent the Hyades cluster stars.*

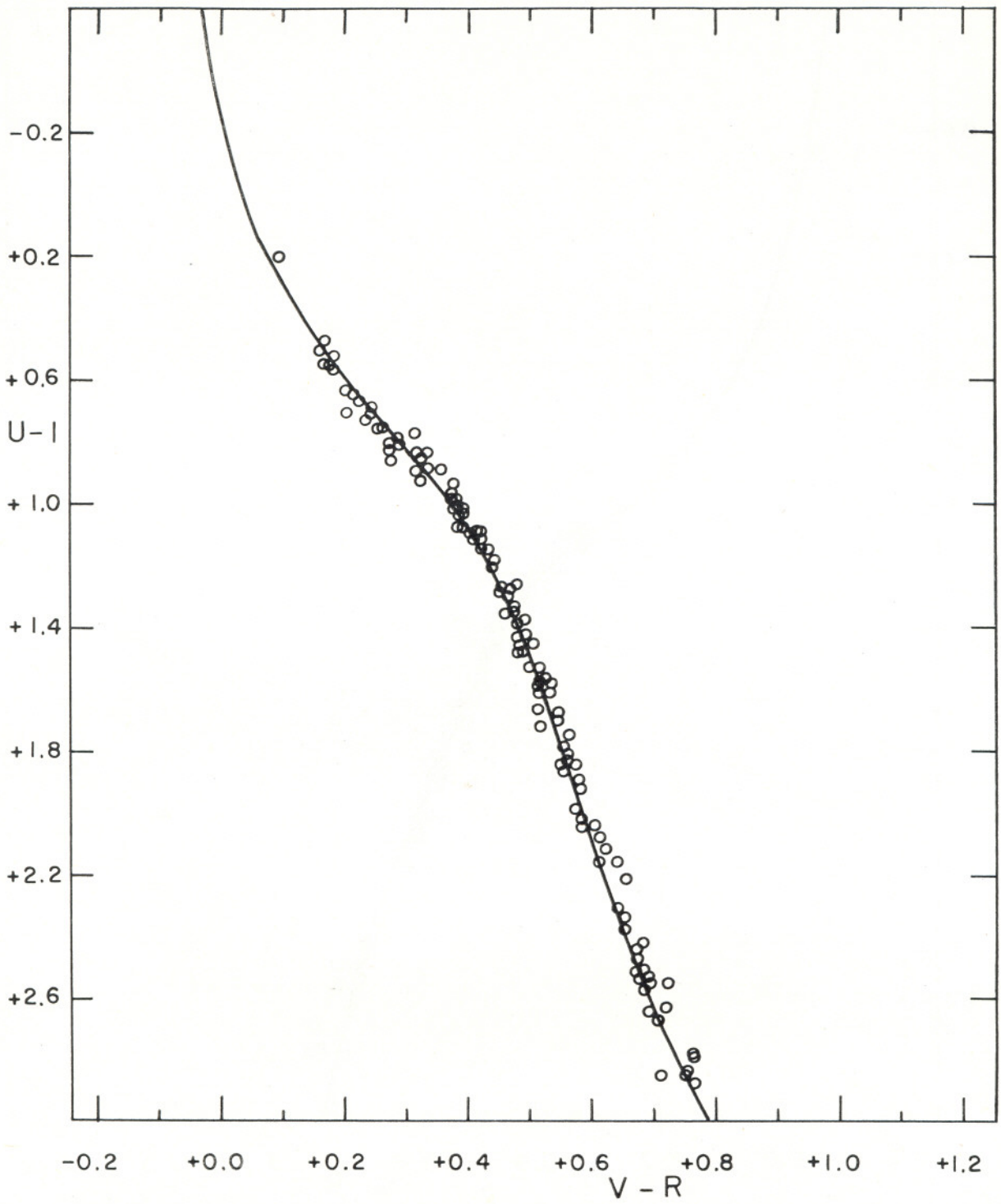

Fig. 4.—*The standard relation between V—R and U—I. The circles represent the Hyades cluster stars.*

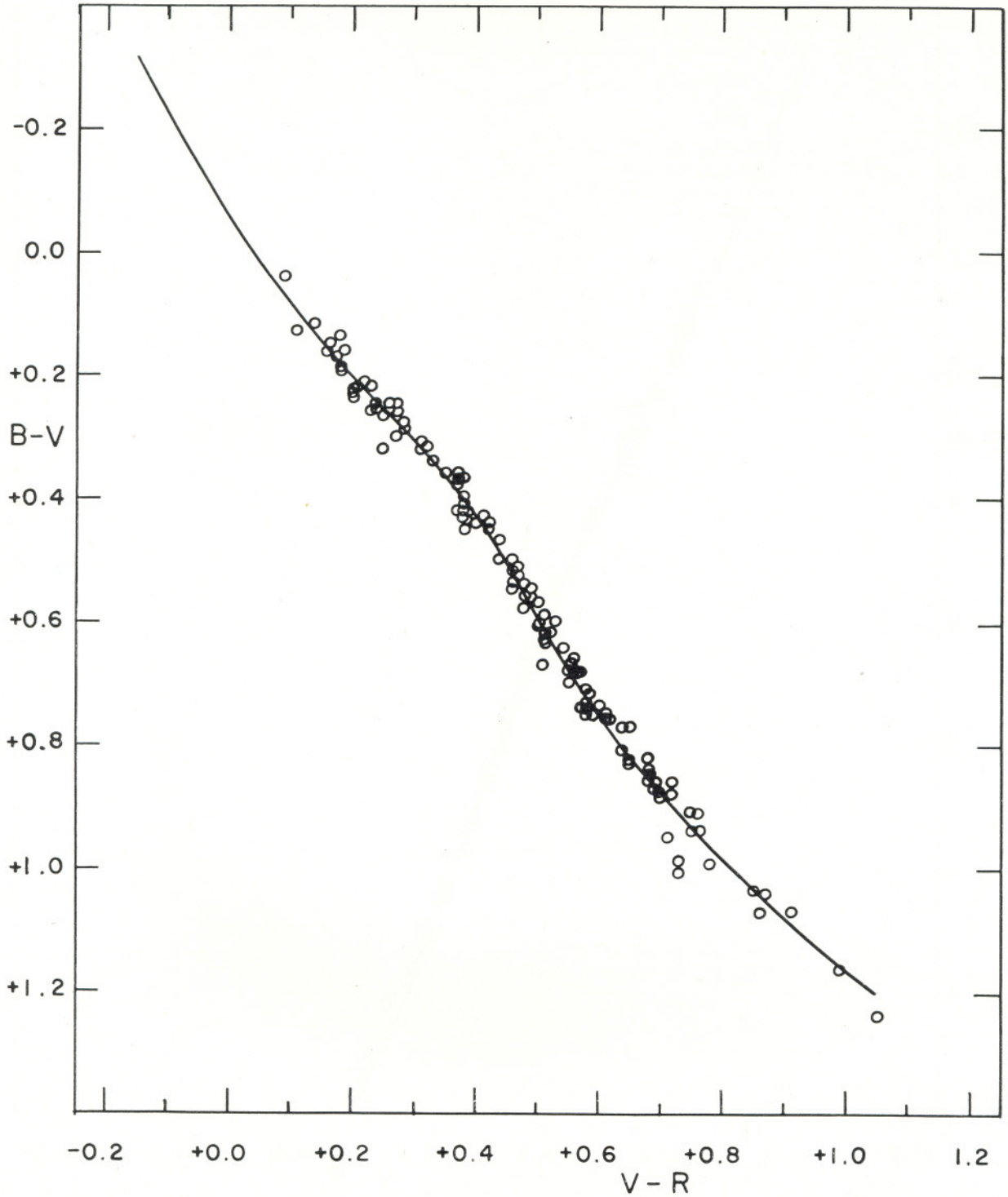

Fig. 5.—*The standard relation between V—R and B—V. The circles represent the Hyades cluster stars.*

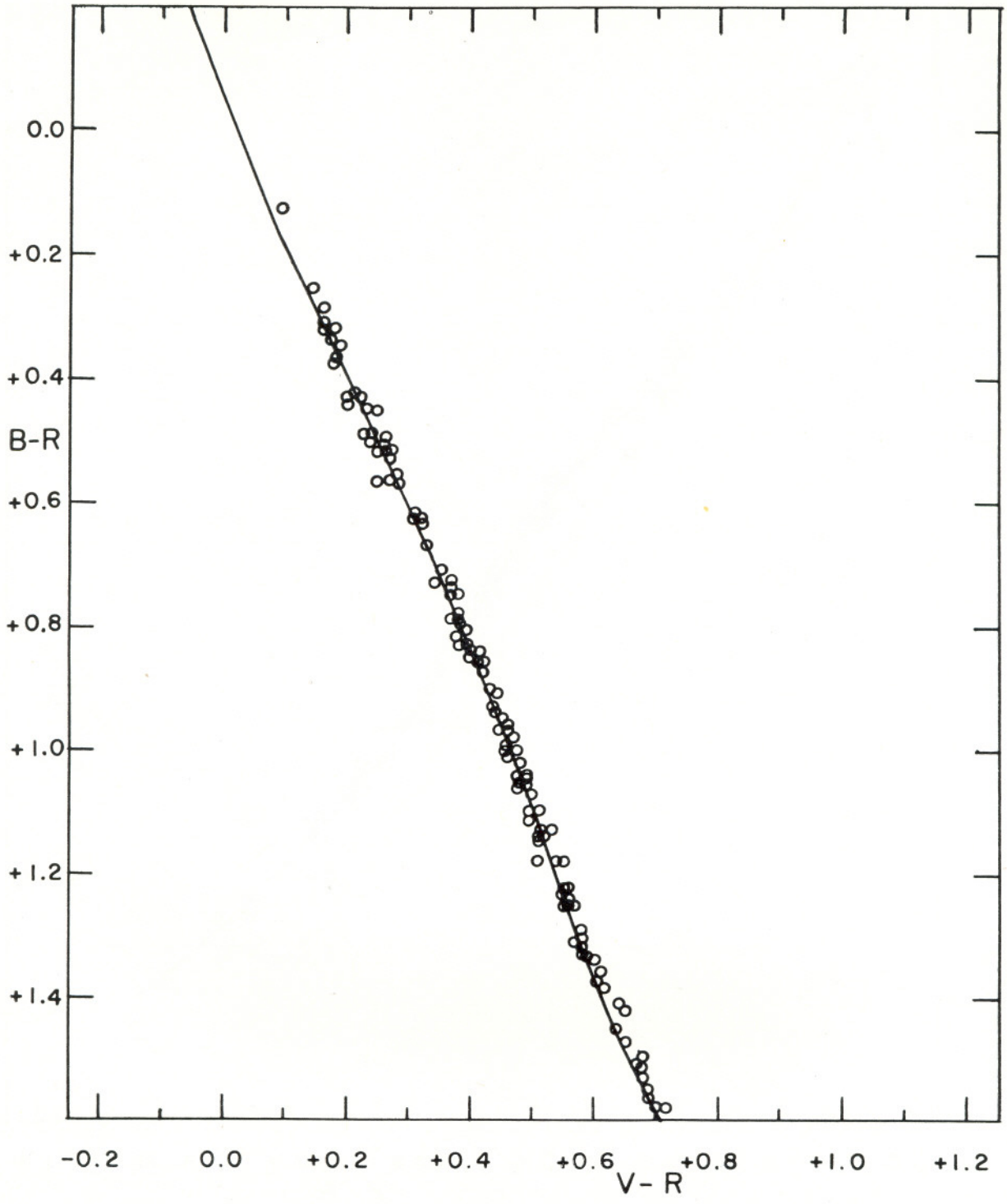

Fig. 6.—*The standard relation between V—R and B—R. The circles represent the Hyades cluster stars.*

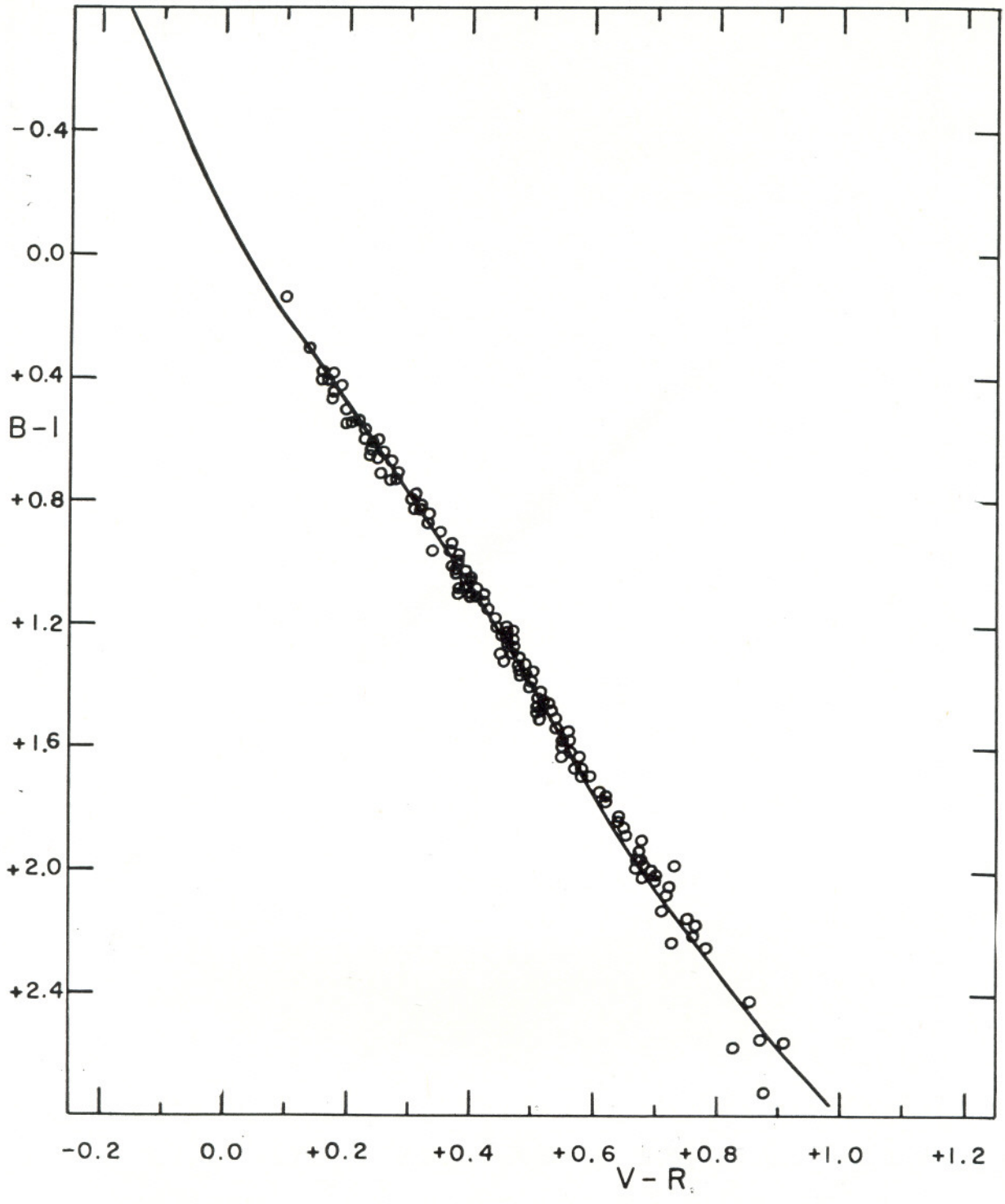

Fig. 7.—*The standard relation between V—R and B—I. The circles represent the Hyades cluster stars.*

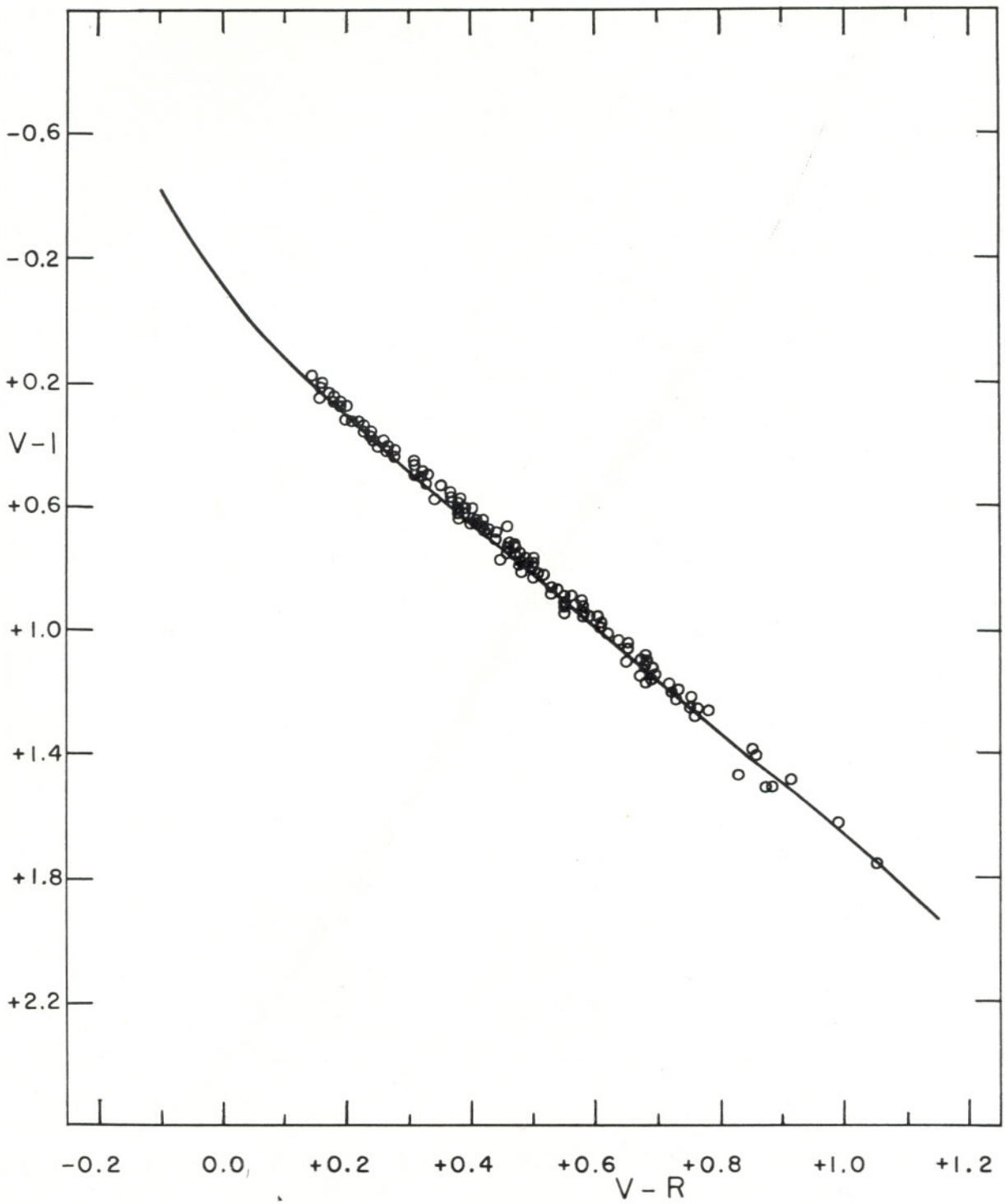

Fig. 8.—*The standard relation between V--R and V—I. The circles represent the Hyades cluster stars.*

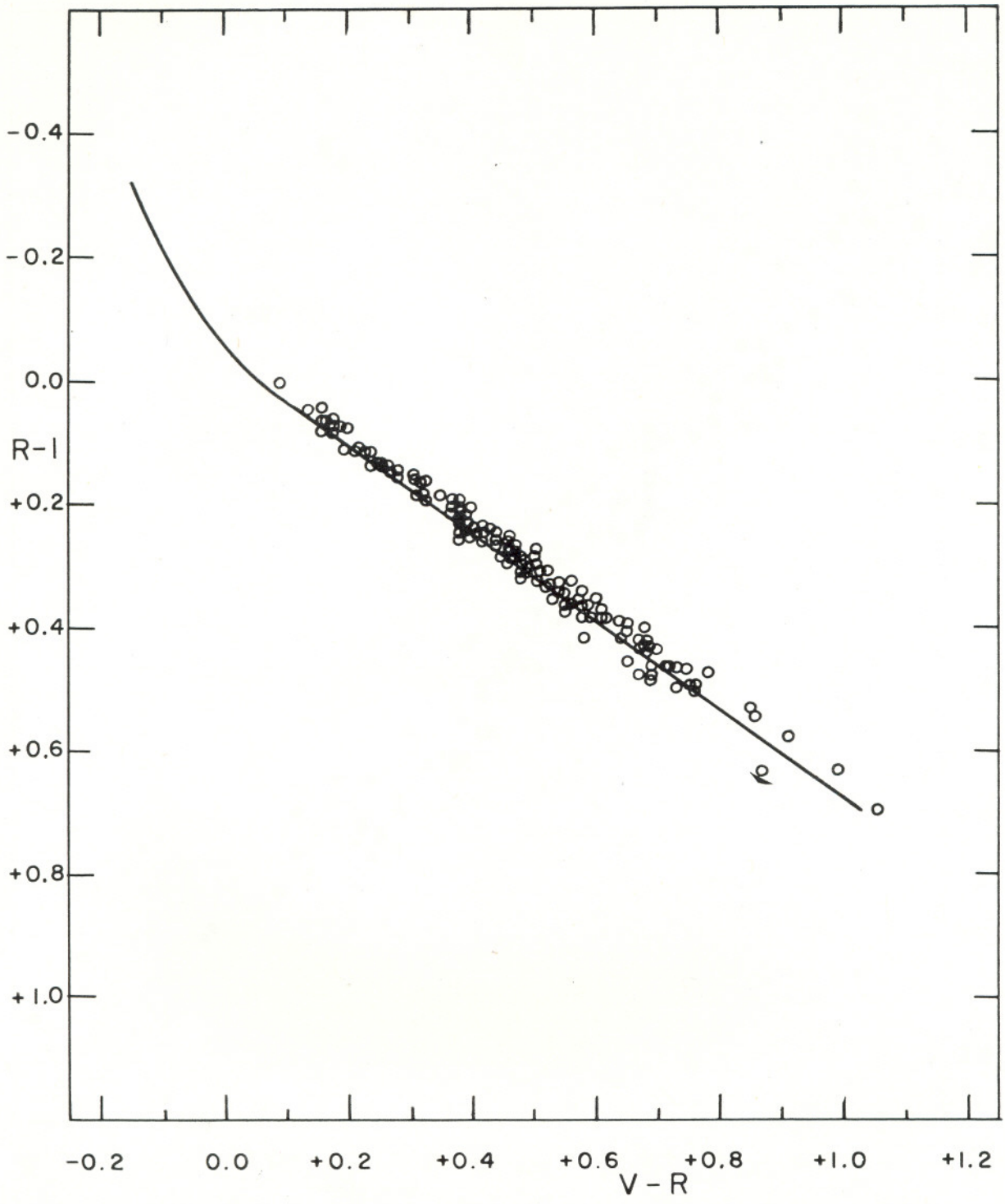

Fig. 9.—*The standard relation between V—R and R—I. The circles represent the Hyades cluster stars.*

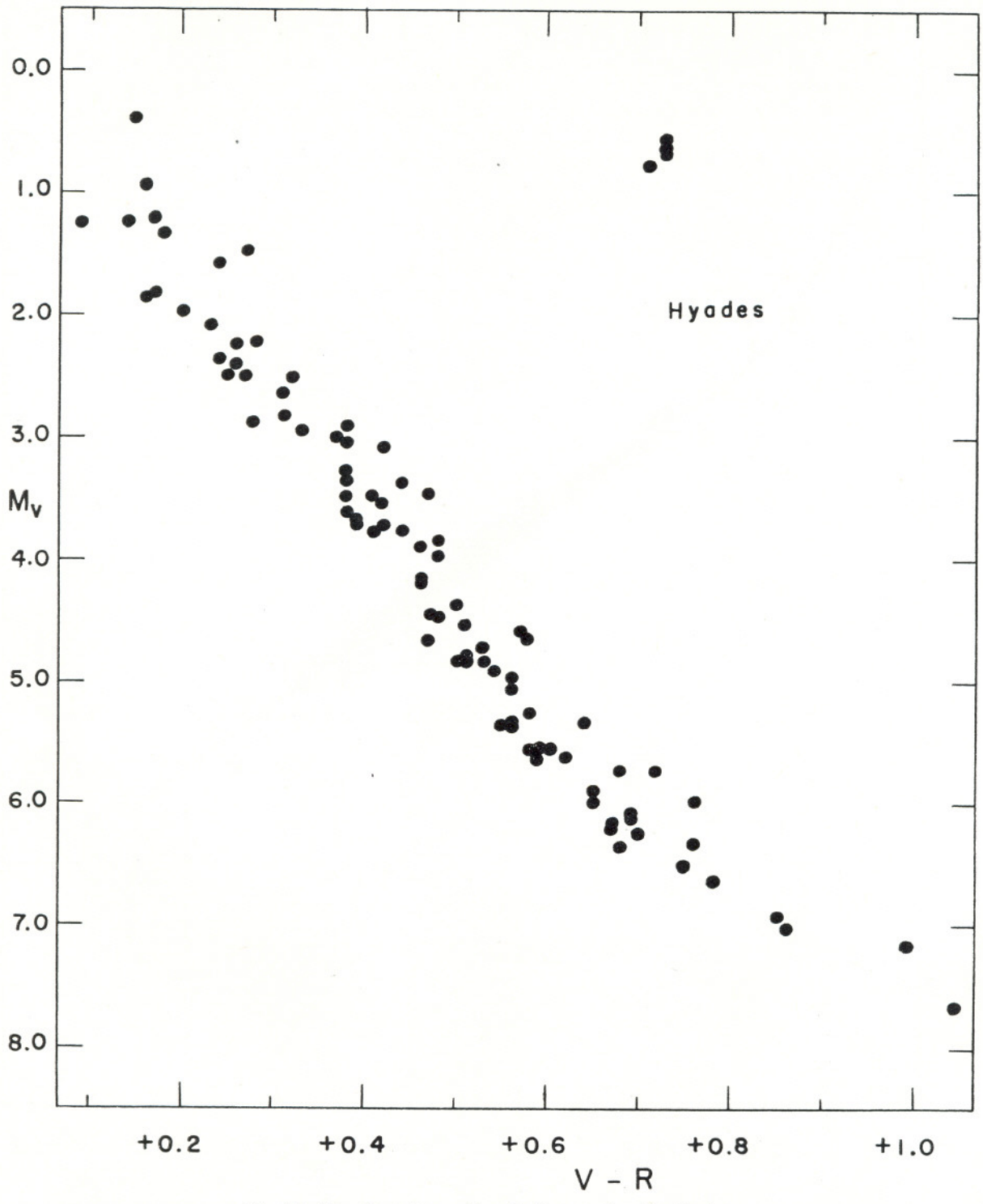

Fig. 10.—*The Hertzsprung-Russell diagram for the Hyades.*

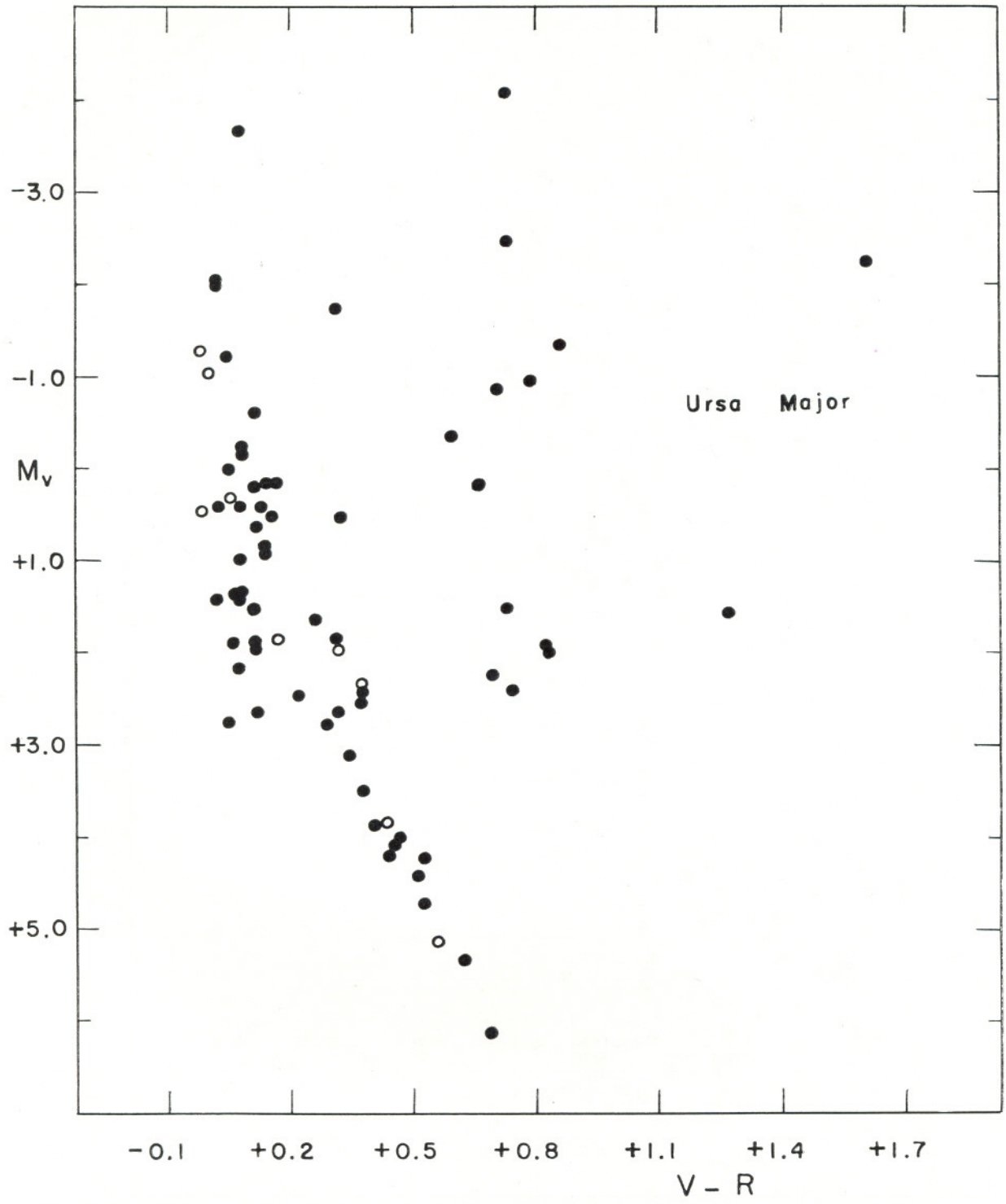

Fig. 11.—*The Hertzsprung-Russell diagram for the Ursa Major Stream. Open circles represent stars of the nucleus of the cluster.*

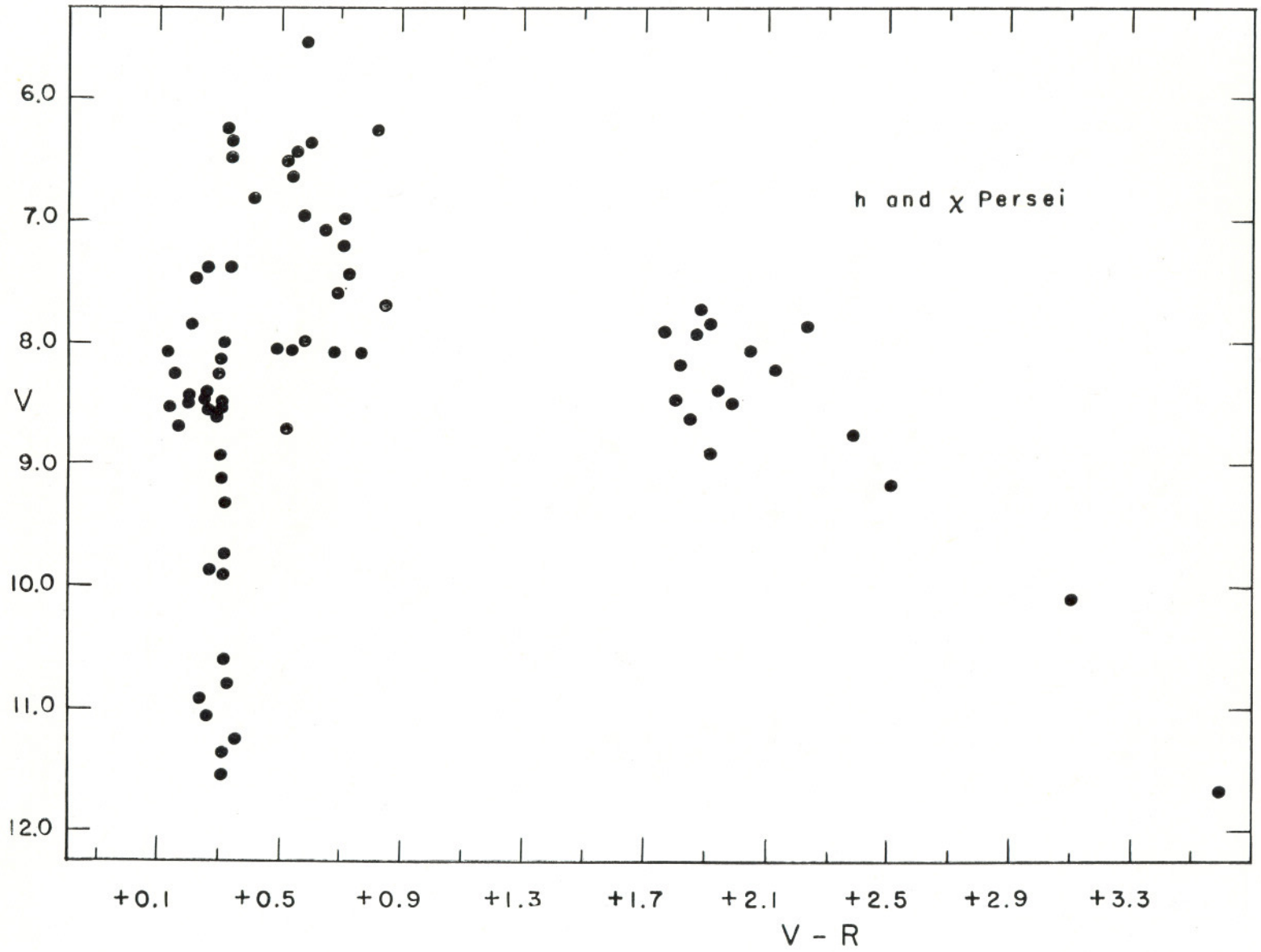

Fig. 12.—*Color-magnitude diagram for the double cluster in Perseus.*

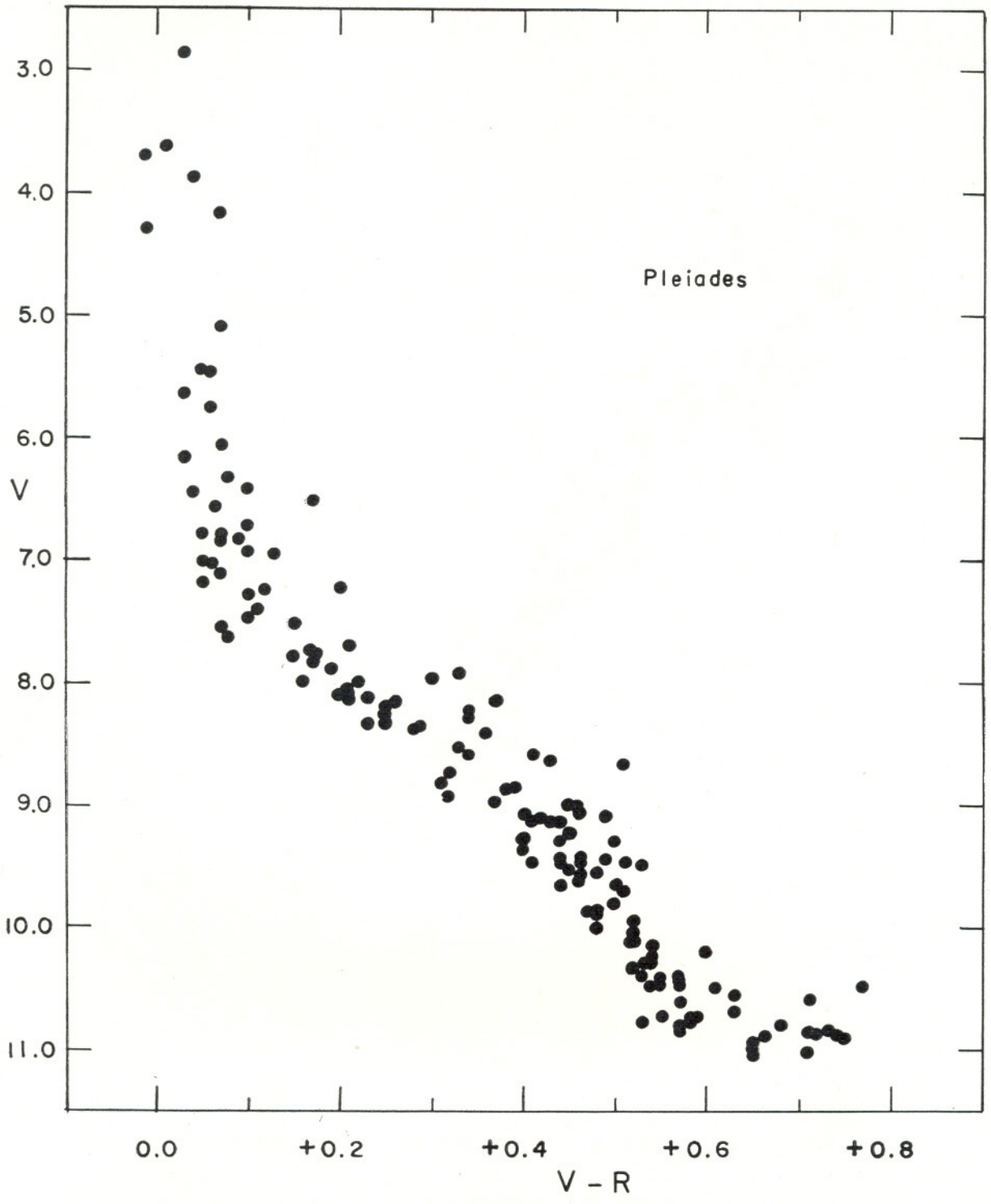

Fig. 13.—*Color-magnitude diagram for the Pleiades.*

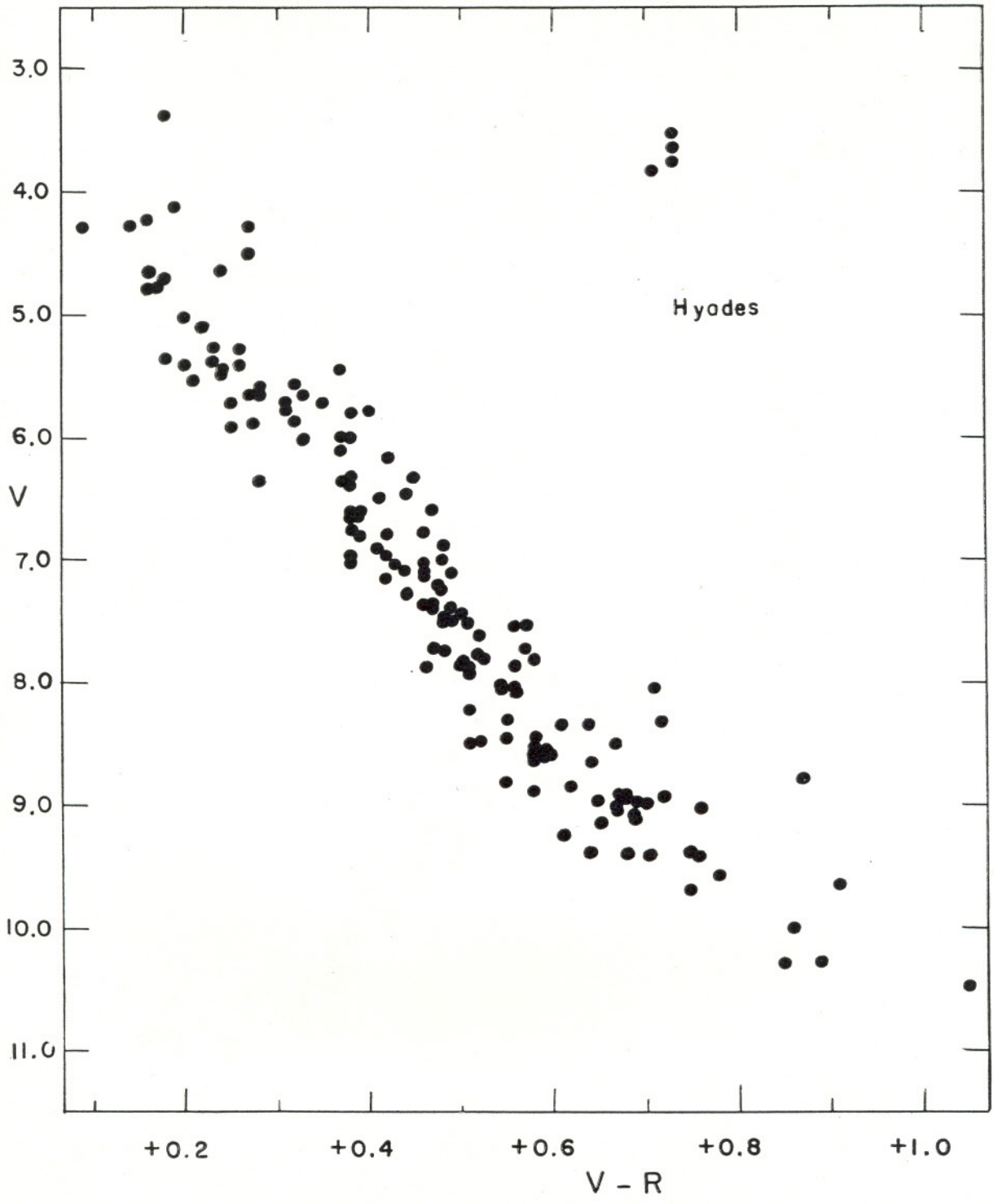

Fig. 14.—*Color-magnitude diagram for the Hyades.*

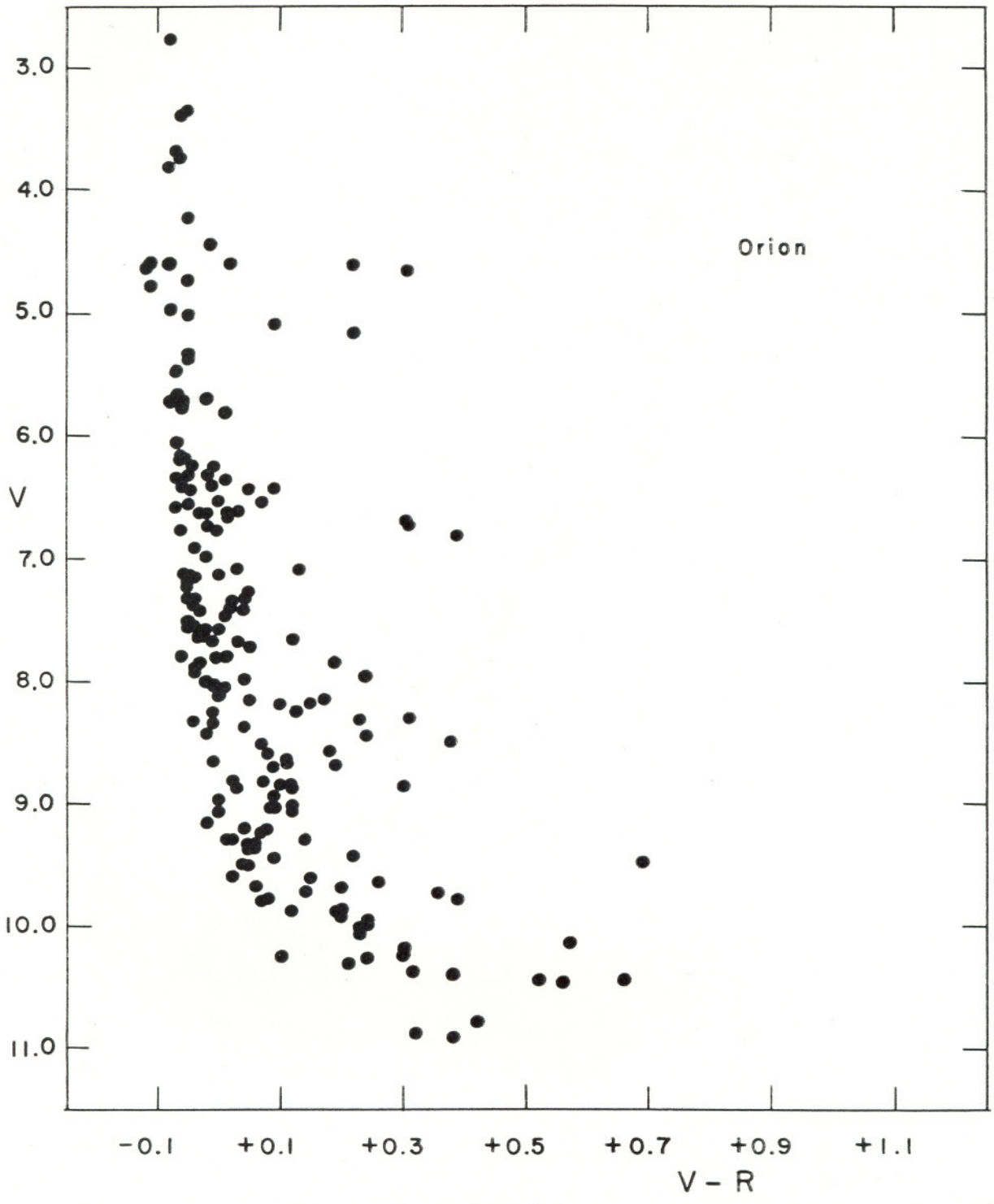

Fig. 15.—*Color-magnitude diagram for Orion.*

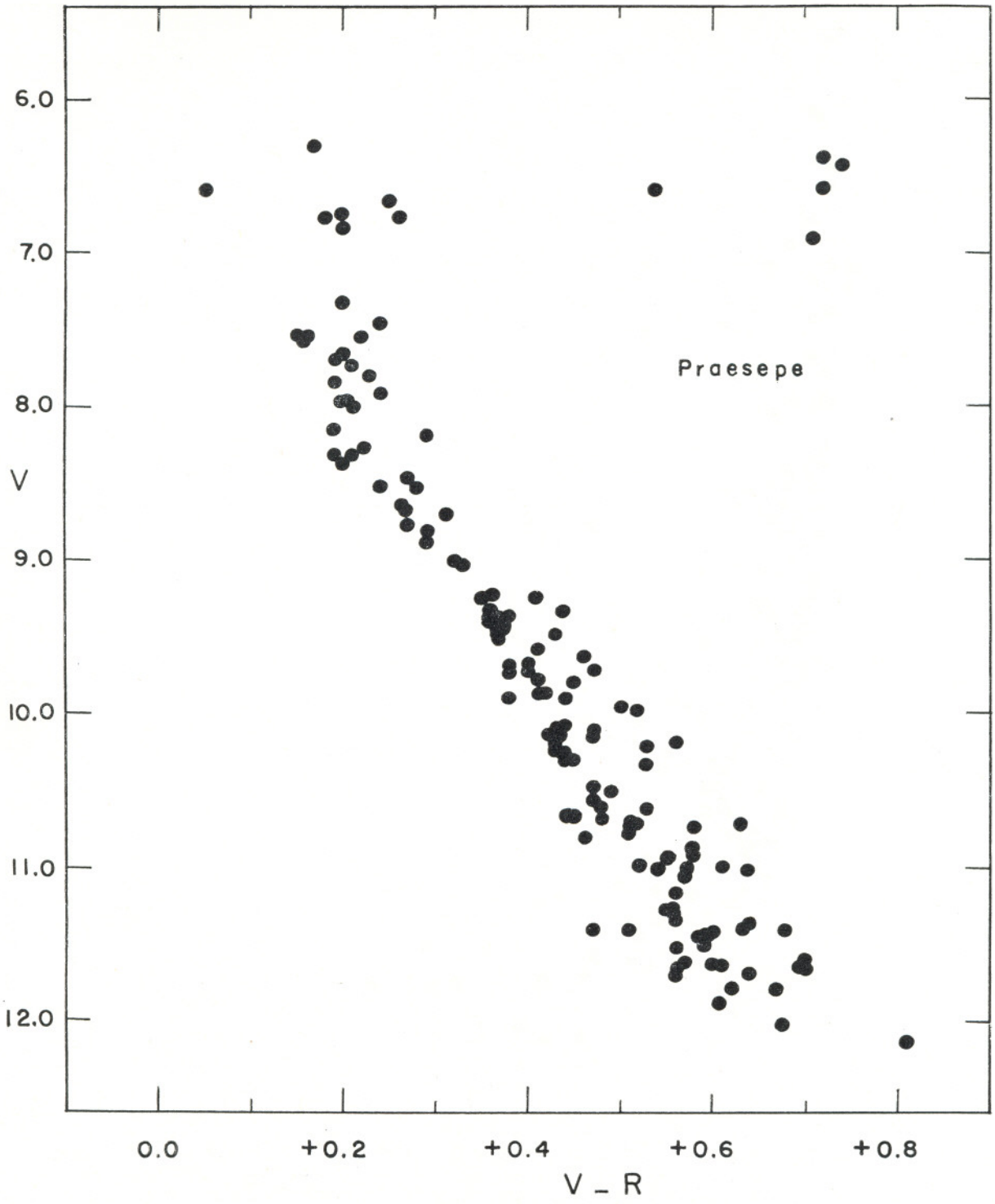

Fig. 16.—*Color-magnitude diagram for Praesepe.*

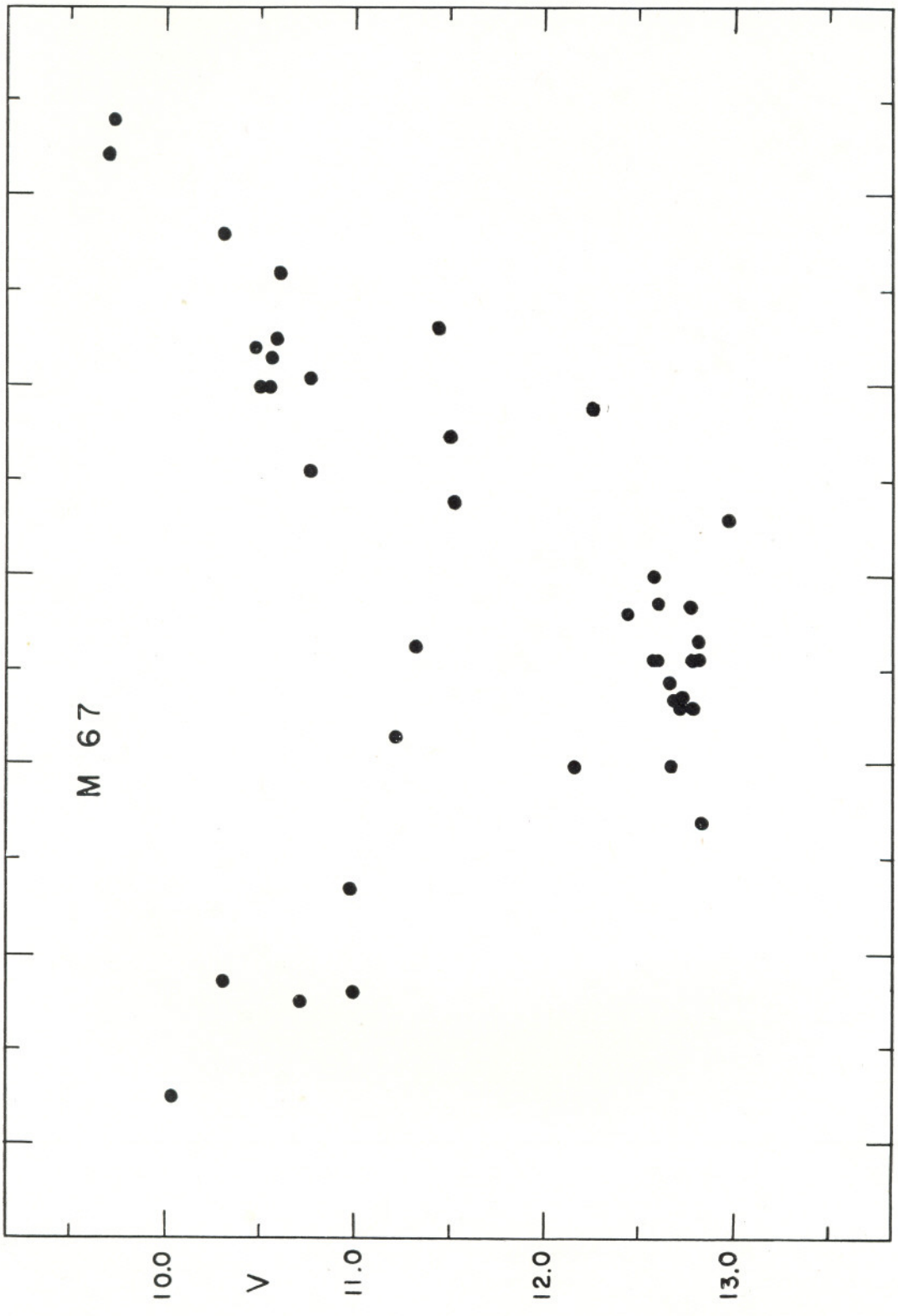

Fig. 17.—*Color-magnitude diagram for M 67.*

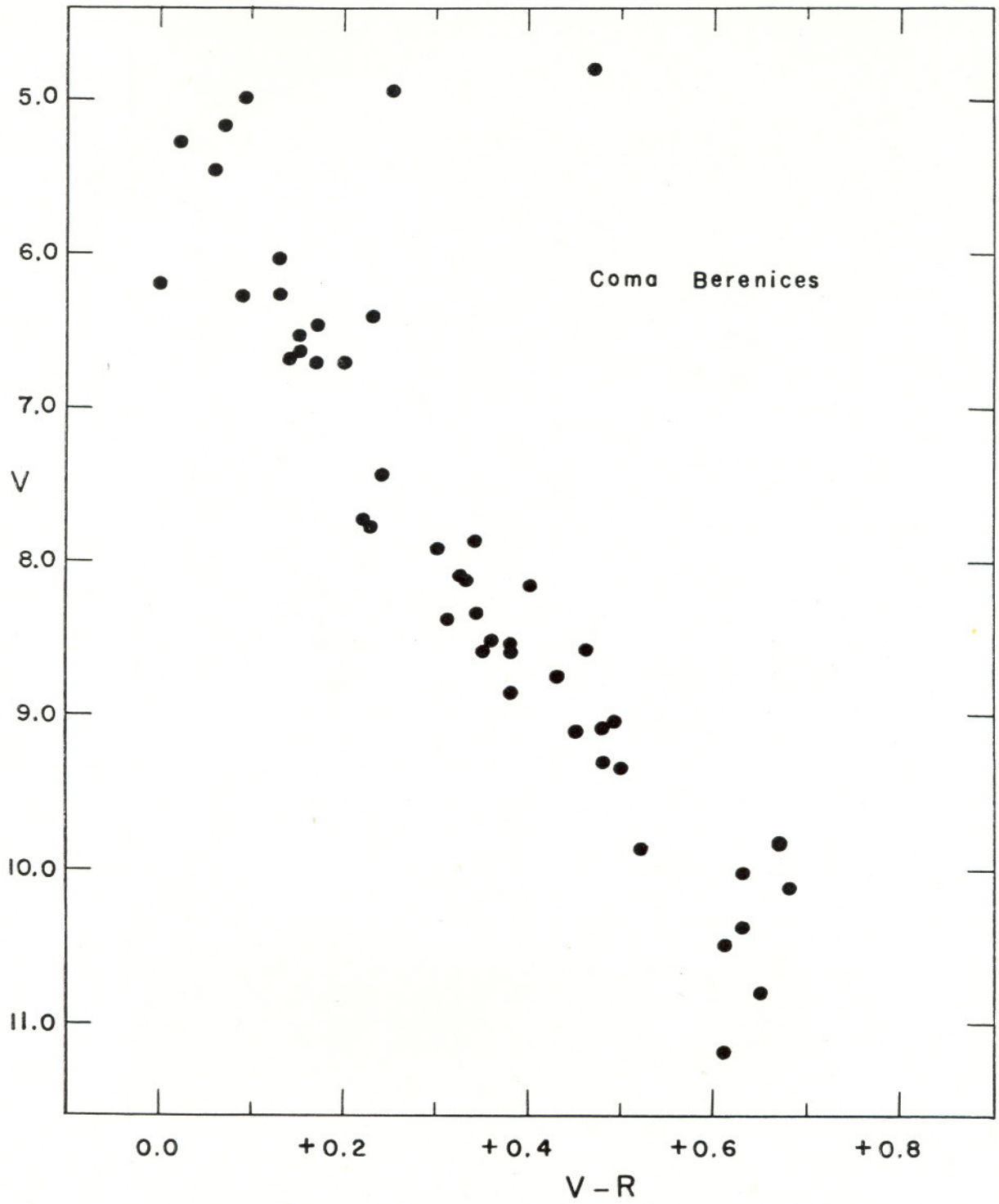

Fig. 18.—*Color-magnitude diagram for Coma Berenices.*

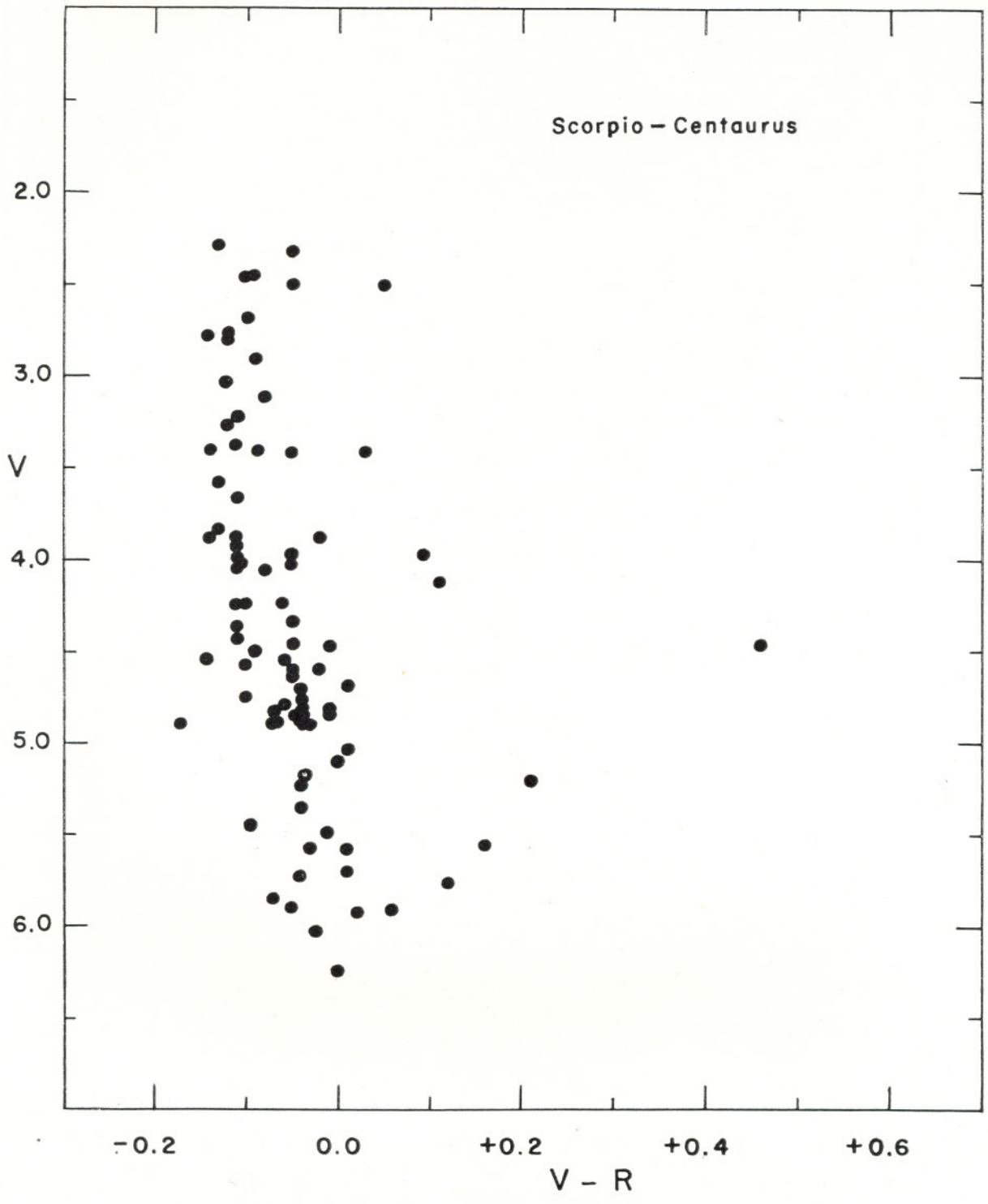

Fig. 19.—*Color-magnitude diagram for Scorpio-Centaurus.*

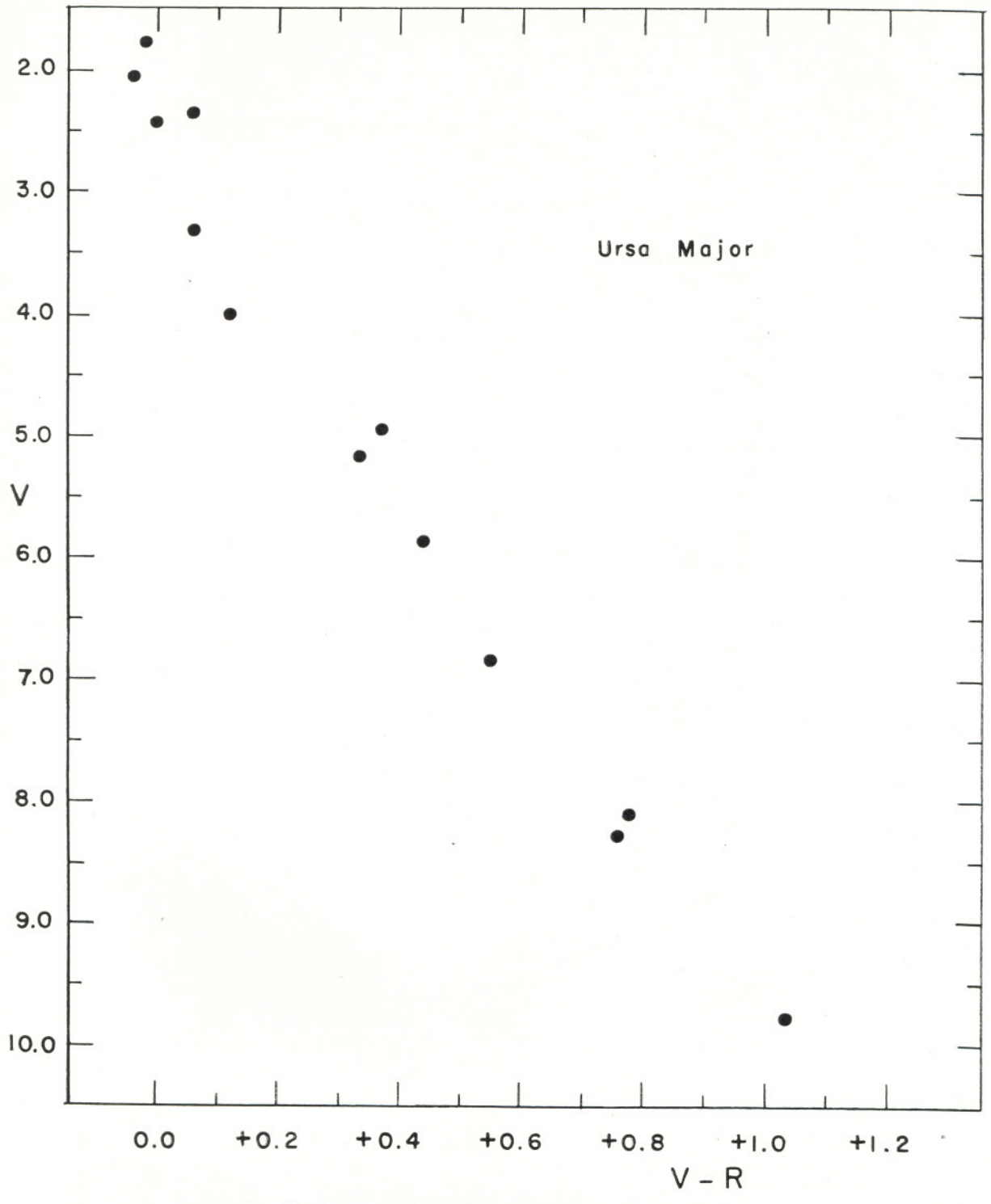

Fig. 20.—*Color-magnitude diagram for Ursa Major (nucleus).*

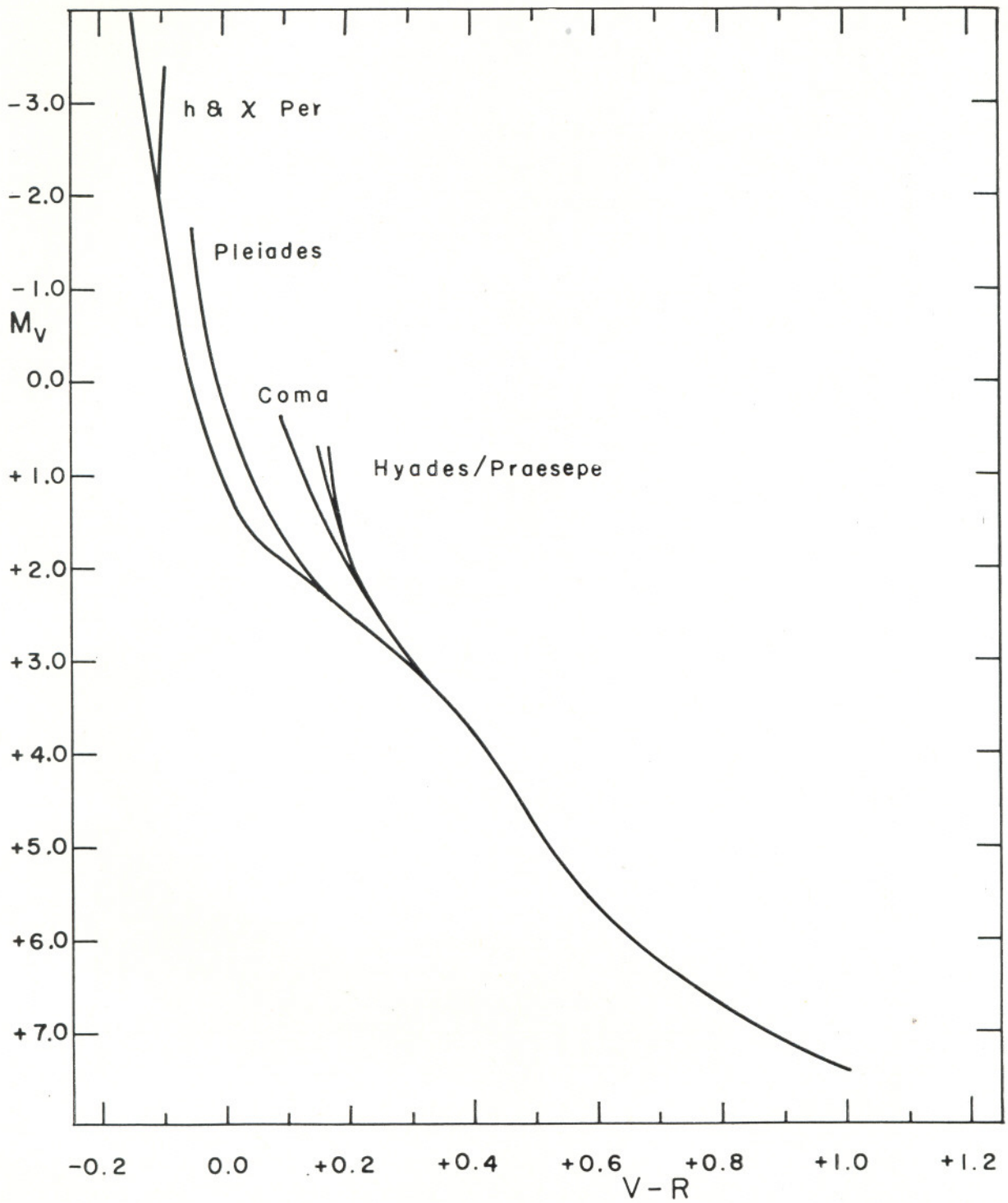

Fig. 21.—*The zero-age main sequence for visual absolute magnitudes, as defined by the non-evolved parts of the main sequence of the clusters indicated in the text.*

TABLE 1

UBVRI PHOTOMETRY OF h AND X PERSEI

STAR	V	U-V	B-V	V-R	V-I	MK
HD 12150	8.62	-0.26	+0.27	+0.27	+0.43	
HDE 236947	8.62	+4.48	+2.19	+1.85	+3.35	M0
HD 12856	8.54	-0.54	+0.23	+0.31	+0.45	B0pe
BS 618	5.67	+0.60	+0.61	+0.59	+1.09	A1 Ia
HD 13051	8.70	-0.60	+0.12	+0.17	+0.20	B1 III
HD 13136	7.73	+4.58	+2.22	+1.88	+3.43	M2 Ib
BS 627	6.35	-0.10	+0.33	+0.34	+0.60	B5 Ia
HD 13402	8.05	+0.18	+0.60	+0.54	+0.94	B0.5 I
BS 641	6.43	+0.84	+0.60	+0.55	+1.06	A3 Iab
HD 13621	8.09	-0.72	+0.06	+0.13	+0.11	B0.5 IV
HD 13658	8.90	+4.93	+2.31	+1.92	+3.42	M0.5
HD 13744	7.57	+0.93	+0.75	+0.69	+1.29	A0 Iab
HD 13745	7.85	-0.60	+0.18	+0.21	+0.29	B0 III
HD 13831	8.24	-0.71	+0.10	+0.15	+0.15	B0 IV
HD 13841	7.38	-0.41	+0.25	+0.26	+0.42	B2 Ib
BS 654	6.48	-0.38	+0.28	+0.34	+0.53	B1 Iab
HD 13866	7.49	-0.44	+0.19	+0.22	+0.32	B2 Ib
HD 13890	8.49	-0.45	+0.19	+0.25	+0.33	B1 IIIpe
HD 13969	8.83	-0.30	+0.31	+0.30	+0.53	B1 IV
HD 14052	8.16	-0.26	+0.33	+0.31	+0.48	B1 Ib
HD 14053	8.39	-0.37	+0.25	+0.26	+0.41	B1 II
BU Per	9.31	+5.07	+2.43	+2.51	+4.51	M3.5 Ib
Oo 864	9.92	-0.31	+0.18:	+0.32	+0.48	B1 V
Oo 950	11.26	-0.04	+0.36	+0.36	+0.57	B2 V
Oo 978	10.62	-0.07	+0.37	+0.22	+0.46	B1.5 V
HD 14134	6.52	+0.08	+0.45	+0.52	+0.87	B3 Ia
Oo 1078	9.74	-0.15	+0.34	+0.32	+0.58	B1 V
T Per	8.50	+4.86	+2.35	+1.99	+3.62	M2 Iab
HD 14143	6.63	+0.05	+0.50	+0.55	+0.92	B2 Ia
Oo 1187	10.81	-0.01	+0.39	+0.33	+0.60	B2 IV

TABLE 1 (continued)

STAR	V	U-V	B-V	V-R	V-I	MK
HD 14242	8.35	+5.04	+2.43	+1.94	+3.49	M1
HD 14250	8.94	-0.22	+0.32	+0.30	+0.48	B1 III
AD Per	7.84	+4.88	+2.28	+1.92	+3.54	M2.5 Iab
HD 14322	6.83	+0.03	+0.31	+0.41	+0.57	B8 Ib
FZ Per	7.92	+4.77	+2.25	+1.76	+3.21	M1 Iab
HD 14331	8.42	-0.59	+0.17	+0.20	+0.23	B0 III
HD 14357	8.50	-0.21	+0.32	+0.31	+0.50	B2 II
HD 14404	7.94	+4.82	+2.31	+1.87	+3.37	M1 Ib
HD 14422	8.72	-0.15	+0.50	+0.52	+0.86	B0 IV:pe
Oo 2139	11.36	-0.21	+0.28	+0.31	+0.46	B2 V
HD 14434	8.47	-0.63	+0.16	+0.20	+0.29	O6
HD 14433	6.37	+0.59	+0.56	+0.60	+1.06	A1 Ia
Oo 2185	10.92	+0.07	+0.32	+0.24	+0.42	B3 V
HD 14443	8.02	-0.21	+0.34	+0.32	+0.52	B2 Ib
Oo 2232	11.08	-0.32	+0.22	+0.26	+0.37	B2 V
Oo 2235	9.33	-0.22	+0.33	+0.32	+0.51	
Oo 2246	9.87	-0.24	+0.32	+0.27	+0.44	B2 III
Oo 2251	11.55	-0.01	+0.33	+0.31	+0.50	B3 V
SU Per	7.91	+4.33	+2.17	+2.23	+4.09	M3.5 Iab
RS Per	8.76	+4.50	+2.25	+2.39	+4.43	M4.5 Iab
HD 14520	9.12	-0.22	+0.33	+0.31	+0.51	B2 II
S Per	10.10	+5.17	+2.74	+3.10	+5.65	M4e Ia
HD 14535	7.44	+0.83	+0.70	+0.73	+1.31	A2 Ia
HD 14542	6.98	+0.48	+0.62	+0.58	+1.08	B8 Ia
56°595	8.17	+4.44	+2.14	+1.82	+3.25	M0.5 Iab
HD 14580	8.47	+4.85	+2.34	+1.80	+3.26	M0 Iab
BS 696	6.25	-0.31	+0.30	+0.33	+0.52	B2 Ia
HD 14826	8.21	+4.84	+2.38	+2.13	+3.91	M3 Iab
HD 14899	7.38	+0.33	+0.44	+0.44	+0.81	B8 Ib
HD 14956	7.19	+0.43	+0.72	+0.65	+1.15	B2 Ia

TABLE 1 (continued)

STAR	V	U-V	B-V	V-R	V-I	MK
60° 478	11.89	+5.99	+3.16	+3.59	+6.36	M2 Iab
HD 15316	7.22	+1.19	+0.77	+0.71	+1.38	A3 Iab
HD 15497	7.01	+0.71	+0.78	+0.71	+1.31	B6 Ia
HD 15570	8.08	+0.29	+0.69	+0.68	+1.24	O5f
HD 15642	8.53	-0.77	+0.07	+0.14	+0.14	B0 IV
HD 15690	7.98	+0.40	+0.67	+0.59	+1.06	B1.5 Ib
YZ Per	8.07	+4.95	+2.36	+2.05	+3.76	M2.5 Iab
HD 16310	8.05	+0.29	+0.64	+0.49	+1.02	B1 II:
HD 16778	7.70	+0.56	+0.90	+0.85	+1.63	A2 Ia
HD 17145	8.15	+0.81	+0.82	+0.77	+1.39	B8 Ia
HD 17520	8.26	-0.36	+0.32	+0.30	+0.53	O8 V
BS 825	6.26	+1.39	+0.88	+0.82	+1.58	A5 Ia

TABLE 2

INRARED PHOTOMETRY OF h AND χ PERSEI

Star	V	V-J	V-I	V-I	V-M
HDE 236947	8.62	+4.36	+5.66	+5.90	
BS 618	5.67	+1.40	+1.74		
HD 13136	7.73	+4.39	+5.63	+5.98	
HD 13658	8.90	+4.43	+5.72	+5.93	
BU Per	9.31	+5.64	+7.10	+7.49	
HD 14134	6.52	+0.94	+1.09		
T Per	8.50	+4.66	+5.95	+6.29	
HD 14143	6.63	+1.08	+1.32		
HD 14242	8.35	+4.53	+5.82	+6.18	
AD Per	7.84	+4.51	+5.81	+6.11	
HD 14322	6.83	+0.77	+0.96	+1.16	
FZ Per	7.92	+4.16	+5.42	+5.77	
HD 14404	7.94	+4.36	+5.63	+5.83	
HD 14433	6.37	+1.22	+1.51	+1.64	
SU Per	7.91	+5.18	+6.55	+6.81	
RS Per	8.76	+5.76	+7.16	+7.57	
S Per	10.10	+6.99	+8.68	+9.58	+10.27
HD 14535	7.44	+1.57	+1.97	+2.07	
BD 56°595	8.17	+4.17	+5.40	+5.72	
HD 14580	8.47	+4.20	+5.46	+5.73	
BS 696	6.25	+0.61	+0.77	+0.87	
HD 14826	8.21	+4.98	+6.30	+6.64	
BD 60°478	11.89	+7.99	+9.99	+10.65	+10.95
HD 15570	8.08	+1.55	+1.66		
YZ Per	8.07	+4.78	+6.07	+6.46	
HD 17520	8.23	+0.61	+0.75		

TABLE 3

UBVRI PHOTOMETRY OF THE PLEIADES

HzII	V	U-V	B-V	V-R	V-I	MK
25	9.47	+0.49	+0.48	+0.46	+0.73	F5 V
102	10.51	+0.88	+0.73	+0.61	+1.07	
120	10.79	+0.91	+0.72	+0.57	+0.98	
152	10.71	+0.85	+0.68	+0.59	+0.96	
153	7.52	+0.25	+0.15	+0.15	+0.21	
157	7.92	+0.45	+0.34	+0.33	+0.53	A9 V
158	8.21	+0.40	+0.26	+0.25	+0.40	A7 V
164	9.52	+0.51	+0.50	+0.45	+0.75	F5 V
173	10.86	+1.33	+0.89	+0.71	+1.15	
232	8.09	+0.35	+0.20	+0.21	+0.31	A5 V
233	9.66	+1.34	+0.53	+0.50	+0.85	F6 V
248	11.01	+1.04	+0.79	+0.65	+1.10	
250	10.72	+0.84	+0.70	+0.55	+0.95	
253	10.71	+0.82	+0.68	+0.63	+1.03	
293	10.78	+0.89	+0.73	+0.58	+0.98	
298+299	10.89	+1.35	+0.88	+0.75	+1.23	
303	10.49	+1.26	+0.91	+0.77	+1.33	
314	10.60	+0.76	+0.66	+0.57	+0.96	
320	11.02	+1.34	+0.90	+0.71	+1.23	
338	9.04	+0.58	+0.48	+0.46	+0.78	F2 V
344	8.17	+0.36	+0.27	+0.26	+0.40	A8 V
405	9.84	+0.59	+0.54	+0.50	+0.81	F9 V
447	5.46	-0.37	-0.04	+0.06	0.01	B7 IV
468	3.70	-0.52	-0.12	-0.01	-0.11	B6 III
470	8.86	+0.41	+0.40	+0.39	+0.63	F3 V
476	10.80	+1.11	+0.84	+0.68	+1.16	
489	10.41	+0.76	+0.63	+0.57	+0.94	G0 V
514	10.73	+0.88	+0.71	+0.58	+0.97	
530	8.96	+0.41	+0.39	+0.37	+0.61	F2 V
531	8.58	+0.50	+0.34	+0.33	+0.54	Am?

TABLE 3 (continued)

Hz II	V	U-V	B-V	V-R	V-I	MK
541	5.65	-0.43	-0.07	+0.03	-0.04	B8 V
563	4.30	-0.57	-0.11	-0.01	-0.10	B6 V
605	9.00	+0.52	+0.44	+0.45	+0.73	F3 V
627	9.65	+0.55	+0.52	+0.46	+0.77	F5 V
652	8.05	+0.39	+0.21	+0.20	+0.35	A3 V
697	8.59	+0.46	+0.35	+0.34	+0.58	A9 V
708	10.11	+0.75	+0.62	+0.55	+0.95	F9 V
717	7.22	+0.24	+0.16	+0.20	+0.33	A1 V
727	9.71	+0.61	+0.56	+0.51	+0.85	F9 V
739	9.48	+0.69	+0.63	+0.53	+0.89	G0 V
745	9.46	+0.64	+0.53	+0.51	+0.86	F5 V
761	10.56	+0.88	+0.71	+0.63	+1.02	
785	3.87	-0.47	-0.07	+0.04	-0.02	B7 III
801	6.85	+0.05	+0.04	+0.07	+0.09	A0 V
804	7.88	+0.36	+0.20	+0.19	+0.32	A2 V
817	5.76	-0.27	-0.04	+0.06	+0.02	B8 V
859	6.43	-0.17	-0.02	+0.04	+0.02	B9 V
923	10.13	+0.71	+0.62	+0.54	+0.87	
948	8.66	+0.70	+0.60	+0.51	+0.85	G0 V
956	7.97	+0.39	+0.32	+0.30	+0.51	A7 V
975	10.58	+1.10	+0.81	+0.71	+1.26	
980	4.18	-0.48	-0.06	+0.07	+0.03	B6 IVn
996	10.40	+0.82	+0.67	+0.53	+0.90	G0 V
1015	10.50	+0.77	+0.65	+0.57	+0.92	
1028	7.40	+0.23	+0.11	+0.11	+0.16	A2 V
1084	8.16	+0.66	+0.37	+0.37	+0.66	A0 V
1101	10.24	+0.69	+0.61	+0.54	+0.90	
1117	10.20	+1.04	+0.73	+0.60	+0.99	G6 V
1122	9.29	+0.49	+0.46	+0.44	+0.70	F4 V
1132	9.42	+0.53	+0.50	+0.46	+0.75	

TABLE 3 (continued)

HzII	V	U-V	B-V	V-R	V-I	MK
1139	9.37	+0.48	+0.48	+0.40	+0.69	F5 V
1182	10.48	+0.74	+0.64	+0.55	+0.91	
1200	9.94	+0.59	+0.54	+0.52	+0.86	
1207	10.47	+0.73	+0.64	+0.56	+0.89	
1215	10.52	+0.81	+0.65	+0.54	+0.91	G0 V
1234	6.83	-0.05	+0.02	+0.07	+0.09	B9.5 V
1266	8.27	+0.48	+0.36	+0.34	+0.56	A9 V
1284	8.36	+0.38	+0.30	+0.28	+0.44	A9 V
1309	9.46	+0.49	+0.47	+0.41	+0.70	F6 V
1338	8.64	+0.49	+0.46	+0.43	+0.71	F3 V
1362	8.27	+0.35	+0.25	+0.25	+0.39	A7 V
1375	6.32	0.00	+0.02	+0.05	+0.03	A0 V
1380	7.04	+0.08	+0.03	+0.04	+0.04	A1 V
1384	7.71	+0.33	+0.21	+0.21	+0.34	A4 V
1397	7.24	+0.11	+0.07	+0.12	+0.17	A2 V
1407	8.12	+0.39	+0.26	+0.23	+0.37	
1425	7.79	+0.28	+0.16	+0.15	+0.23	A3 V
1431	6.83	+0.09	+0.07	+0.09	+0.12	A0 V
1432	2.87	-0.44	-0.09	+0.03	-0.01	B7 III
1514	10.48	+0.78	+0.66	+0.54	+0.91	
1613	9.87	+0.65	+0.54	+0.47	+0.81	F8 V
1726	9.28	+0.67	+0.55	+0.50	+0.82	F6 V
1762	8.27	+0.47	+0.36	+0.34	+0.56	A9 V
1766	9.13	+0.54	+0.47	+0.44	+0.75	F4 V
1776	10.88	+0.95	+0.73	+0.63	+1.04	
1797	10.13	+0.63	+0.56	+0.52	+0.83	F9 V
1823	5.45	-0.39	-0.07	+0.05	-0.01	B8 V
1856	10.01	+0.65	+0.56	+0.48	+0.80	F8 V
1876	6.95	+0.22	+0.13	+0.13	+0.21	A1 V
1912	9.05	+0.49	+0.47	+0.46	+0.77	F4 V

TABLE 3 (continued)

HzII	V	U-V	B-V	V-R	V-I	MK
1924	10.34	+0.74	+0.61	+0.52	+0.87	G0 V
1993	8.39	+0.39	+0.26	+0.28	+0.44	A8 V
2027	10.88	+1.36	+0.86	+0.74	+1.23	
2147	10.87	+1.16	+0.82	+0.72	+1.26	
2168	3.62	-0.45	-0.09	+0.01	-0.04	B8 III
2172	10.43	+0.72	+0.63	+0.55	+0.93	
2181	5.09	-0.36	-0.08	+0.07	+0.01	B8p
2195	8.13	+0.32	+0.22	+0.20	+0.32	A7 V
2220	7.46	+0.22	+0.11	+0.10	+0.15	A2 V
2263	6.57	-0.14	-0.02	+0.03	0.00	B9.5 V
2278	10.84	+1.32	+0.86	+0.73	+1.23	
2289	7.99	+0.31	+0.18	+0.16	+0.26	A3 V
2341	10.85	+0.96	+0.72	+0.57	+0.98	
2345	9.14	+0.46	+0.44	+0.41	+0.66	F3 V
2415	8.14	+0.34	+0.21	+0.21	+0.30	A7 V
2425	6.17	-0.24	-0.05	+0.03	-0.02	B9 V
2488	7.55	+0.16	+0.08	+0.07	+0.09	A2 V
2500+2507	6.72	0.00	+0.06	+0.10	+0.17	A0 V
2506	10.27	+0.68	+0.60	+0.54	+0.89	
2644	11.05	+0.98	+0.73	+0.65	+1.05	
2786	10.29	+0.68	+0.61	+0.53	+0.87	
2866	6.93	+0.12	+0.09	+0.10	+0.16	A2 V
3031	8.87	+0.43	+0.38	+0.38	+0.61	F2 V
3097	10.94	+0.99	+0.74	+0.65	+1.06	
3179	10.05	+0.63	+0.57	+0.52	+0.86	
TR 60	9.45	+0.46	+0.48	+0.44	+0.73	
TS 4	9.54	+0.52	+0.51	+0.48	+0.80	
TS 9	8.93	+0.38	+0.36	+0.32	+0.55	
TS 19	9.23	+0.53	+0.53	+0.45	+0.76	
TS 23	6.77	-0.01	0.00	+0.05	+0.03	

TABLE 3 (continued)

HzII	V	U-V	B-V	V-R	V-I	MK
TS 25	7.13	+0.07	+0.04	+0.07	+0.05	
TS 25a	6.50	+0.33	+0.15	+0.17	+0.24	
TS 26	7.28	+0.10	+0.08	+0.10	+0.13	
TS 29	8.80	+0.39	+0.35	+0.31	+0.52	
TS 37	9.18	+0.46	+0.45	+0.40	+0.66	
TS 39	9.11	+0.49	+0.47	+0.42	+0.70	
TS 42	9.86	+0.58	+0.55	+0.48	+0.79	
TS 45+45x	8.59	+0.47	+0.47	+0.41	+0.68	
TS 51x	9.84	+0.62	+0.58	+0.48	+0.83	
TS 61	9.49	+0.51	+0.49	+0.44	+0.75	
TS 67	9.13	+0.63	+0.50	+0.43	+0.77	
TS 76	7.77	+0.31	+0.18	+0.17	+0.27	
TS 78+78x	7.84	+0.34	+0.19	+0.17	+0.26	
TS 84	7.99	+0.34	+0.22	+0.22	+0.33	
TS 93	8.73	+0.49	+0.37	+0.32	+0.55	
TS 115	8.33	+0.41	+0.27	+0.23	+0.37	
TS 127	8.40	+0.39	+0.40	+0.36	+0.62	
TS 137	7.75	+0.30	+0.18	+0.17	+0.27	
TS 142	7.03	+0.01	+0.03	+0.05	+0.05	
TS 144y	9.57	+0.59	+0.53	+0.46	+0.81	
TS 149	6.07	-0.33	-0.01	+0.07	+0.06	
TS 151x	9.64	+0.53	+0.52	+0.44	+0.77	
TS 156x	9.45	+0.63	+0.54	+0.49	+0.84	
TS 165	7.64	+0.30	+0.17	+0.08	+0.16	
TS 177	6.36	+0.27	+0.12	+0.10	+0.24	
TS 183x	9.09	+0.67	+0.55	+0.49	+0.84	
TS 184	9.07	+0.42	+0.45	+0.40	+0.68	
TS 184x	10.49	+0.83	+0.67	+0.57	+1.03	
TS 185	8.34	+0.40	+0.28	+0.25	+0.43	
TS 194	7.20	+0.03	+0.04	+0.05	+0.05	

TABLE 4

INFRARED PHOTOMETRY OF THE PLEIADES

HzII	V	V-J	V-K	V-L
447	5.46	+0.01	-0.14	-0.06
468	3.70	-0.18	-0.24	-0.31
541	5.65	-0.12	-0.18	-0.18
563	4.30	-0.15	-0.21	-0.27
785	3.87	-0.06	-0.13	-0.10
817	5.76	-0.04	-0.06	-0.07
980	4.18	+0.02	+0.12	+0.21
1084	8.16	+0.91	+1.08	+1.11
1432	2.87	-0.08	-0.09	-0.03
1823	5.45	-0.13	-0.22	-0.37
2168	3.62	-0.12	-0.18	-0.05
2181	5.09	-0.02	+0.03	+0.14

TABLE 5

UBVRI PHOTOMETRY OF THE HYADES

VB	V	U-V	B-V	V-R	V-I	MK
1	7.40	+0.69	+0.57	+0.49	+0.79	
2	7.78	+0.78	+0.62	+0.52	+0.83	
3	8.35	+1.08	+0.75	+0.61	+1.00	
4	8.90	+1.38	+0.84	+0.67	+1.10	
5	9.38	+1.61	+0.91	+0.75	+1.25	
6	5.97	+0.34	+0.34	+0.33	+0.50	
7	8.99	+1.53	+0.89	+0.70	+1.14	
8	6.37	+0.42	+0.42	+0.37	+0.59	
9	8.67	+0.95	+0.71	+0.58	+0.97	
10	7.85	+0.70	+0.60	+0.50	+0.78	
11+12	6.01	+0.42	+0.40	+0.38	+0.58	F3 V
13	6.62	+0.41	+0.42	+0.39	+0.61	
14	5.73	+0.35	+0.36	+0.35	+0.54	F4 V
15	8.05	+0.86	+0.66	+0.56	+0.89	G3 V
16	7.05	+0.43	+0.42	+0.38	+0.58	
17	8.46	+0.94	+0.70	+0.55	+0.93	G5 V
18	8.06	+0.81	+0.64	+0.54	+0.87	
19	7.12	+0.56	+0.51	+0.46	+0.72	
20	6.32	+0.42	+0.40	+0.38	+0.59	F3 V
21	9.15	+1.29	+0.82	+0.65	+1.05	K0 V
22	8.35	+1.10	+0.77	+0.64	+1.06	G8 V
23	7.53	+0.93	+0.69	+0.56	+0.89	
24	5.65	+0.35	+0.28	+0.28	+0.44	A8 V
25	9.58	+1.80	+0.99	+0.78	+1.26	K3 V
26	8.62	+1.07	+0.74	+0.59	+0.98	G9 V
27	8.45	+1.04	+0.73	+0.58	+0.96	G8 V
28	3.65	+1.80	+0.99	+0.73	+1.20	K0 III
29	6.89	+0.65	+0.56	+0.48	+0.78	F8 V
30	5.59	+0.36	+0.28	+0.28	+0.43	F0 V
31	7.46	+0.65	+0.57	+0.50	+0.80	G0 V

TABLE 5 (continued)

VB	V	U-V	B-V	V-R	V-I	MK
32	6.11	+0.40	+0.37	+0.37	+0.57	F2 V
33	5.26	+0.32	+0.22	+0.23	+0.35	A9 V
34	6.17	+0.48	+0.46	+0.42	+0.67	F6 V
35	6.80	+0.43	+0.44	+0.42	+0.66	F5 V
36	6.81	+0.44	+0.44	+0.39	+0.64	F6 V
37	6.61	+0.41	+0.41	+0.38	+0.61	F4 V
38	5.72	+0.42	+0.32	+0.31	+0.48	Am
39	7.87	+0.90	+0.68	+0.56	+0.93	
40	7.00	+0.65	+0.56	+0.48	+0.81	G0 V
41	3.76	+1.81	+0.99	+0.73	+1.20	K1 III
42	8.85	+1.11	+0.76	+0.62	+1.01	G9 V
43	9.40	+1.52	+0.91	+0.76	+1.26	K2 V
44	7.18	+0.48	+0.45	+0.42	+0.67	
45	5.64	+0.43	+0.30	+0.27	+0.43	Am
46	9.12	+1.40	+0.86	+0.69	+1.13	K1 V
47	4.80	+0.28	+0.15	+0.16	+0.23	A7.5 V
48	7.14	+0.56	+0.52	+0.46	+0.74	F7 V
49	8.24	+0.71	+0.59	+0.51	+0.82	
50	7.61	+0.72	+0.60	+0.53	+0.89	G1 V
51	6.97	+0.44	+0.44	+0.42	+0.68	F6 V
52	7.80	+0.73	+0.60	+0.53	+0.86	G1 V
53	5.97	+0.41	+0.37	+0.38	+0.60	F4 Vn
54	4.22	+0.27	+0.13	+0.16	+0.21	A7 V
55	5.28	+0.34	+0.25	+0.26	+0.40	A7 V
56	4.28	+0.12	+0.04	+0.09	+0.10	A3 V
57	6.46	+0.51	+0.49	+0.44	+0.69	F7 V
58	7.53	+0.92	+0.68	+0.57	+0.93	G6 V
59	7.49	+0.62	+0.54	+0.48	+0.77	F8 V
60	4.28	+0.41	+0.26	+0.27	+0.41	A8 Vn
61	7.38	+0.53	+0.51	+0.47	+0.74	

TABLE 5 (continued)

VB	V	U-V	B-V	V-R	V-I	MK
62	7.38	+0.62	+0.54	+0.46	+0.67	F8 V
63	8.05	+0.81	+0.64	+0.54	+0.89	G5 V
64	8.12	+0.86	+0.66	+0.56	+0.89	G6 V
65	7.42	+0.60	+0.54	+0.47	+0.75	F8 V
66	7.51	+0.60	+0.55	+0.49	+0.78	
67	5.72	+0.37	+0.27	+0.25	+0.39	Am
68	5.90	+0.38	+0.32	+0.31	+0.50	F0 V
69	8.60	+1.09	+0.75	+0.58	+0.95	G8 V
70	3.54	+1.88	+1.01	+0.73	+1.23	K1 III
71	3.83	+1.67	+0.95	+0.71	+1.18	G9 III
72	3.39	+0.30	+0.18	+0.18	+0.27	A7 IV n
73	7.85	+0.74	+0.61	+0.50	+0.79	G1 V
74	5.03	+0.35	+0.23	+0.20	+0.28	A7 IV n
75	6.59	+0.59	+0.53	+0.47	+0.76	
76	9.24	+1.16	+0.76	+0.61	+0.99	
77	7.03	+0.54	+0.50	+0.46	+0.74	F7 V
78	6.91	+0.45	+0.45	+0.41	+0.66	F6 V
79	8.95	+1.32	+0.83	+0.65	+1.06	K0 V
80	5.58	+0.42	+0.32	+0.32	+0.51	F0 V
81	7.10	+0.48	+0.47	+0.44	+0.71	F6 V
82	4.78	+0.30	+0.17	+0.17	+0.24	A6 V n
83	5.48	+0.36	+0.26	+0.24	+0.36	Am
84	5.41	+0.36	+0.26	+0.25	+0.40	F0 V n
85	6.51	+0.44	+0.43	+0.41	+0.65	F5 V
86	7.04	+0.47	+0.47	+0.43	+0.68	
87	8.60	+1.09	+0.74	+0.60	+0.96	G8 V
88	7.77	+0.60	+0.54	+0.47	+0.76	F9 V
89	6.02	+0.37	+0.34	+0.33	+0.53	F2 V n
90	6.40	+0.41	+0.41	+0.38	+0.63	(dF4)
91	8.94	+1.43	+0.88	+0.72	+1.20	K1 V

TABLE 5 (continued)

VB	V	U-V	B-V	V-R	V-I	MK
92	8.64	+1.09	+0.75	+0.59	+0.96	G8 V
93	9.40	+1.50	+0.88	+0.70	+1.14	K2 V
94	6.62	+0.42	+0.43	+0.39	+0.62	F5 V
95	4.65	+0.33	+0.25	+0.24	+0.36	A8 V n
96	8.50	+1.33	+0.84	+0.67	+1.11	K0 IV
97	7.90	+0.79	+0.64	+0.51	+0.82	G1 V
98	9.23	+0.44	+0.45	+0.40	+0.66	
99	9.38	+1.46	+0.86	+0.68	+1.11	K1 V
100	6.02	+0.40	+0.38	+0.37	+0.58	(dF2)
101	6.65	+0.45	+0.44	+0.38	+0.64	F5 V
102	7.54	+0.73	+0.62	+0.51	+0.84	G1 V
103	5.79	+0.37	+0.31	+0.31	+0.47	F0 V
104	4.27	+0.25	+0.12	+0.14	+0.19	A6 V n
105	7.53	+0.68	+0.58	+0.48	+0.78	
106	7.96	+0.88	+0.67	+0.51	+0.84	
107	5.39	+0.37	+0.25	+0.23	+0.35	
108	4.70	+0.28	+0.14	+0.18	+0.25	A5 V n
109	9.39	+1.26	+0.81	+0.64	+1.04	
110	8.86	+0.93	+0.68	+0.55	+0.92	
111	5.40	+0.33	+0.25	+0.25	+0.39	
112	5.37	+0.31	+0.19	+0.18	+0.26	Am
113	7.26	+0.64	+0.56	+0.48	+0.79	
114	8.53	+1.03	+0.72	+0.58	+0.95	
115	9.05	+1.37	+0.84	+0.67	+1.11	
116	8.97	+1.33	+0.82	+0.68	+1.09	
117	9.64	+1.99	+1.07	+0.91	+1.49	
118	7.74	+0.69	+0.58	+0.48	+0.78	
119	7.11	+0.63	+0.56	+0.49	+0.80	
120	7.73	+1.06	+0.74	+0.57	+0.93	
121	7.29	+0.53	+0.50	+0.44	+0.71	

TABLE 5 (continued)

VB	V	U-V	B-V	V-R	V-I	MK
122	6.77	+0.60	+0.55	+0.46	+0.76	
123	5.11	+0.33	+0.21	+0.22	+0.34	(dA5n)
124	6.29	+0.56	+0.50	+0.45	+0.74	
125	9.31	+0.45	+0.49	+0.47	+0.74	
126	6.37	+0.36	+0.29	+0.28	+0.45	(dA9n)
127	8.89	+1.09	+0.74	+0.58	+0.93	
128	6.76	+0.44	+0.45	+0.38	+0.64	
129	4.64	+0.30	+0.16	+0.16	+0.25	A7 V
130	5.43	+0.39	+0.24	+0.20	+0.32	(Am)
131+132	5.94	+0.37	+0.32	+0.25	+0.39	Am
135	8.99	+1.49	+0.87	+0.69	+1.16	
136	7.44	+2.06	+1.11	+0.83	+1.47	
137	5.89	+0.37	+0.32	+0.32	+0.49	F1 V
138	8.29	+1.36	+0.86	+0.72	+1.19	
140	8.93	+1.11	+0.77	+0.65	+1.11	
141	4.50	+0.39	+0.25	+0.27	+0.42	F0 V
142	8.31	+0.88	+0.67	+0.55	+0.90	
143	7.89	+0.59	+0.53	+0.46	+0.73	
146	7.24	+0.59	+0.53	+0.47	+0.75	
148	8.96	+0.71	+0.63	+0.55	+0.95	
149	8.50	+0.71	+0.62	+0.52	+0.86	
150	8.78	+1.66	+1.04	+0.87	+1.51	
153	8.92	+1.41	+0.84	+0.68	+1.12	
154	5.80	+0.42	+0.41	+0.38	+0.58	(dF4)
157	5.79	+0.48	+0.44	+0.40	+0.61	(dF3)
158	8.04	+0.74	+0.61	+0.51	+0.84	
159	8.77	+0.51	+0.52	+0.45	+0.78	
160	5.46	+0.36	+0.36	+0.37	+0.58	
162	7.83	+0.98	+0.71	+0.58	+0.92	
163	7.98	+0.42	+0.39	+0.34	+0.58	

TABLE 5 (continued)

VB	V	U-V	B-V	V-R	V-I	MK
164	6.01	+2.53	+1.21	+0.88	+1.51	(gK4)
165	8.52	+0.82	+0.63	+0.51	+0.84	
167	9.27	+0.22	+0.20	+0.25	+0.41	
168	5.54	+0.32	+0.22	+0.21	+0.33	(A5)
169	4.13	+0.27	+0.16	+0.19	+0.27	Am
173	10.49	+2.42	+1.24	+1.05	+1.75	
174	10.00	+2.02	+1.07	+0.86	+1.41	K4 V
175	10.30	+1.97	+1.04	+0.85	+1.39	K4 V
176	9.03	+1.60	+0.94	+0.76	+1.27	K2 V
178	9.04	+1.37	+0.84	+0.67	+1.15	K0 V
180	9.11	+1.42	+0.86	+0.69	+1.13	K1 V
181	10.30	+2.24	+1.16	+0.99	+1.63	
182	8.94	+1.34	+0.85	+0.68	+1.17	
183	9.69	+1.62	+0.94	+0.75	+1.22	K2 V

TABLE 6

INFRARED PHOTOMETRY OF THE HYADES

VB	V	V-J	V-K	V-L
28	3.65	1.58	2.14	
41	3.76	1.53	2.12	2.21
70	3.54	1.60	2.21	
71	3.83	1.54	2.10	
72	3.39	0.32	0.47	

TABLE 7

UBVRI PHOTOMETRY OF ORION

Star	V	U-V	B-V	V-R	V-I	Sp
30836	3.68	-0.96	-0.16	-0.07	-0.22	B2 III
31237	3.73	-1.01	-0.19	-0.06	-0.26	B2 III
-3° 1013	10.08	+0.25	+0.20	+0.23	+0.40	B9 V
33647	6.67	-0.41	-0.07	+0.01	-0.10	B8 V
34179	8.04	-0.50	-0.06	+0.01	-0.07	B8 V
34317	6.42	0.00	-0.02	+0.05	+0.02	A0 V
34748	6.35	-0.86	-0.11	+0.01	-0.13	B1.5 V
34511	7.38	-0.82	-0.14	-0.04	-0.20	B5 V
34959	6.62	-0.56	-0.09	+0.03	-0.02	B5 p
34989	5.80	-1.01	-0.13	+0.01	-0.12	B1 V
35007	5.69	-0.77	-0.11	-0.02	-0.17	B3 V
35039	4.74	-0.95	-0.16	-0.05	-0.23	B2 IV
35079	7.07	-0.56	-0.04	+0.03	-0.03	B3 V
35149	5.00	-1.01	-0.14	-0.05	-0.23	B1 V
35203	7.98	-0.56	-0.09	-0.02	-0.10	B6 V
35298	7.89	-0.71	-0.12	-0.04	-0.20	B9 V
35299	5.70	-1.09	-0.21	-0.08	-0.27	B1 V
35407	6.32	-0.78	-0.15	-0.05	-0.21	B5 V
35411	3.35	-1.10	-0.17	-0.05	-0.30	B0.5 V
35439	4.96	-1.13	-0.20	-0.08	-0.30	B1 Vp
35501	7.42	-0.44	-0.05	+0.02	-0.08	B8 V
35502	7.34	-0.58	-0.04	+0.02	-0.06	B5 V
35575	6.43	-0.89	-0.17	-0.05	-0.22	B3 V
35588	6.16	-0.93	-0.18	-0.06	-0.26	B3 V
35640	6.23	-0.28	-0.05	+0.01	-0.04	B9 V
35673	6.53	-0.20	0.00	+0.07	+0.04	B9 V
35715	4.60	-1.14	-0.21	-0.11	-0.33	B2 IV
35718	8.69	+0.02	+0.06	+0.09	+0.10	(B 8-9)
35730	7.20	-0.80	-0.13	-0.05	-0.23	B5 p
35762	6.75	-0.90	-0.16	-0.06	-0.25	B2 V

TABLE 7 (cont.)

Star	V	U-V	B-V	V-R	V-I	Sp
35777	6.62	-0.91	-0.15	-0.03	-0.20	B2 V
35792	7.21	-0.77	-0.14	-0.05	-0.19	B3 V
CO Ori	12.27	+1.71	+1.06	+1.01	+1.80	(Gpe α)
35834	7.70	-0.36	-0.03	+0.05	0.00	B8 V
35881	7.80	-0.55	-0.07	0.00	-0.09	B8 V
35882	7.81	-0.53	-0.07	+0.01	-0.02	(B 8)
35899	7.51	-0.74	-0.12	-0.05	-0.18	B5 V
35901	9.03	-0.16	-0.03	+0.09	+0.08	(B 8-9)
35910	7.57	-0.62	-0.10	-0.03	-0.15	B6 V
35912	6.40	-0.92	-0.17	-0.06	-0.24	(B 2)
GW Ori	9.75	+1.30	+1.00	+0.88	+1.50	(dK 3e)
36012	7.33	-0.69	-0.11	-0.05	-0.15	(B2 - B5)
36013	6.91	-0.77	-0.14	-0.04	-0.18	B2 V
36120	7.97	-0.40	-0.05	+0.04	-0.01	(B 8-9)
36133	7.12	-0.78	-0.11	-0.06	-0.23	B2 V
36151	6.67	-0.70	-0.11	-0.02	-0.14	B5 V
36166	5.78	-1.04	-0.20	-0.06	-0.26	B1.5 V
36219	7.65	-0.38	-0.06	-0.02	-0.08	(B 8-9)
36234	8.65	-0.43	-0.06	-0.01	-0.10	(B 8-9)
36267	4.21	-0.70	-0.13	-0.05	-0.20	B5 V
36285	6.32	-1.03	-0.19	-0.07	-0.24	B1.5 V
36324	9.03	+0.14	+0.06	+0.08	+0.10	(A0 - A2)
-3° 1119	10.31	+0.32	+0.20	+0.21	+0.36	(B9 - A0)
36351	5.46	-0.99	-0.17	-0.07	-0.26	B1.5 V
36366	8.18	+0.01	+0.05	+0.10	+0.11	(B9 - A0)
36392	7.54	-0.75	-0.12	-0.04	-0.19	B3 V
36411	9.71	+0.15	+0.09	+0.14	+0.12	(B 8-9)
36412	9.47	+1.24	+0.72	+0.69	+1.20	(A 7)
36429	7.56	-0.75	-0.12	0.00	-0.12	B5 V
36430	6.21	-0.92	-0.18	-0.06	-0.24	B2 V

TABLE 7 (cont.)

Star	V	U-V	B-V	V-R	V-I	Sp
36486	2.24	-1.28	-0.22	-0.08	-0.30	09.5 II
36487	7.78	-0.63	-0.11	-0.01	-0.13	B5 V
36512	4.63	-1.33	-0.26	-0.12	-0.37	B0 V
36513	9.49	-0.05	+0.02	+0.04	+0.02	(B 8-9)
36527	9.49	+0.25	+0.15	+0.24	+0.29	(A 0)
36540	8.14	-0.42	+0.06	+0.17	+0.22	(B 8-9)
36541	7.67	-0.54	-0.10	+0.03	-0.07	(B 8-9)
36550	9.35	-0.04	+0.02	+0.05	+0.02	(B 8-9)
36559	8.81	-0.26	-0.03	+0.07	-0.04	(B 8-9)
36560	8.25	-0.46	-0.08	-0.01	-0.11	(B 9)
36591	5.35	-1.12	-0.19	-0.05	-0.24	B1 V
36607	9.19	-0.18	-0.03	+0.04	-0.02	(B 8-9)
-5° 1287	10.02	+0.35	+0.28	+0.23	+0.36	(A 8)
36627	7.58	-0.64	-0.10	-0.05	-0.14	B6 V
36629	7.65	-0.64	+0.02	+0.12	+0.12	B2 V
36646	6.53	-0.75	-0.10	0.00	-0.11	B3 V
36655	8.61	-0.31	-0.05	+0.11	+0.08	(B 8-9)
36670	8.94	-0.05	+0.02	+0.09	+0.03	(B 8-9)
36695	5.34	-1.09	-0.18	-0.05	-0.25	B1 V
36697	8.63	+0.03	+0.07	+0.11	+0.13	(B 8-9)
P 1212	11.36	+1.06	+0.68	+0.66	+1.23	(A 0)
36741	6.58	-0.96	-0.16	-0.07	-0.28	B2 V
36779	6.20	-0.97	-0.16	-0.06	-0.24	B3 V
36781	8.51	-0.40	0.00	+0.07	+0.07	(B 9)
36783	9.49	-0.08	+0.01	+0.05	+0.07	(B 8-9)
-3° 1140	10.18	+0.36	+0.27	+0.30	+0.50	(B 8-9)
36811	7.07	+0.29	+0.17	+0.13	+0.23	(A 0)
P 1352	15.9:	+1.5:	+1.2	+1.1	+1.7	(flare)
36822	4.41	-1.12	-0.15	-0.01	-0.18	B0 IV
36824	6.71	-0.85	-0.14	-0.02	-0.18	B3 V

TABLE 7 (cont.)

Star	V	U-V	B-V	V-R	V-I	Sp
36841	8.58	-0.30	+0.04	+0.08	+0.11	(B 9)
36842	8.12	-0.59	-0.08	0.00	-0.11	(B 3)
EZ Ori	12.84	+1.14	+0.86	+0.81	+1.38	(F9: eV)
36861	3.39	-1.20	-0.18	-0.06	-0.23	O 8
36863	8.28	+0.47	+0.27	+0.31	+0.39	(A0 - A2)
36865	7.41	-0.48	-0.05	+0.04	-0.04	(B 8-9)
36867	9.28	-0.14	0.00	+0.02	-0.01	(B 8-9)
-5° 1302	10.27	+0.38	+0.25	+0.24	+0.36	A7 V
36883	7.26	-0.55	-0.09	+0.05	-0.05	(B 8-9)
36898	7.11	-0.50	-0.08	+0.01	-0.08	(B 5)
36899	9.59	+0.01	+0.05	+0.02	+0.02	(B 8-9)
P 1553	14.6	+1.7	+1.16	+1.12	+1.99	(flare)
36916	6.75	-0.67	-0.14	0.00	-0.14	(B 8-9
36917	7.94	+0.17	+0.13	+0.24	+0.46	(A 0
36918	8.32	-0.63	-0.10	-0.04	-0.17	(B -)
36936	7.57	-0.68	-0.11	-0.02	-0.16	(B 5-6)
36938	8.85	-0.14	+0.06	+0.12	+0.18	(B 8-9)
36939	8.97	-0.30	-0.04	0.00	-0.03	(B 8-9)
-5° 1309	10.91	+0.71	+0.41	+0.38	+0.65	(A 0)
-5° 1310	10.43	+0.78	+0.54	+0.52	+0.90	(B 9)
36954	6.97	-0.75	-0.11	-0.02	-0.13	B3 V
36957	8.84	+0.03	+0.06	+0.10	+0.07	(B 8-9)
36958	7.32	-0.72	-0.10	+0.04	-0.04	(B 3)
36959	5.67	-1.15	-0.24	-0.07	-0.28	B1 V
36960	4.78	-1.27	-0.25	-0.11	-0.35	B0 V
-3° 1143	9.87	+0.22	+0.13	+0.20	+0.35	(B 8-9)
36981	7.84	-0.71	-0.13	-0.03	-0.16	(B 3)
36982	8.43	-0.52	+0.10	+0.24	+0.45	B1.5 Vp
36983	9.15	-0.22	0.00	-0.02	-0.06	(B 8-9)
36998	9.02	-0.21	-0.01	+0.12	+0.05	(B 8-9)

TABLE 7 (cont.)

Star	V	U-V	B-V	V-R	V-I	Sp
36999	8.43	-0.55	-0.11	-0.02	-0.14	(B 8-9)
37000	7.42	-0.80	-0.14	-0.03	-0.17	(B 5)
37001	8.88	-0.30	-0.04	+0.03	-0.04	(B 8-9)
37016	6.25	-0.85	-0.15	-0.01	-0.18	B3 V
37017	6.55	-0.89	-0.13	-0.05	-0.19	B1.5 V
37018	4.59	-1.13	-0.19	-0.08	-0.26	B2 III
-4° 1181	9.51	-0.10	+0.35	+0.49	+0.94	(B 3)
37019	9.34	-0.06	+0.02	+0.06	+0.03	(B 8-9)
37020	6.72	-0.86	0.00	+0.31	+0.52	B0.5 Vp
37020-3	4.58	-0.81	+0.05	+0.22	+0.43	O-
37022	5.13	-0.95	0.00	+0.22	+0.40	O 6p
37023	6.70	-0.74	+0.08	+0.31	+0.51	B0.5 Vp
37025	7.13	-0.78	-0.14	-0.04	-0.16	(B 3)
-5° 1318	9.71	-0.07	+0.27	+0.36	+0.90	(B 2)
37040	6.32	-0.84	-0.13	-0.02	-0.18	(B 2-3)
37041	5.07	-1.02	-0.09	+0.09	+0.09	O 9.5 Vp
37042	6.41	-0.98	-0.08	+0.04	0.00	B1 V
37043	2.76	-1.31	-0.25	-0.08	-0.29	O9 III
37055	6.40	-0.76	-0.12	-0.01	-0.14	B3 V
37056	8.37	-0.41	-0.05	+0.04	-0.02	(B 8-9)
37057	9.29	-0.11	+0.01	+0.14	+0.14	(B 8-9)
37058	7.32	-0.93	-0.15	-0.04	-0.24	B2 Vp
37059	9.07	-0.28	-0.02	0.00	-0.06	(B 8-9)
37060	9.35	-0.07	-0.01	+0.05	+0.03	(B 8-9)
37061	6.80	-0.39	+0.27	+0.39	+0.70	B1 V
37062	8.17	-0.45	+0.04	+0.15	+0.24	B5 V
P 2078	14.9:	+1.2	+1.3	+1.21	+2.16	(flare)
-5° 1328	9.86	+0.08	+0.05	+0.12	+0.11	(A 0)
-5° 1324	9.78	+0.61	+0.46	+0.42	+0.70	(A8 - F0)
37078	9.44	+0.19	+0.09	+0.09	+0.10	(A 0)

TABLE 7 (cont.)

Star	V	U-V	B-V	V-R	V-I	Sp
P 2172	15.98	+2.05	+1.33	+1.37	+2.58	(flare)
37128	1.69	-1.21	-0.18	-0.07	-0.24	B0 Ia
37129	7.14	-0.87	-0.17	-0.05	-0.21	(B2 - 3p)
37130	9.97	+0.02	+0.11	+0.24	+0.45	(B 8-9)
P 2305	16.04	+2.50	+1.32	+1.20	+2.06	(flare)
37131	8.13	-0.40	-0.07	+0.05	+0.02	(B 8-9)
37140	8.56	-0.31	+0.10	+0.18	+0.24	(B 5)
P 2347	15.4:	+1.4:	+1.06	+1.14	+1.84	(flare)
V380 Ori	10.31	+0.29	+0.52	+0.73	+1.41	(A1:e)
37209	5.74	-1.13	-0.22	-0.06	-0.30	(B 2)
-3° 1154	9.67	-0.14	-0.04	+0.06	+0.01	(B8 - A0)
P 2441	11.66	+0.86	+0.68	+0.61	+1.07	(F5:e)
P 2455	17.5	+3.0	+1.69	+1.89	+3.37	(flare)
37258	9.60	+0.15	+0.11	+0.15	+0.27	(A 0)
37273	9.92	+0.20	+0.15	+0.20	+0.33	(B 8-9)
37303	6.06	-1.13	-0.21	-0.07	-0.32	B1 V
37321	7.13	-0.58	-0.08	0.00	-0.08	B3 V
37322	9.80	+0.09	+0.07	+0.07	+0.08	(A 0)
37330	7.46	-0.62	-0.10	+0.01	-0.11	B6 V
37357	8.87	+0.17	+0.09	+0.12	+0.22	(B8 - A0)
P 2603	10.87	+0.55	+0.30	+0.32	+0.55	(A 2-5)
37373	8.33	-0.47	-0.11	-0.01	-0.12	(B 8-9)
37390	9.42	+0.10	+0.15	+0.22	+0.39	(B 8-9)
-6° 1270	9.78	+0.15	+0.08	+0.08	+0.14	(A0 - A2)
P 2652	11.45	+1.22	+0.88	+0.84	+1.42	(B 9)
37411	9.79	+0.24	+0.12	+0.19	+0.34	(B 8-9)
-6° 1273	10.23	+0.29	+0.29	+0.30	+0.60	(B 8-9)
37428	8.68	-0.05	+0.11	+0.19	+0.31	(B 8-9)
37468	3.80	-1.25	-0.24	-0.08	-0.32	O9.5 V
37469	9.62	+0.23	+0.19	+0.26	+0.44	(B 8-9)

TABLE 7 (cont.)

Star	V	U-V	B-V	V-R	V-I	Sp
37470	8.24	-0.21	+0.02	+0.13	+0.17	(B 8-9)
37490	4.59	-0.86	-0.10	+0.02	-0.08	B3 IIIe
-0° 1046	10.39	+0.68	+0.39	+0.38	+0.69	(A 2)
-0° 1050	10.13	+0.71	+0.59	+0.57	+0.99	(B8 - A0)
37526	7.60	-0.66	-0.14	-0.03	-0.17	(B3 V)
37547	9.28	-0.11	-0.03	+0.01	-0.02	(B 8-9)
-5° 1352	10.45	+1.03	+0.61	+0.56	+0.99	(A8 - F0)
37642	8.06	-0.71	-0.14	0.00	-0.12	(B 8-9)
37700	8.04	-0.57	-0.11	-0.01	-0.14	(B 8-9)
-4° 1211	10.26	+0.24	+0.14	+0.10	+0.24	(A 2)
37742	1.77	-1.27	-0.21	-0.08	-0.28	O9.5 Ib
NGC 2024 No. 1	12.17	+1.70	+1.41	+1.80	+3.46	B1 V
P 2942	12.24	+1.25	+0.70	+0.66	+1.13	(A 0)
37807	7.90	-0.72	-0.11	-0.04	-0.15	(B 2)
37888	9.21	0.00	+0.02	+0.08	+0.10	(B 8-9)
37889	7.67	-0.80	-0.13	-0.01	-0.13	B2 V
37903	7.83	-0.51	-0.11	+0.19	+0.31	B1.5 V
38051	8.48	+0.05	+0.35	+0.38	+0.64	B3
38087	8.30	-0.33	+0.11	+0.23	+0.40	(B 3)
38088	9.68	+0.23	+0.16	+0.20	+0.34	(A 0)
38120	9.05	-0.04	+0.03	+0.12	+0.16	(B 8-9)
38165	8.84	+0.05	+0.25	+0.30	+0.50	(B 9)
38239	9.22	+0.05	+0.04	+0.07	+0.03	(A 0)
-5° 1377	9.78	+0.78	+0.44	+0.39	+0.72	(A 2)
38563A	10.42	+0.51	+0.58	+0.66	+1.25	(B 5)
38563B	10.56	+1.53	+1.14	+1.23	+2.31	(B 1)
38771	2.06	-1.18	-0.18	-0.04	-0.21	B0.5 Ia
41117	4.63	-0.39	+0.28	+0.31	+0.53	B2 Ia

TABLE 8

INFRARED PHOTOMETRY OF ORION

Star	V	V-J	V-K	V-L	V-M
30836	3.68	-0.38	-0.47	-0.52	
34748	6.35	-0.30	-0.37	-0.26	
34989	5.80	-0.33	-0.47	-0.49	
35039	4.74	-0.35	-0.49	-0.49	
35079	7.07	-0.07	-0.10	+0.06	
35149	5.00	-0.36	-0.56	-0.66	
35411	3.35	-0.40	-0.52	-0.57	
35502	7.34	-0.13	-0.19	0.00	
35673	6.53	+0.03	+0.02		
CO Ori	12.27	+2.6	+4.0	+5.0	
35910	7.57	-0.27	-0.23		
GW Ori	9.75	+2.08	+3.64	+4.71	+6.9
36267	4.21	-0.37	-0.45	-0.43	
36351	5.46	-0.46	-0.53	-0.48	
36486	2.24	-0.45	-0.63	-0.63	
36512	4.63	-0.67	-0.90	-1.03	
36629	7.65	+0.04	+0.07		
36646	6.53	-0.27	-0.33		
36695	5.34	-0.46	-0.57	-0.69	
36781	8.51	0.00	-0.07		
36811	7.07	+0.36	+0.50	+0.49	
36822	4.41	-0.38	-0.54	-0.56	
36824	6.71	-0.46	-0.54	-0.49	
EZ Ori	12.84	+1.9	+3.0	+3.6	
36861	3.39	-0.38	-0.53		
P 1553	14.6	+2.8	+4.1	+4.5	
36981	7.84	-0.25	-0.37		
37020-3	4.58	+0.45	+0.83	+1.26	
37022	5.13	+0.55	+0.77	+0.98	
37025	7.13	-0.25	-0.36		

TABLE 8 (cont.)

Star	V	V-J	V-K	V-L	V-M
-5° 1318	9.71	+1.23	+2.14	+3.04	
37041	5.07	+0.01	+0.08	+0.61	
37042	6.41	+0.01	+0.01	+0.33	
37043	2.76	-0.52	-0.72	-0.75	
37061	6.80	+0.92	+1.30	+1.57	
37128	1.69	-0.37	-0.48	-0.46	
P 2305	16.04	+2.8	+3.8	+4.7	
37140	8.56	+0.35	+0.43	+0.88	
V380 Ori	10.31	+2.11	+4.23	+5.57	+6.7
37428	8.68	+0.32	+0.25	+0.19	
37468	3.80	-0.54	-0.70	-0.73	
37490	4.59	-0.17	-0.23	-0.21	
-0° 1050	10.13	+1.16	+1.43		
37742	1.77	-0.44	-0.56	-0.54	
NGC 2024 No. 1	12.17	+4.79	+6.24	+7.09	
37903	7.83	+0.35	+0.42	+0.83	
38051	8.48	+0.72	+0.79		
38563A	10.42	+1.35	+1.82	+2.78	
38563B	10.56	+3.00	+3.85	+3.99	
38771	2.06	-0.41	-0.53	-0.56	
41117	4.63	+0.59	+0.77	+0.92	

TABLE 9

UBVRI PHOTOMETRY OF PRAESEPE

VL	V	U-V	B-V	V-R	V-I	MK
133	6.59	+0.93	+0.68	+0.54	+0.91	G0 III
166	7.56	+0.32	+0.17	+0.16	+0.22	A5 V
236	7.55	+0.22	+0.16	+0.13	+0.17	A4 V
237	11.59	+1.48	+0.91	+0.70	+1.15	
265	9.49	+0.49	+0.46	+0.43	+0.69	F6 V
312	11.66	+1.11	+0.76	+0.56	+0.95	
315	11.39	+1.19	+0.80	+0.60	+1.00	
321	8.68	+0.47	+0.32	+0.27	+0.41	Am
363	9.25	+0.49	+0.47	+0.41	+0.66	F6 V
387	11.03	+0.87	+0.69	+0.57	+0.94	
388	11.29	+0.96	+0.71	+0.55	+0.90	
408	11.44	+1.05	+0.73	+0.58	+0.94	
418	11.40	+0.95	+0.73	+0.51	+0.85	
440	11.65	+1.17	+0.78	+0.64	+1.07	
441	9.79	+0.63	+0.56	+0.45	+0.75	
443	9.50	+0.44	+0.43	+0.37	+0.62	F6 V
455	8.76	+0.41	+0.32	+0.27	+0.45	FOn V
460	10.66	+0.74	+0.63	+0.44	+0.75	
467	7.84	+0.37	+0.21	+0.19	+0.26	Am
483	8.27	+0.33	+0.24	+0.22	+0.34	FOn V
489	9.87	+0.50	+0.48	+0.42	+0.70	
498	10.66	+0.68	+0.58	+0.45	+0.77	
501	6.75	+0.30	+0.19	+0.20	+0.31	A5 V
508	11.41	+1.31	+0.84	+0.68	+1.16	
515	11.28	+0.87	+0.68	+0.56	+0.91	
545	11.89	+1.20	+0.79	+0.61	+1.03	
570	11.71	+1.17	+0.78	+0.56	+0.97	
588	11.45	+1.01	+0.72	+0.59	+0.96	
598	10.92	+0.92	+0.70	+0.58	+0.95	
621	10.56	+0.67	+0.58	+0.47	+0.78	

TABLE 9 (continued)

VL	V	U-V	B-V	V-R	V-I	MK
659	8.15	+0.32	+0.21	+0.19	+0.28	F0 V
691	9.00	+0.34	+0.31	+0.32	+0.48	F4 V
700	10.81	+0.70	+0.61	+0.46	+0.78	
744	9.32	+0.50	+0.48	+0.44	+0.70	F7 V
747	8.31	+0.32	+0.23	+0.19	+0.30	A9 V
750	9.38	+0.40	+0.40	+0.36	+0.57	F5 V
761	7.45	+0.39	+0.25	+0.24	+0.41	A9 V
775	8.51	+0.32	+0.25	+0.24	+0.38	A9 V
778	9.42	+0.42	+0.41	+0.37	+0.59	F6 V
787	10.60	+0.63	+0.57	+0.48	+0.77	
789	11.31	+0.95	+0.71	+0.56	+0.93	
828	10.51	+0.69	+0.61	+0.49	+0.84	
843	11.63	+1.55	+0.91	+0.70	+1.18	
847	10.32	+0.84	+0.68	+0.53	+0.86	
867	10.74	+0.68	+0.59	+0.51	+0.81	
877	7.74	+0.31	+0.22	+0.21	+0.33	A5 V
880	6.67	+0.39	+0.24	+0.25	+0.39	F0 III
889	7.67	+0.30	+0.19	+0.20	+0.31	A7n V
891	10.68	+0.68	+0.59	+0.48	+0.81	
899	6.59	+1.67	+0.95	+0.72	+1.21	K0 III
900	11.80	+1.17	+0.76	+0.67	+1.07	
907	9.40	+0.48	+0.42	+0.37	+0.58	F6 V
908	10.25	+0.52	+0.50	+0.44	+0.70	
917	10.12	+0.48	+0.48	+0.43	+0.69	
921	7.32	+0.33	+0.19	+0.20	+0.28	Am
922	8.89	+0.37	+0.32	+0.29	+0.46	F2 V
925	7.54	+0.37	+0.25	+0.22	+0.33	Am
926	9.23	+0.39	+0.39	+0.35	+0.57	F5 V
929	9.49	+0.40	+0.41	+0.37	+0.60	F6 V
934	11.92	+1.80	+0.99	+0.81	+1.36	

TABLE 9 (continued)

VL	V	U-V	B-V	V-R	V-I	MK
937	10.30	+0.51	+0.51	+0.44	+0.71	
941	9.67	+0.41	+0.43	+0.40	+0.65	F6 V
947	10.20	+0.76	+0.64	+0.53	+0.87	
952	9.79	+0.47	+0.47	+0.41	+0.67	
958	6.39	+1.81	+0.98	+0.72	+1.19	K0 III
963	10.25	+0.65	+0.57	+0.43	+0.75	
967	11.00	+1.15	+0.77	+0.64	+1.03	
973	12.00	+1.26	+0.83	+0.64	+1.07	
979	6.61	+0.03	+0.01	+0.05	+0.04	A1 V
982	9.89	+0.47	+0.47	+0.44	+0.73	
987	8.81	+0.38	+0.32	+0.29	+0.45	Am
993	9.96	+0.66	+0.58	+0.50	+0.80	
997	7.54	+0.28	+0.15	+0.16	+0.21	Am
1003	7.70	+0.34	+0.19	+0.19	+0.26	Am
1005	6.77	+0.40	+0.27	+0.26	+0.41	A9 V
1008	10.08	+0.51	+0.50	+0.44	+0.72	
1009	6.44	+1.92	+1.02	+0.74	+1.23	K0 III
1012	8.01	+0.32	+0.19	+0.18	+0.26	Am
1013	10.71	+0.67	+0.58	+0.52	+0.82	
1014	9.41	+0.44	+0.41	+0.36	+0.57	
1022	8.19	+0.38	+0.29	+0.29	+0.46	F2n V
1027	9.89	+0.50	+0.48	+0.38	+0.63	
1028	9.37	+0.43	+0.42	+0.37	+0.60	F6 V
1031	6.30	+0.33	+0.17	+0.17	+0.23	Am
1033	11.64	+1.34	+0.86	+0.70	+1.21	
1036	11.16	+0.85	+0.66	+0.56	+0.80	
1044	11.52	+1.06	+0.75	+0.59	+0.99	
1049	11.63	+1.11	+0.76	+0.61	+1.01	
1054	8.65	+0.37	+0.29	+0.26	+0.41	F0 V
1057	11.62	+1.11	+0.77	+0.57	+0.99	

TABLE 9 (continued)

VL	V	U-V	B-V	V-R	V-I	MK
1070	10.87	+0.87	+0.68	+0.57	+0.95	
1071	7.81	+0.30	+0.21	+0.23	+0.33	A9 V
1077	11.33	+0.98	+0.72	+0.56	+0.91	
1078	10.61	+0.69	+0.60	+0.53	+0.88	
1079	6.85	+0.35	+0.20	+0.20	+0.29	A9 III
1086	9.56	+0.43	+0.43	+0.38	+0.61	F6 V
1090	11.01	+0.80	+0.63	+0.54	+0.87	
1091	11.00	+0.98	+0.71	+0.61	+0.99	
1092	11.46	+0.96	+0.71	+0.59	+0.99	
1098	8.49	+0.32	+0.25	+0.27	+0.41	FOn V
1100	10.30	+0.55	+0.52	+0.45	+0.73	
1113	8.70	+0.43	+0.32	+0.31	+0.45	Am
1114	6.78	+0.30	+0.16	+0.18	+0.27	A6n V
1142	10.18	+0.82	+0.64	+0.56	+0.91	
1149	10.71	+0.87	+0.68	+0.58	+0.98	
1150	11.52	+1.01	+0.72	+0.56	+0.96	
1151	10.10	+o.53	+0.50	+0.47	+0.72	
1152	9.03	+0.38	+0.34	+0.33	+0.51	F5 V
1164	8.33	+0.24	+0.19	+0.21	+0.32	A5 V
1180	7.92	+0.34	+0.24	+0.24	+0.37	A7n V
1197	10.72	+0.70	+0.60	+0.51	+0.79	
1205	9.88	+0.51	+0.47	+0.41	+0.65	
1209	10.93	+0.75	+0.62	+0.55	+0.88	
1220	10.71	+1.15	+0.77	+0.63	+1.03	
1232	9.33	+0.37	+0.39	+0.36	+0.57	F4 V
1236	9.68	+0.47	+0.45	+0.38	+0.62	F6 V
1242	9.58	+0.40	+0.40	+0.41	+0.66	F6 V
1243	10.47	+0.63	+0.57	+0.47	+0.77	
1248	10.16	+0.54	+0.52	+0.47	+0.74	
1253	11.41	+0.55	+0.52	+0.47	+0.78	

TABLE 9 (continued)

VL	V	U-V	B-V	V-R	V-I	MK
1258	6.91	+1.70	+0.96	+0.71	+1.19	KO III
1263	8.53	+0.36	+0.29	+0.28	+0.44	F2n V
1273	11.36	+0.97	+0.72	+0.64	+1.04	
1276	11.04	+0.82	+0.64	+0.57	+0.93	
1283	9.48	+0.39	+0.40	+0.37	+0.59	F5 V
1300	7.96	+0.30	+0.20	+0.20	+0.30	A7 V
1304	7.96	+0.34	+0.21	+0.20	+0.30	A7n V
1312	9.88	+0.48	+0.47	+0.42	+0.67	
1322	9.71	+0.60	+0.54	+0.47	+0.77	
1326	9.22	+0.39	+0.38	+0.36	+0.57	F3n V
1345	10.99	+0.81	+0.65	+0.52	+0.88	
1356	9.77	+0.44	+0.45	+0.40	+0.64	
1361	11.62	+1.12	+0.76	+0.60	+1.01	
1365	9.74	+0.45	+0.44	+0.38	+0.64	F6 V
1399	11.42	+1.04	+0.73	+0.60	+0.98	
1416	9.97	+0.83	+0.66	+0.52	+0.84	
1421	9.63	+0.57	+0.54	+0.46	+0.75	F8 V
1426	11.78	+1.12	+0.78	+0.62	+0.98	
1452	10.79	+0.68	+0.59	+0.51	+0.82	
1483	10.15	+0.55	+0.51	+0.43	+0.74	
1517	10.13	+0.50	+0.48	+0.42	+0.68	
1540	8.38	+0.06	+0.11	+0.20	+0.37	
1567	10.15	+0.43	+0.44	+0.43	+0.66	

TABLE 10

INFRARED PHOTOMETRY OF PRAESEPE

VL	V	V-J	V-K	V-L
899	6.59	1.57	2.19	2.24
958	6.39	1.65	2.16	2.19
1009	6.44	1.65	2.25	2.32
1258	6.91	1.58	2.13	2.21

TABLE 11

UBVRI PHOTOMETRY OF M67

FJS	V	U-V	B-V	V-R	V-I	Sp
81	10.03	-0.46	-0.08	+0.05	-0.07	B8 V
84	10.59	+2.07	+1.11	+0.92	+1.48	
94	12.83	+0.63	+0.54	+0.53	+0.82	
95	12.67	+0.51	+0.52	+0.40	+0.69	
105	10.30	+2.58	+1.26	+0.96	+1.59	K2-3 III
108	9.72	+2.92	+1.36	+1.08	+1.75	K4 III
111	12.74	+0.61	+0.56	+0.47	+0.80	
115	12.65	+0.75	+0.63	+0.49	+0.82	
117	12.61	+1.05	+0.77	+0.57	+1.01	
119	12.57	+0.66	+0.60	+0.60	+0.91	

TABLE 11 (continued)

FJS	V	U-V	B-V	V-R	V-I	Sp
124	12.14	+0.48	+0.47	+0.40	+0.67	
127	12.77	+0.62	+0.56	+0.46	+0.85	
131	11.22	+0.48	+0.42	+0.43	+0.69	F0 IV:
134	12.27	+0.64	+0.58	+0.56	+0.90	
135	11.45	+1.98	+1.06	+0.86	+1.38	K2 III:
136	11.31	+0.77	+0.63	+0.56	+0.91	
141	10.48	+2.09	+1.11	+0.84	+1.40	K2 III
143	11.52	+1.36	+0.88	+0.68	+1.13	K0 III$^+$
145	12.82	+0.64	+0.60	+0.51	+0.82	
149	12.56	+0.69	+0.60	+0.51	+0.84	
151	10.49	+2.06	+1.10	+0.80	+1.36	
153	11.31	+0.24	+0.13	+0.17	+0.22	Am
156	10.99	+0.20	+0.11	+0.16	+0.18	A2 V
157	12.78	+0.65	+0.58	+0.51	+0.79	
162	12.84	+0.66	+0.58	+0.34	+0.85	
164	10.55	+2.14	+1.13	+0.80	+1.38	K1 III
170	9.69	+2.84	+1.36	+1.01	+1.72	K3 III
190	10.98	+0.40	+0.27	+0.27	+0.41	A8 IV - V
193	12.26	+1.82	+1.02	+0.77	+1.30	
223	10.58	+2.08	+1.10	+0.85	+1.42	
224	10.76	+2.22	+1.13	+0.81	+1.38	
226	12.77	+1.01	+0.76	+0.57	+0.88	
227	12.97	+1.49	+0.92	+0.66	+1.06	
231	11.50	+1.93	+1.07	+0.75	+1.30	
241	12.68	+0.69	+0.60	+0.47	+0.75	
243	12.61	+0.69	+0.61	+0.51	+0.84	
244	10.78	+1.61	+0.94	+0.71	+1.22	
255	12.72	+0.60	+0.54	+0.46	+0.74	
266	10.55	+2.05	+1.10	+0.83	+1.42	
280	10.70	+0.20	+0.11	+0.15	+0.17	A3 V

TABLE 12

UBVRI PHOTOMETRY OF THE SCORPIO-CENTAURUS

BS	V	U-V	B-V	V-R	V-I	MK
3371	6.31	-0.53	-0.02	+0.14	+0.08	B5 IV
3415	5.26	-0.76	-0.14	-0.04	-0.20	B3 Vn
3467	4.85	-0.85	-0.17	-0.04	-0.23	B4 IV
3498	4.48	-0.91	-0.18	-0.09	-0.28	B2 Vne
3539	5.91	-0.74	-0.15	-0.05	-0.21	B6: Vn
3582	4.91	-0.94	-0.19	-0.09	-0.33	B3 IV
3659	3.44	-0.88	-0.19	-0.05	-0.24	B2 IV
3663	3.97	-0.84	-0.18	-0.05	-0.23	B3 IV
3691	6.02	-0.56	-0.10	-0.03	-0.14	B7 IV
3717	6.28	-0.67	-0.10	0.00	-0.06	B7 IV
3734	2.50	-0.93	-0.18	-0.05	-0.23	B2 IV
3856	4.52	-0.27	-0.07	-0.01	-0.09	B9 V
3860	5.11	-0.71	-0.14	0.00	-0.18	B5 IV
3875	5.56	-0.15	-0.04	+0.05	-0.02	A0 V
3886	5.55	-0.90	-0.18	-0.11	-0.26	B3 V
3925	5.71	-0.68	-0.11	-0.04	-0.15	B4 V
3940	3.54	-0.71	-0.08	+0.04	-0.04	B5 II
3990	4.86	-0.82	-0.12	-0.04	-0.13	B2 V
4023	3.85	+0.13	+0.05	+0.02	+0.04	A2 V
4037	3.32	-0.41	-0.08	+0.05	+0.02	B7 IV
4204	5.77	-0.57	+0.01	+0.12	+0.09	B3: V
4205	4.82	-0.79	-0.13	-0.01	-0.14	B5 Vn
4222	4.85	-0.79	-0.15	-0.05	-0.23	B3 IV
4234	4.45	-0.89	-0.19	-0.07	-0.27	B3 V
4390	3.89	-0.74	-0.15	-0.04	-0.21	B5 Vn
4406	5.59	-0.53	+0.06	+0.16	+0.16	B3 III
4415	5.28	-0.65	-0.08	+0.20	+0.14	B5 IV
4537	4.32	-0.77	-0.15	-0.07	-0.21	B3 Vne
4549	4.90	-0.64	-0.11	-0.03	-0.16	B4 IV
4573	5.57	-0.82	-0.15	-0.03	-0.26	B3 V

TABLE 12 (continued)

BS	V	U-V	B-V	V-R	V-I	MK
4603	4.72	-0.69	-0.08	-0.02	-0.12	B3 IV
4618	4.47	-0.82	-0.15	-0.01	-0.19	B6 III
4621	2.51	-1.01	-0.13	+0.05	-0.09	B2: V: pe
4638	3.96	-0.76	-0.15	-0.07	-0.24	B4 V
4656	2.78	-1.16	-0.24	-0.12	-0.36	B2 IV
4679	4.04	-0.85	-0.17	-0.07	-0.26	B3 IV
4732	4.82	-0.81	-0.14	-0.01	-0.18	B5 Vn
4743	3.91	-0.96	-0.19	-0.11	-0.31	B3 V
4773	3.87	-0.76	-0.15	-0.02	-0.19	B5 V
4798	2.69	-1.07	-0.22	-0.05	-0.29	B3 IV
4823	4.92	-0.44	-0.04	+0.08	+0.07	B7 IV
4844	3.05	-0.92	-0.18	-0.08	-0.29	B2.5 V
4848	4.65	-0.79	-0.16	-0.05	-0.21	B3 IV
4853	1.25	-1.21	-0.23	-0.13	-0.39	B0.5 IV
4897	4.62	-0.75	-0.15	-0.05	-0.22	B5: Vn
4898	4.03	-0.92	-0.17	-0.07	-0.30	B5 Ve
4899	5.19	-0.61	-0.11	+0.21	+0.15	B5 Ve
4940	4.71	-0.71	-0.14	-0.04	-0.18	B5 V
4942	4.27	-0.96	-0.19	-0.11	-0.31	B2 V
5026	5.49	-0.66	-0.13	-0.01	-0.16	B5 III
5035	4.53	-0.72	-0.13	-0.04	-0.19	B5 V
5132	2.30	-1.14	-0.22	-0.13	-0.36	B1 V
5190	3.41	-1.07	-0.22	-0.09	-0.33	B2 IV
5193	3.42	-1.06	-0.16	+0.03	-0.06	B2 V: pne
5217	5.89	-0.42	+0.01	+0.06	+0.06	B5 V
5221	4.73	-0.70	-0.14	-0.04	-0.17	B5 III
5248	3.83	-1.04	-0.21	-0.13	-0.35	B2 IV
5249	3.87	-1.00	-0.20	-0.14	-0.35	B2 V
5285	4.36	-0.96	-0.19	-0.11	-0.33	B2 V
5378	4.12	-0.92	-0.18	-0.11	-0.28	B3 V

TABLE 12 (continued)

BS	V	U-V	B-V	V-R	V-I	MK
5395	4.56	-0.94	-0.15	-0.10	-0.21	B3 III
5440	2.31	-1.01	-0.19	-0.10	-0.28	B1.5 V: ne
5469	2.30	-1.08	-0.20	-0.09	-0.26	B1 V
5471	4.00	-0.86	-0.17	-0.11	-0.26	B3 V
5528	4.33	-0.75	-0.14	-0.05	-0.16	B6 III:
5571	2.68	-1.07	-0.22	-0.10	-0.27	B2 IV
5576	3.13	-0.98	-0.20	-0.08	-0.24	B2 V
5625	5.85	-0.61	-0.12	-0.07	-0.20	B7: V: nn
5626	4.05	-0.86	-0.18	-0.08	-0.23	B3 V
5651	4.83	-0.88	-0.17	-0.07	-0.23	B3 III
5695	3.22	-1.09	-0.22	-0.11	-0.33	B2 IV
5708	3.37	-0.91	-0.18	-0.11	-0.27	B3 IV
5712	4.54	-0.77	-0.15	-0.06	-0.20	B5 V
5736	5.45	-0.76	-0.15	-0.09	-0.26	B5 V
5764	5.50	-0.89	-0.14	-0.09	-0.26	B2 V nn
5776	2.78	-1.02	-0.20	-0.14	-0.38	B2 Vn
5780	5.18	-0.54	-0.09	-0.04	-0.16	B7 IV:
5781	4.54	-0.86	-0.18	-0.15	-0.37	B5 IV
5812	3.65	-0.87	-0.18	-0.11	-0.30	B2.5 V
5839	4.75	-0.68	-0.14	-0.10	-0.26	B6 V
5883	3.95	-0.18	-0.04	-0.02	-0.09	A0 III-IV
5885	4.68	-0.79	-0.06	+0.01	-0.09	B2.5 Vn
5902	5.03	-0.61	-0.01	+0.01	-0.04	B3 V
5904	4.59	-0.73	-0.06	-0.02	-0.11	B2.5 Vn
5906	5.39	-0.44	-0.02	+0.01	-0.01	B6 V
5907	5.43	-0.66	-0.04	+0.01	-0.04	B2 V nn
5915	5.93	-0.52	-0.02	+0.02	-0.01	B5 V:
5928	3.86	-1.02	-0.20	-0.11	-0.31	B2 V
5941	4.87	-0.26	-0.10	-0.04	-0.09	Bpe
5944	2.91	-1.09	-0.20	-0.09	-0.29	B1 V

TABLE 12 (continued)

BS	V	U-V	B-V	V-R	V-I	MK
5948	3.41	-1.06	-0.22	-0.14	-0.35	B2 V
5953	2.32	-1.02	-0.12	-0.05	-0.18	B0 V
5967	4.89	-0.71	-0.14	-0.07	-0.21	B7 IV:
5987	4.23	-0.86	-0.18	-0.10	-0.27	B2 Vn
5993	3.97	-0.87	-0.05	+0.06	-0.02	B1 V
6027	4.01	-0.61	+0.03	+0.11	+0.14	B2 IV-V
6028	4.59	-0.90	-0.16	-0.05	-0.22	B2.5 Vn
6118	4.43	-0.48	+0.28	+0.46	+0.70	B2 Ve
6141	4.79	-0.86	-0.07	-0.06	-0.20	B2 V
6143	4.23	-0.96	-0.16	-0.06	-0.21	B2 IV
6165	2.81	-1.26	-0.25	-0.12	-0.37	B0 V
6175	2.56	-0.83	+0.02	+0.10	+0.06	O9.5 V
6247	3.03	-1.05	-0.22	-0.12	-0.31	B1.5 V
6252	3.57	-1.05	-0.21	-0.13	-0.35	B2 IV
6334	4.87	-0.43	+0.26	+0.28	+0.45	B1 Iabe
6453	3.26	-1.08	-0.23	-0.12	-0.33	B2 IV
6508	2.68	-1.04	-0.23	-0.14	-0.37	B3 Ib
6510	2.95	-0.86	-0.17	-0.10	-0.34	B2.5 V
6527	1.63	-1.11	-0.22	-0.17	-0.45	B1 V
6580	2.41	-1.09	-0.21	-0.08	-0.30	B2 IV
7029	4.84	-0.93	-0.18	-0.17	-0.33	B2 V
7121	2.03	-0.97	-0.22	-0.11	-0.32	B2 V

TABLE 13

INFRARED PHOTOMETRY OF THE SCORPIO-CENTAURUS

BS	V	V-J	V-K	V-L
4023	3.85	+0.08	+0.11	
4743	3.91	-0.46	-0.56	
5953	2.32	-0.26	-0.43	-0.51
5993	3.97	-0.03	-0.06	-0.16
6027	4.01	+0.20	+0.24	+0.26
6175	2.56	-0.05	-0.08	-0.06
6453	3.26	-0.49	-0.58	

TABLE 14

UBVRI PHOTOMETRY OF COMA BERENICES

T	V	U-V	B-V	V-R	V-I	MK
10	6.04	+0.18	+0.11	+0.13	+0.16	A3 V
19	8.15	+0.37	+0.40	+0.33	+0.54	F4 V
36	8.16	+0.36	+0.40	+0.33	+0.56	F3 V
49	7.91	+0.42	+0.37	+0.30	+0.48	F2 V
52	7.48	+0.20	+0.14	+0.13	+0.18	A5 V
53	8.75	+0.54	+0.52	+0.43	+0.73	F9 V
58	8.85	+0.51	+0.50	+0.38	+0.66	F9 V
60	6.48	+0.27	+0.18	+0.17	+0.24	A5 V
61	7.78	+0.35	-0.29	+0.23	+0.38	F0 V
62	6.27	+0.31	+0.17	+0.13	+0.15	Am
65	9.04	+0.62	+0.58	+0.49	+0.80	G0 V
68	6.70	+0.27	-0.18	+0.17	+0.18	A6 IV-V
70	6.12	+0.38	+0.30	+0.28	+0.42	F0 V
76	9.09	+0.59	+0.56	+0.48	+0.77	G0 V
79	9.09	+0.22	+0.12	+0.11	+0.15	A2 V
80	8.07	+1.98	+1.04	+0.71	+1.24	K0 V
82	7.44	+0.30	+0.28	+0.24	+0.38	A9 V
85	9.31	+0.64	+0.58	+0.48	+0.79	G1 V
86	8.52	+0.45	+0.47	+0.36	+0.60	F6 V
89	6.20	-0.05	0.00	0.00	-0.03	A0 V
90	8.56	+0.43	+0.47	+0.38	+0.62	F5 V
91	4.81	+0.76	+0.49	+0.47	+0.80	G2 III + A4 V
92	8.57	+0.51	+0.51	+0.46	+0.75	F7 V
97	9.10	+0.58	+0.57	+0.45	+0.73	F9 V
98	7.42	+1.99	+1.05	+0.67	+1.21	K1 III
99	9.04	+0.45	+0.47	+0.40	+0.68	F7 III
101	8.37	+0.42	+0.45	+0.31	+0.54	F5 V
102	9.34	+0.70	+0.62	+0.50	+0.82	G1 V
104	6.72	+0.29	+0.24	+0.20	+0.32	A8 V
107	5.18	+0.18	+0.08	+0.07	+0.09	A3 V

TABLE 14 (continued)

T	V	U-V	B-V	V-R	V-I	MK
109	6.42	+0.34	+0.27	+0.23	+0.33	F0 V
111	8.16	+0.50	+0.51	+0.40	+0.70	F8 V
114	8.58	+0.40	+0.45	+0.38	+0.62	F8 V
118	8.36	+0.41	+0.44	+0.34	+0.57	F6 V
125	4.95	+0.45	+0.27	+0.25	+0.40	F0p
130	5.00	+0.21	+0.08	+0.09	+0.11	A4 V
132	9.87	+0.86	+0.68	+0.52	+0.86	G5 V
133	8.25	+1.92	+1.03	+0.79	+1.29	K5 V
135	10.11	+1.52	+0.93	+0.68	+1.15	K0 V
139	6.69	+0.26	+0.17	+0.14	+0.19	Am
140	7.72	+0.32	+0.27	+0.22	+0.35	A9 V
144	6.54	+0.29	+0.18	+0.15	+0.24	Am
145	6.65	+0.30	+0.22	+0.15	+0.23	Am
146	5.29	-0.16	-0.06	+0.02	-0.06	A0p
150	9.82	+1.10	+0.79	+0.67	+1.11	G9 V
152	7.87	+0.40	+0.44	+0.34	+0.57	F5 V
160	5.46	+0.15	+0.05	+0.06	+0.03	A3p
162	8.58	+0.43	+0.48	+0.35	+0.59	F7 V
183	6.29	+0.20	+0.11	+0.09	+0.12	Am?
A 3	10.81	+1.43	+0.87	+0.65	+1.10	G9 V
A13	10.49	+1.14	+0.76	+0.61	+1.02	K0 V
A14	10.02	+1.13	+0.80	+0.63	+1.10	G4 V
A19	11.20	+1.21	+0.82	+0.61	+1.05	G9 V
A21	10.38	+1.24	+0.82	+0.63	+1.11	G7 V

TABLE 15

INFRARED PHOTOMETRY OF COMA BERENICES

T	V	V-J	V-K
91	4.81	+0.53	+0.47

TABLE 16

UBVRI PHOTOMETRY OF THE URSA MAJOR STREAM

HD	V	U-V	B-V	V-R	V-I	MK
1404	4.52	+0.12	+0.05	+0.08	+0.08	A2 V
3817	5.33	+1.49	+0.89	+0.71	+1.17	G8 III
4813	5.20	+0.49	+0.50	+0.46	+0.74	F8 V
5516	4.42	+1.63	+0.94	+0.73	+1.21	G8 III-IV
5612	6.32	+1.48	+0.90	+0.67	+1.13	G5 III
6116	5.98	+0.25	+0.16	+0.18	+0.23	A7 V
6482	6.12	+1.86	+1.01	+0.73	+1.26	K0 III
6763	5.53	+0.33	+0.34	+0.35	+0.53	F2 V
7804	5.17	+0.15	+0.07	+0.11	+0.14	A3 V
9900	5.56	+2.81	+1.38	+0.97	+1.68	G5 II
10348	5.99	+1.89	+1.01	+0.77	+1.23	K0 III
11154/5	5.86	+1.24	+0.74	+0.68	+1.17	K0 III + A6 V
11171	4.68	+0.35	+0.32	+0.29	+0.45	F2 IV
11257	5.94	+0.28	+0.30	+0.33	+0.50	F0 V
12471	5.50	+0.09	+0.03	+0.06	+0.09	A2 III
13594	6.06	+0.33	+0.40	+0.38	+0.63	F5 V
15144	5.83	+0.23	+0.14	+0.12	+0.16	A7 p
16161	4.86	+1.39	+0.86	+0.65	+1.14	G8 III
16861	6.30	+0.12	+0.06	+0.05	+0.07	A2 V
16970	3.47	+0.16	+0.09	+0.11	+0.15	A2 V
18331	5.17	+0.13	+0.08	+0.11	+0.16	A1 V
18519/20	4.63	+0.12	+0.04	+0.05	+0.07	A2 V
18778	5.95	+0.24	+0.15	+0.13	+0.20	Am
18978	4.09	+0.24	+0.16	+0.13	+0.22	A4 V
20894	5.52	+1.47	+0.88	+0.66	+1.13	G5 II
21447	5.10	+0.09	+0.04	+0.09	+0.08	A1 V
27022	5.27	+1.28	+0.81	+0.64	+1.07	G5 III
27820	5.12	+0.18	+0.07	+0.10	+0.15	(A2)
27861	5.17	+0.16	+0.08	+0.10	+0.13	A1 V
28978	5.68	+0.17	+0.05	+0.12	+0.16	(A2)

TABLE 16 (continued)

HD	V	U-V	B-V	V-R	V-I	MK
30834	4.77	+2.99	+1.41	+1.09	+1.87	K3 III
31278	4.47	-0.04	-0.02	+0.09	+0.08	A1 V
33111	2.79	+0.23	+0.13	+0.14	+0.22	A3 III
36777	5.36	+0.12	+0.05	+0.08	+0.12	(A2)
38104	5.47	+0.10	+0.03	+0.08	+0.09	A0 p
38393	3.60	+0.48	+0.47	+0.45	+0.71	F6 V + K2 V
38656	4.53	+1.63	+0.94	+0.73	+1.22	G8 III
39587	4.41	+0.67	+0.59	+0.51	+0.82	G0 V
40183	1.90	+0.07	+0.03	+0.08	+0.07	A2 V
43244	6.52	+0.36	+0.27	+0.27	+0.41	F0 V
43261	6.09	+1.52	+0.90	+0.69	+1.18	G5 III
44691	5.64	+0.36	+0.24	+0.22	+0.32	Am
47442	4.42	+2.19	+1.15	+0.86	+1.46	K1 II-III
48915	-1.46	-0.05	0.00	0.00	-0.03	A1 V
50973	4.90	+0.08	+0.03	+0.05	+0.06	A2 V
56537	3.58	+0.21	+0.12	+0.12	+0.17	A3 V
58367	4.99	+1.79	+1.01	+0.73	+1.23	G8 III
61913	5.56	+3.55	+1.64	+1.60	+3.02	M2 III
64096	5.16	+0.66	+0.60	+0.52	+0.88	G1 V
65810	4.61	+0.16	+0.08	+0.15	+0.21	A3 V
70442/3	5.58	+1.27	+0.77	+0.64	+1.09	G2 III + A
72905	5.64	+0.69	+0.62	+0.52	+0.85	G0 V
74137	4.88	+1.99	+1.07	+0.82	+1.35	K1 III
74485	6.13	+1.57	+0.94	+0.70	+1.19	G5 III
77350	5.46	-0.13	-0.03	+0.02	-0.02	B9 p
79439	4.84	+0.27	+0.18	+0.25	+0.34	A5 V
85444	4.11	+1.57	+0.92	+0.69	+1.16	G8 III
87696	4.49	+0.25	+0.18	+0.18	+0.25	A7 V
88355	6.44	+0.48	+0.46	+0.41	+0.68	F6 V
89025	3.44	+0.50	+0.31	+0.31	+0.50	F0 III

TABLE 16 (continued)

HD	V	U-V	B-V	V-R	V-I	MK
91480	5.16	+0.32	+0.34	+0.33	+0.50	F1 V
94686	7.34	+0.57	+0.55	+0.46	+0.79	
95418	2.37	-0.02	-0.02	+0.06	+0.02	A1 V
97603	2.56	+0.23	+0.12	+0.13	+0.16	A4 V
99028	3.94	+0.48	+0.41	+0.39	+0.60	F2 IV
99648	4.95	+1.80	+1.00	+0.75	+1.25	G8 II-III
102070	4.72	+1.71	+0.97	+0.73	+1.21	G8 III
103287	2.44	+0.03	0.00	0.00	-0.03	A0 V
105452	4.02	+0.30	+0.32	+0.30	+0.48	F2 V
106591	3.31	+0.15	+0.08	+0.06	+0.06	A3 V
108123	6.03	+2.10	+1.10	+0.79	+1.35	K0 III
109011	8.10	+1.56	+0.94	+0.78	+1.30	K2 V
109799	5.45	+0.35	+0.32	+0.31	+0.50	F2 V
110463	8.27	+1.71	+0.96	+0.76	+1.25	K3 V
110646	5.93	+1.33	+0.86	+0.67	+1.16	G8p III
111397	5.70	+0.09	+0.02	+0.04	+0.03	A2 V
111456	5.85	+0.42	+0.46	+0.44	+0.72	F6 V
112097	6.25	+0.32	+0.27	+0.25	+0.40	Am
112185	1.77	-0.01	-0.02	-0.02	-0.05	Ap
112394	9.55	+0.95	+0.71	+0.57	+0.95	
113139	4.93	+0.37	+0.36	+0.37	+0.58	F2 V
114038	5.19	+2.26	+1.14	+0.82	+1.40	K1 III
115043	6.82	+0.69	+0.59	+0.55	+0.85	G2 V
238208	9.74	+1.21	+0.81	+0.66	+1.09	
115659	3.00	+1.58	+0.92	+0.60	+1.07	G8 III
238224	9.77	+2.48	+1.28	+1.13	+1.94	M0 V
116656/7	2.06	+0.05	+0.02	-0.04	-0.06	A2 V + A2 V
116842	4.02	+0.24	+0.16	+0.17	+0.24	A5 V
118022	4.94	+0.02	+0.02	+0.08	+0.05	A2 p
119605	5.60	+1.22	+0.81	+0.64	+1.09	G0 II

TABLE 16 (continued)

HD	V	U-V	B-V	V-R	V-I	MK
120528	8.57	+0.88	+0.67	+0.52	+0.85	
120818	6.65	+0.19	+0.12	+0.08	+0.09	A4 V
122408	4.26	+0.23	+0.10	+0.15	+0.21	A3 III
124674/5	4.41	+0.30	+0.20	+0.17	+0.29	F2 V + A7 IV
124752	8.53	+1.34	+0.81	+0.69	+1.16	K0 V
124953	5.98	+0.31	+0.26	+0.23	+0.35	Am
125451	5.41	+0.35	+0.38	+0.34	+0.53	F5 IV-V
125642	6.33	+0.10	+0.05	+0.06	+0.03	A2 V
129246/7	3.78	+0.10	+0.05	+0.02	+0.01	A2 III
129798	6.25	+0.40	+0.41	+0.37	+0.57	F2 V
131156	4.54	+1.06	+0.77	+0.63	+1.06	G8 V
134083	4.93	+0.41	+0.43	+0.40	+0.61	F5 V
137006	6.12	+0.31	+0.26	+0.24	+0.36	F0 V
137107/8	4.98	+0.62	+0.58	+0.48	+0.76	G2 V
138481	5.02	+3.50	+1.59	+1.27	+2.20	K5 III
139006	2.24	-0.05	-0.02	+0.03	-0.01	A0 V
139798	5.75	+0.34	+0.36	+0.33	+0.51	F2 V
140027	6.01	+1.51	+0.90	+0.69	+1.15	G5 III
140160	5.33	+0.09	+0.04	+0.05	+0.01	A0 p
140775	5.58	+0.07	+0.04	+0.04	+0.03	A2 V
141003	3.67	+0.14	+0.06	+0.06	+0.09	A2 IV
141680	5.23	+1.84	+1.02	+0.77	+1.30	G8 III
146738	5.78	+0.17	+0.07	+0.07	+0.07	A3 III
146834	6.28	+1.84	+1.07	+0.83	+1.45	K5 III
148112	4.58	-0.05	-0.01	+0.07	+0.03	A1 p
151044	6.47	+0.56	+0.54	+0.44	+0.70	F8 V
152107	4.82	+0.11	+0.09	+0.10	+0.11	A2 p
152863	6.08	+1.54	+0.92	+0.70	+1.18	G5 III
159561	2.07	+0.25	+0.15	+0.14	+0.22	A5 III
169981	5.83	+0.16	+0.07	+0.08	+0.12	A2 V

TABLE 17

INFRARED PHOTOMETRY OF THE URSA MAJOR STREAM

HD	V	V-J	V-K	V-L	V-M
16970	3.47	+0.17	+0.24		
27022	5.27	+1.36	+1.86	+1.92	
33111	2.79	+0.28	+0.41		
38393	3.60	+0.90	+1.19		
38656	4.53	+1.61	+2.19		
40183	1.90	+0.07	+0.05	+0.04	
47442	4.42	+1.88	+2.61		
48915	-1.46	-0.12	-0.15	-0.17	-0.20
85444	4.11	+1.55	+2.09		
89025	3.44	+0.63	+0.82		
95418	2.37	+0.02	+0.02		
97603	2.56	+0.27	+0.31		
103287	2.44	+0.04	+0.07		
106591	3.31	+0.20	+0.22		
112185	1.77	+0.05	+0.02		
115659	3.00	+1.46	+2.02	+2.21	
116656/7	2.06	-0.04	-0.05		
134083	4.93	+0.72	+1.03	+1.04	
139006	2.24	-0.01	+0.06		
159561	2.07	+0.29	+0.42		

TABLE 18

PROBABLE ERROR OF A SINGLE OBSERVATION AT 1.0 AIR MASS

V	B-V	U-B	V-R	R-I	RANGE
±0.014	±0.010	±0.015	±0.015	±0.010	$V \leq 9.0$ (mag.)
±0.020	±0.014	±0.021	±0.021	±0.014	$14 > V > 9$ (mag.)

K	J-K	K-L	RANGE
±0.03	±0.03	±0.04	$K \leq 4.0$ (mag.)
±0.05	±0.05	±0.06	$7 > K > 4$ (mag.)

M	RANGE
±0.06	$M \leq 2.0$ (mag.)
±0.1	$4 > M > 2$ (mag.)

TABLE 19

THE ZERO-AGE MAIN SEQUENCE

V-R	M_V	V-R	M_V	V-R	M_V
-0.15	-4.0:	+0.20	+2.50	+0.55	+5.25
-0.10	-1.8	+0.25	+2.72	+0.60	+5.66
-0.05	0.0	+0.30	+3.00	+0.65	+5.99
0.00	+1.05	+0.35	+3.32	+0.70	+6.22
+0.05	+1.70	+0.40	+3.75	+0.80	+6.70
+0.10	+1.96	+0.45	+4.25	+0.90	+7.11
+0.15	+2.22	+0.50	+4.75	+1.00	+7.43

TABLE 20

DISTANCES

Cluster	V_o-M_V
h and X Persei	11.8
Pleiades	5.50
Hyades	3.08
Orion	7.90
Praesepe	5.97
M 67	>9.5
Scorpio-Centaurus	6.20
Coma Berenices	4.90
Ursa Major (nucleus)	1.70