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THE EVOLUTION OF GALAXIES IN CLUSTERS. IV. PHOTOMETRY OF 10 LOW-REDSHIFT CLUSTERS

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ABSTRACT

Colors and magnitudes, obtained from Palomar 48 inch (1.2 m) Schmidt plates in the J and F bands, and morphological types are presented for galaxies in the cores of 10 nearby clusters of galaxies. In the typical cluster, the sample includes all galaxies within a radius of 1.5 Mpc (assuming $H_0 = 50$ km s^{-1} Mpc^{-1}) of the cluster center and brighter than $J = 17.5$. The accuracy of the photometry varies with cluster, but most magnitudes are accurate to 0.10 mag, and typical errors in the colors are of the same order.

In order to correct for foreground and background contamination of the cluster samples, a determination of the density of field galaxies has also been made using existing data, extended with new measurements in two fields toward the Galactic polar caps.

As expected, the colors of the elliptical and S0 galaxies show a narrow dispersion about a mean color which decreases with magnitude. However, the colors of the spiral galaxies are not entirely as expected, having a smaller dispersion than would have been predicted from their morphological types.

Subject headings: galaxies: clustering — galaxies: evolution — galaxies: photometry — galaxies: structure

I. INTRODUCTION

It has long been recognized that variations in galaxy populations exist, particularly between clusters and the "field," and that these variations must contain significant information about the processes of galaxy formation and evolution. Most existing studies of population variations have been based on galaxy morphology, and particularly on galaxies' locations along the Hubble sequence. Since location along the Hubble sequence is the single most important property of galaxies, and since the morphological type of a galaxy is easily obtained from inspection of photographic plates, this is the most natural approach.

It does, however, have its limitations. The typing of galaxies is a qualitative and inexact procedure. Furthermore, the existence of anemic spirals (van den Bergh 1976) raises the possibility that the forms and stellar content of galaxies, and, in particular, of cluster galaxies, may occupy more than the essentially one-dimensional parameter space represented by the Hubble sequence. Specifically, cluster galaxies may not exhibit the good correlation between present rate of star formation and galaxy structure generally found in field galaxies. Finally, problems of resolution limit the morphological typing of galaxies to fairly nearby objects.

For some years we have been engaged in a study of the evolution of cluster galaxies (Butcher and Oemler 1978*a*, *b*). Our initial studies compared the directly observed colors of galaxies in distant clusters with colors predicted from the morphology of galaxies in nearby clusters and found evidence for strong recent evolution of galaxy populations. However, this is not a very satisfactory approach. In addition to the problems with the use of morphological type just mentioned, it is clearly undesirable to use a different measure of galaxy populations for nearby and distant objects. A much better procedure would be to look for variations using a uniform set of photometry of clusters at every redshift. To supplement our original observations of two distant clusters, we obtained photometry of an additional 17 intermediate- and high-redshift clusters (Butcher, Oemler, and Wells 1983). We wish to compare this with similar observations of nearby clusters.

Surprisingly, few such data exist in the literature. Some photographic and photoelectric color measurements exist for subsets of the populations of a few nearby clusters, but the only sufficiently complete and accurate observations of which we are aware are those of the Coma Cluster by Godwin, Metcalfe, and Peach (1982). We have, therefore, set about to obtain the needed data ourselves, for our own purposes and in the hope that they may be of some general use. In this paper we present photometry, positions, and morphological types of galaxies in 10 nearby clusters, as well as an estimate of the samples' contamination by foreground and background galaxies.

II. OBSERVATIONS

The 10 clusters were selected, from among those for which we had suitable plate material, to provide a range in richness, cluster structure, galaxy content, and redshift within the interval $0.0 < z < 0.1$. The clusters chosen, their redshifts (from Sarazin, Rood, and Struble 1982), and galactic latitudes are presented in the first three columns of Table 1. The clusters Abell 262, Abell 1367, and the Hercules Cluster are irregular clusters, with large populations of spiral galaxies; the other seven are compact, regular clusters with few spirals in their cores. A brief description of each cluster is given in the last column of Table 1.

Plates of these clusters were obtained in two bands on the Palomar 48 inch (1.2 m) Schmidt telescope. Blue plates are on IIIa-J emulsion behind a Wratten 4 filter, defining a band which we call *J*. Red plates are on 103a-F or 098 emulsion behind a RG610 filter, defining a band which we call *F*. The response functions of these photographic bands and of their photoelectric equivalents are illustrated in Figure 1 of Oemler (1974); their effective wavelengths are approximately 5000 Å and 6500 Å. They are tied to the *UBV* system by the requirement that, for a star with $B-V=0.0$, $J-F=0.0$ and $J-V=0.0$. Except for a difference in zero point, the photoelectric *J* and *F* bands are identical to the Thuan and Gunn (1976) *g* and *r* bands. The relation of the $J-F$ to the $B-V$ colors is illustrated in Figure 1. The smooth curve represents the observed relation for stars and also for star clusters, as determined by comparing the suitably shifted $g-r$ cluster photometry of Searle, Wilkinson, and Bagnuolo (1980) with the *UBV* photometry of the same objects, as reported in van den Bergh (1981). The points compare the $B-V$ and $J-F$ colors of galaxies, as described below in the discussions of the individual clusters. To within the errors, the galaxies appear to follow the relation for stars and star clusters.

We have photometered galaxies only within the core of each cluster. Usually, but not always, we have included galaxies within a distance from the cluster center of 1.5 Mpc, calculated assuming $H_0 = 50$ km s^{-1} Mpc^{-1} and $q_0 = 0.1$. This radius was chosen so as to be always greater than R_{30}, the sample radius for our population studies (Butcher and Oemler 1978*a*, *b*, 1984). The cluster center has been defined as the location of the dominant galaxy in those clusters possessing one or has been determined by strip counts in irregular clusters. Within these limits, the photometry should be complete to the magnitude cutoff, which varies from cluster to cluster according to the quality of the plate material and the distance of the cluster. The spatial and magnitude limits of the photometry in each cluster are presented in the fourth and fifth columns of Table 1.

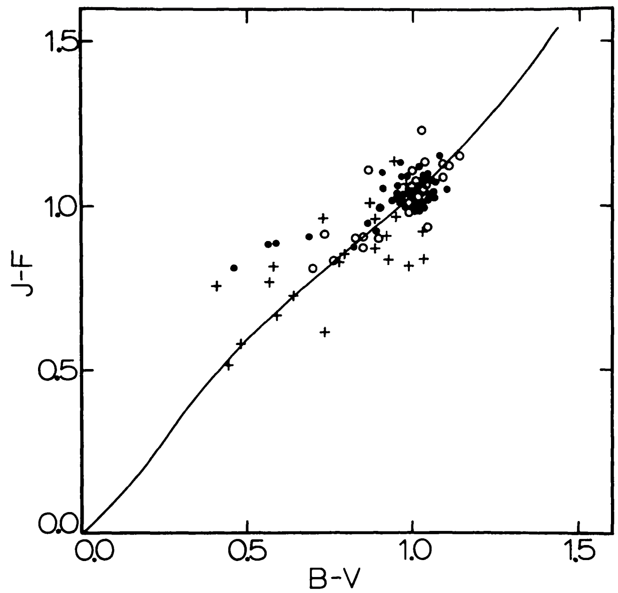

FIG. 1.—The relation between $J-F$ and $B-V$ colors. *Smooth curve*, relation for stars and star clusters. *Filled circles*, Coma Cluster galaxies. *Open circles*, Hercules Cluster galaxies. *Crosses*, A1367 galaxies.

The plates were measured on the Yale PDS and the data reduced using routines very similar to those described in Kirshner *et al.* (1983, hereafter KOSS). The search for objects and the separation of galaxies from stars were done automatically but were then checked by eye to correct any misclassifications and add any missing objects. The final results are *J* magnitudes which approximate the total magnitudes of the galaxies, and $J-F$ colors which refer to that part of the galaxy within approximately the $S_J = 24.0$ isophote. Objects which were missed or obviously mishandled by the automatic routines have magnitudes estimated by eye but no colors.

Equatorial coordinates of the galaxies were calculated from plate coordinates using transformations based on SAO stars on each plate and should, in general, be accurate to a few arc seconds. The morphological types of the brighter galaxies were estimated using the plates from which the photometry was obtained, or from 4 m telescope plates in the case of A401, A1367, A2199, and the Coma and Hercules clusters. The

TABLE 1

CLUSTERS OBSERVED

Cluster	z	b	Sample	J_{lim}	σ_0	m_0	Description[a]
A262	0.0164	−25°	ΔX, $\Delta Y \leq 1.25$ Mpc = 90′	16.0	0.035	19.	BMIII SR I
A400	0.0234	−45°	$R < 1.5$ Mpc = 38′	17.0	0.035	19.	BMII SP C
A401	0.0748	−39°	$R < 1.5$ Mpc = 12′.8	18.75	0.035	20.	BMI SP C
A1367	0.0213	74°	$R < 1.6$ Mpc = 45′	17.0	0.075	18.	BMIII SR I
Coma........	0.0235	87°	$R < 1.5$ Mpc = 38′	17.5	0.035	19.	BMII SP C
A1904	0.0714	62°	$R < 1.5$ Mpc = 13′.4	19.0	0.035	20.	BMII SP C
Hercules	0.0371	44°	$R < 1.5$ Mpc = 24′.5	18.0	0.035	19.	BMIII SR I
A2199	0.0305	43°	$R < 1.5$ Mpc = 30′	17.5	0.035	19.	BMI SP C
A2634	0.0322	−33°	$R < 1.8$ Mpc = 33′	17.5	0.075	18.	BMI SP C
A2670	0.0749	−69°	$R < 1.5$ Mpc = 12′.8	18.5	0.035	20.	BMI SP C

[a] BM = Bautz-Morgan type. SR/P = spiral rich/poor. C/I = compact/irregular.

system used is the same elaboration of the Hubble system used in Kirshner, Oemler, and Schechter (1978, hereafter KOS); it is summarized in Table 12. In addition to the standard Hubble sequence, there are several parallel sequences of lower precision. The rationale for this system is that, for these rather distant galaxies, the precision of the type we assign should be no greater than the accuracy with which the true morphological type is known. Absolute calibration of the photometry is based on photoelectric photometry in the *BV* and *JF* bands. Details of the calibrations are discussed below for individual clusters.

Photometric errors have been estimated in several ways. Previous experience has shown that random errors in the magnitudes are dominated by ambiguities in defining the brightness of extended objects and are, for all but the very faintest objects, about 0.1 mag. A very good estimate of the random color errors may be obtained by measuring the "colors" of galaxies using two plates in the same band. We have done this for several clusters. A typical result is shown in Figure 2, which presents the "colors" of galaxies measured on two red plates of the Coma Cluster. The steady increase in color with magnitude is a scale error, probably due to an error in the characteristic curve of one plate. Such scale errors are a constant hazard with photographic photometry and may be present at this level (~ 0.02 mag mag^{-1}) in some of our data. The standard deviation of the colors about the mean varies from 0.03 mag at $F=14.$–0.09 mag at $F=17.5$.

Internal estimators of the data quality, such as sky noise and the scatter among different magnitude determinations, show that the cluster photometry divides into three groups, within each of which the data quality is very similar. We have used the method of error determination illustrated in Figure 2 to estimate the color errors in each of these groups. After the fact, we have found that the predicted errors in each cluster closely match the observed scatter in the colors of the E and S0 galaxies about a mean color-magnitude trend. Since that scatter should be dominated by photometry errors, this agreement gives us confidence that we have estimated the errors accurately. It is useful to describe the variation of error with magnitude by an analytic expression. If galaxies are of approximately the same surface brightness independent of absolute magnitude, which seems to be true, at least for E and S0 galaxies, and if the errors are due to plate noise, then the variation should have the form

$$\sigma = A \text{ dex}\left[0.2(m - m_0)\right]. \quad (1)$$

TABLE 12

CLASSIFICATION SYSTEM

E	EL		
E/S0	EL		
S0	EL		
S0/a	S−	SP	S
Sa	S−	SP	S
Sab	S−	SP	S
Sb	S+	SP	S
Sbc	S+	SP	S
Sc	S+	SP	S
Irr			S
Pec			S

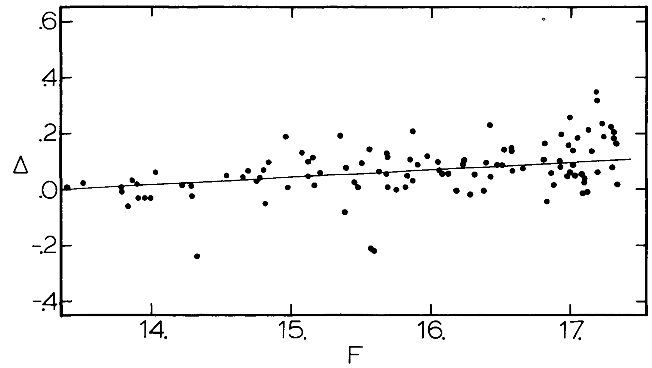

FIG. 2.—The "colors" of Coma Cluster galaxies, as measured on two plates in the same F band.

In fact, although a good description of the errors of faint galaxies, this expression predicts smaller errors for bright galaxies than are observed, presumably because of other sources of error. However, the errors are well described by the expression

$$\sigma^2 = \sigma_0^2 + \left\{0.2 \text{ dex}\left[0.2(m - m_0)\right]\right\}^2. \quad (2)$$

The first factor of 0.2 is, of course, arbitrary and merely determines the normalization of m_0. Values of σ_0 and m_0 for our clusters are presented in the sixth and seventh columns of Table 1.

The photometry is presented in Tables 2–11. Galaxies are listed in order of increasing declination. The first column lists a serial number, ordering the galaxies in increasing magnitude. The other columns give the galaxy's NGC or IC number (or, in the case of Coma, Rood-Baum [1967] number) if it has one, right ascension, declination, distance from the cluster center (in arc seconds), morphological type, J magnitude, and $J-F$ color. Galaxies with estimated magnitudes and some for which there were measurement problems do not have colors given. The data from Tables 2–11 are also presented in Figure 3.

III. DISCUSSION OF INDIVIDUAL CLUSTERS

We discuss below details of the photometry in each cluster.

a) Abell 262

The photoelectric zero-point calibration of A262 is based on *JF* photometry of three galaxies and should be accurate to 0.03 mag in $J-F$. There is no published photometry of this cluster. The outstanding fact about the color-magnitude distribution of this cluster, as seen in Figure 3, is the redness of the spiral galaxies. Although they have a larger range in color than do the E/S0's, their mean color is virtually the same. A similar, though less pronounced, effect is seen in other spiral-rich clusters. The significance of this effect has been considered in another paper (Butcher and Oemler 1984).

b) Abell 400

The photoelectric zero-point calibration of A400 is based on *JF* photometry of five galaxies. The zero point may be uncertain by as much as 0.05 mag. The galaxies in this cluster

TABLE 2

ABELL 262

Object	Ident	R.A.(1950)	Dec(1950)	Radius	Type	J	J–F
21		1 49 11.0	35 10 4	2905	S0	14.83	1.07
20		1 52 1.4	35 10 32	2756	S+	14.75	1.00
25		1 52 17.5	35 12 49	2699	S0	15.13	1.09
32		1 53 24.6	35 19 41	2799	?	15.26	0.88
39		1 53 43.1	35 20 53	2906	SP	15.54	1.03
46		1 48 56.3	35 24 57	2229	S	15.82	1.05
44		1 52 44.5	35 30 2	2010	S0	15.73	0.86
30		1 49 25.5	35 32 56	1632	S0	15.25	1.04
10		1 49 28.6	35 36 37	1440	S–	14.28	
48		1 48 36.6	35 37 29	1902	E	15.90	
43		1 51 58.1	35 37 45	1287	SP	15.73	1.12
34		1 51 14.6	35 40 35	865	S0	15.37	0.99
8	I1732	1 47 51.9	35 41 5	2300	S0	14.00	
27		1 54 0.6	35 42 7	2431	SP	15.20	
37		1 47 26.3	35 44 5	2546	E	15.52	0.92
47		1 53 50.8	35 44 56	2270	SP	15.90	
28		1 50 27.2	35 45 54	562	EL	15.22	1.13
23		1 49 20.4	35 47 23	1158	E	15.06	1.11
13	N710	1 49 57.4	35 48 25	721	Sc	14.35	1.02
11		1 48 32.8	35 49 5	1691	Sc	14.32	0.95
31	N700	1 49 16.2	35 51 1	1151	S0	15.25	1.06
38		1 49 36.0	35 52 6	904	E	15.54	1.02
24		1 49 41.2	35 52 39	837	E	15.07	1.11
19	N704	1 49 41.2	35 52 49	837	S0	14.63	1.11
2		1 53 7.7	35 52 53	1679	S0	13.04	1.15
41		1 49 6.2	35 52 57	1259	S+	15.56	1.06
40		1 48 49.0	35 53 11	1468	SP	15.55	1.20
17	N705	1 49 44.1	35 53 56	797	S0	14.52	1.02
4	N708	1 49 49.4	35 54 7	733	E	13.25	1.08
9	N703	1 49 43.0	35 55 28	815	E	14.28	1.14
7	N714	1 50 32.5	35 58 30	338	S0	13.57	1.16
22	N709	1 49 53.9	35 58 35	730	S0	14.99	1.05
42		1 47 18.5	35 58 50	2580	E	15.58	0.98
16	N717	1 50 58.1	35 58 59	312	S0	14.49	1.16
35		1 52 7.6	35 59 32	1002	E	15.45	1.06
36		1 52 13.6	36 0 56	1099	Sc	15.50	0.91
6		1 47 55.0	36 1 27	2168	E	13.50	
26		1 52 24.0	36 3 42	1282	S	15.15	0.80
33		1 50 17.8	36 5 15	774	S0	15.30	1.10
18		1 50 53.1	36 6 15	732	EL	14.57	1.14
3	N687	1 47 36.7	36 7 27	2476	E	13.22	1.02
12		1 53 46.2	36 8 24	2308	S0	14.33	1.10
45		1 52 3.0	36 9 52	1301	S	15.75	1.01
1		1 49 37.8	36 15 12	1538	S–	12.84	1.15
14		1 50 0.1	36 15 47	1435	S–	14.41	1.28
5		1 49 49.0	36 22 23	1851	S∫	13.31	1.03
15		1 51 22.2	36 23 2	1782	S+	14.49	1.34
29		1 50 59.6	36 23 42	1782	S	15.24	1.18

TABLE 3

ABELL 400

Object	Ident	R.A.(1950)	Dec(1950)	Radius	Type	J	J–F
21		2 55 3.9	5 13 55	2135	S0/a	15.36	1.22
60		2 55 54.7	5 21 22	1867		16.22	1.11
78		2 56 10.0	5 24 39	1809		16.69	1.21
22		2 55 6.2	5 28 19	1271	EL	15.36	1.25
81		2 55 52.0	5 28 22	1474		16.74	1.11
87		2 54 6.3	5 29 6	1474		16.91	1.05
28		2 57 12.4	5 30 37	2257	EL	15.51	1.25
64		2 55 16.5	5 32 17	1055		16.29	1.09
84		2 57 16.0	5 32 56	2237		16.87	1.12
37		2 57 10.1	5 33 5	2154	EL	15.72	1.15
92		2 57 4.2	5 34 8	2046		17.00	
27		2 55 19.8	5 35 6	895	EL	15.51	1.20
49		2 55 19.0	5 35 18	895	S0	15.96	1.20
82		2 54 2.1	5 35 23	1229		16.85	0.98
58		2 56 49.6	5 36 21	1789		16.11	0.85
62		2 53 0.6	5 37 0	1959		16.27	1.21

TABLE 3—*Continued*

Object	Ident	R.A.(1950)	Dec(1950)	Radius	Type	J	J–F
52		2 55 6.6	5 37 36	715		16.00	1.15
5	IC1869	2 55 33.0	5 38 20	813	S0	14.53	1.19
30		2 55 5.0	5 39 59	570	S0	15.56	1.40
24		2 54 14.8	5 40 6	903	E	15.39	1.24
42		2 55 35.1	5 42 24	648	S0	15.82	1.30
16		2 54 1.8	5 42 26	996	SP	15.30	1.34
90		2 54 26.7	5 42 56	660		16.97	1.03
50		2 55 36.3	5 43 8	634	E	15.98	1.19
45		2 54 44.3	5 44 42	393	S0	15.87	1.39
71		2 57 4.1	5 45 0	1835		16.46	1.28
29		2 55 7.2	5 45 8	270	Pec	15.53	0.95
33		2 57 7.5	5 45 14	1884	S0/–	15.63	1.13
54		2 53 39.1	5 45 30	1266		16.04	1.18
19		2 55 35.5	5 46 27	525	E	15.33	1.28
40		2 55 7.1	5 46 32	189	S0	15.81	1.20
8		2 54 55.0	5 46 34	207	S0	14.74	1.25
20		2 54 39.1	5 46 39	388	S0	15.35	1.23
35		2 57 21.3	5 46 40	2079	SP	15.68	1.08
61		2 54 45.2	5 46 49	304		16.26	1.30
67		2 54 3.4	5 47 20	892		16.31	1.21
39		2 56 25.3	5 47 37	1240	EL	15.79	1.20
83		2 57 10.4	5 48 4	1909		16.86	1.11
65		2 54 48.9	5 48 42	211		16.29	1.23
3		2 55 2.9	5 49 13	15	E	14.40	1.32
4		2 55 3.0	5 49 32	4	E	14.40	1.32
51		2 55 8.7	5 49 40	90	E	15.98	1.34
79		2 54 47.1	5 50 5	235		16.70	1.18
73		2 56 46.6	5 50 24	1550		16.48	0.81
63		2 56 42.1	5 50 41	1484		16.27	1.17
43		2 54 58.8	5 50 47	99	E	15.87	1.18
41		2 54 7.2	5 50 59	834	S+	15.81	0.77
31		2 55 11.9	5 51 10	169	S0	15.59	1.29
6		2 55 42.2	5 53 46	640	E	14.69	1.24
36		2 56 56.8	5 54 17	1722	E	15.71	1.03
69		2 53 34.0	5 54 24	1360		16.33	0.75
18		2 52 41.2	5 54 48	2141	S–?	15.33	1.11
80		2 56 6.2	5 54 51	997		16.74	0.98
17		2 56 15.4	5 55 17	1135	EL	15.32	1.17
76		2 55 15.9	5 56 22	455		16.58	1.21
11		2 56 37.3	5 56 24	1466	S0/a	14.96	1.01
55		2 54 58.4	5 56 37	434		16.04	1.16
53		2 56 39.0	5 56 47	1496		16.01	1.17
25		2 53 44.0	5 56 56	1263	SP	15.40	
59		2 56 14.7	5 57 47	1177	S+	16.17	0.93
13		2 52 36.1	5 58 0	2253	EL	15.19	1.35
23		2 55 58.9	5 58 49	1002	S0/–	15.38	1.24
38		2 53 50.3	5 59 21	1240	S0	15.75	1.21
46		2 56 16.4	5 59 53	1256	S0	15.89	1.22
10		2 54 17.9	6 0 9	932	S0	14.89	1.17
32		2 55 49.8	6 0 33	959	S0/–	15.62	1.16
9		2 53 8.1	6 0 33	1843	Sc	14.80	1.06
34		2 54 23.3	6 1 23	932	EL	15.67	1.22
91		2 56 10.9	6 3 45	1321		16.99	1.21
12		2 56 22.0	6 4 26	1474	S0	15.12	1.14
85		2 53 53.0	6 4 27	1384		16.90	0.84
48		2 56 17.0	6 5 30	1457	EL	15.95	1.15
7		2 55 50.8	6 6 34	1243	SP	14.73	1.23
2		2 53 50.0	6 6 52	1516	S0	14.13	1.40
15		2 53 3.8	6 8 21	2119	S0	15.27	1.32
56		2 55 55.3	6 8 58	1398		16.05	0.89
70		2 53 39.8	6 9 15	1727		16.39	1.15
77		2 56 16.9	6 9 30	1622		16.62	1.11
66		2 55 13.0	6 9 38	1217		16.30	1.09
88		2 53 26.0	6 10 4	1914		16.91	1.14
14		2 53 27.8	6 10 10	1898	E	15.25	1.25
47		2 56 11.5	6 10 15	1613	EL	15.95	1.21
26		2 56 12.1	6 10 44	1631	S0/–	15.50	1.18
57		2 54 58.9	6 10 56	1289		16.07	1.20
89		2 53 30.1	6 12 59	1989		16.92	1.37
44		2 56 5.6	6 13 38	1715	S+	15.87	0.96
75		2 56 39.7	6 17 5	2183		16.53	0.93
86		2 56 15.7	6 19 28	2090		16.90	0.97
68		2 54 20.8	6 19 49	1934		16.32	1.24
74		2 55 9.5	6 21 28	1921		16.51	0.97
72		2 55 5.4	6 22 26	1977		16.46	1.11
1		2 55 45.5	6 23 44	2144	S0	14.10	1.30

TABLE 4

ABELL 401

Object	Ident	R.A.(1950)	Dec(1950)	Radius	Type	J	J–F
117		2 56 20.3	13 10 33	756		18.51	1.11
99		2 55 59.5	13 11 10	733		18.32	0.83
13		2 56 32.5	13 11 12	768	S+	17.09	0.89
102		2 56 25.2	13 11 44	702		18.35	1.02
98		2 55 48.7	13 12 5	739		18.32	1.20
58		2 55 59.5	13 12 18	668	EL	17.81	1.19
132		2 56 23.4	13 12 40	641		18.63	0.86
66		2 55 47.4	13 13 4	697		17.98	1.21
48		2 56 4.0	13 13 55	557		17.72	1.18
31		2 55 51.3	13 14 10	611	S0	17.41	1.18
124		2 56 10.7	13 14 15	525		18.57	1.20
15		2 55 35.6	13 14 21	744	SB–	17.12	1.01
131		2 55 41.7	13 14 53	659		18.63	0.74
79		2 55 40.2	13 14 54	675		18.09	0.98
127		2 55 40.2	13 14 54	711		18.60	
129		2 55 47.1	13 15 6	599		18.61	0.47
141		2 55 59.8	13 15 10	503		18.75	0.82
4		2 55 42.0	13 15 11	644		16.64	1.20
3		2 56 29.5	13 15 19	525	E	16.37	1.19
73		2 55 40.1	13 15 20	657		18.03	1.03
30		2 56 30.5	13 15 35	518	S0	17.41	1.06
55		2 56 1.3	13 16 9	440		17.79	1.20
40		2 56 20.8	13 16 21	417		17.55	1.29
32		2 56 15.9	13 16 23	400	S0	17.42	1.33
60		2 55 30.6	13 16 30	722		17.83	1.29
111		2 55 46.4	13 16 47	530		18.45	1.08
54		2 55 37.5	13 17 7	618		17.79	1.08
92		2 55 52.4	13 17 22	445		18.24	1.09
20		2 56 36.3	13 17 23	487	Pec	17.18	1.07
52		2 56 12.0	13 17 25	335		17.77	1.09
101		2 55 50.8	13 17 42	447		18.35	1.03
14		2 55 29.7	13 17 42	698	SP	17.11	1.03
134		2 56 12.9	13 17 45	315		18.64	1.09
27		2 56 42.9	13 17 46	545	S0	17.31	1.17
71		2 56 22.8	13 17 50	345		18.03	0.82
69		2 55 57.9	13 17 51	374		18.00	1.18
24		2 56 47.2	13 18 58	563	E	17.24	1.17
39		2 55 49.0	13 19 1	415		17.55	1.15
136		2 56 14.9	13 19 13	230		18.67	1.14
121		2 56 3.6	13 19 14	259		18.55	1.11
91		2 56 8.1	13 19 28	221		18.24	0.93
65		2 55 42.3	13 19 51	478		17.92	1.02
33		2 56 0.2	13 19 53	257	S0	17.46	1.12
11		2 55 50.7	13 19 54	366	S0	17.02	
64		2 56 28.1	13 19 59	292		17.90	1.12
19		2 55 57.2	13 19 59	286	S0	17.16	1.21
114		2 55 51.3	13 20 16	348		18.49	1.09
16		2 56 30.1	13 20 19	304	S0	17.13	1.15
61		2 55 35.9	13 20 34	552		17.84	1.11
118		2 55 59.6	13 20 36	236		18.54	0.72
81		2 56 14.6	13 20 36	147		18.15	1.14
104		2 56 12.1	13 20 52	128		18.37	0.86
107		2 56 27.3	13 20 53	251		18.40	
72		2 55 54.6	13 20 57	287		18.03	1.11
119		2 56 17.0	13 21 0	137		18.54	1.00
36		2 56 3.1	13 21 14	172	EL	17.50	1.13
49		2 56 10.6	13 21 17	106		17.72	1.08
44		2 55 52.0	13 21 17	314		17.67	1.13
85		2 56 4.4	13 21 24	150		18.19	0.78
96		2 55 35.9	13 21 30	540		18.30	
62		2 56 6.0	13 21 38	124		17.84	1.17
10		2 56 31.1	13 21 50	281	S+	16.98	0.94
76		2 55 28.2	13 22 7	647		18.06	1.19
100		2 56 7.1	13 22 11	91		18.35	1.11
137		2 55 46.6	13 22 16	379		18.70	1.17
43		2 56 2.2	13 22 21	153		17.62	1.23
6		2 55 46.8	13 22 21	376	S0	16.72	1.20
110		2 56 30.9	13 22 29	271		18.43	1.38
83		2 56 26.6	13 22 41	207		18.18	1.01
120		2 56 25.2	13 22 51	186		18.54	1.00
103		2 55 34.2	13 22 56	558		18.36	1.00
106		2 56 54.0	13 23 5	606		18.40	0.93
1		2 56 12.6	13 23 5	5	cD	15.32	1.21
21		2 56 22.4	13 23 15	145	S0	17.18	1.07
47		2 56 10.4	13 23 32	46		17.70	
51		2 56 25.0	13 23 36	186		17.75	1.16
26		2 56 10.0	13 23 36	48	E	17.30	
7		2 56 10.8	13 23 42	48	S0	16.81	1.11

TABLE 4—*Continued*

Object	Ident	R.A.(1950)	Dec(1950)	Radius	Type	J	J−F
8		2 56 13.7	13 24 5	67	E	16.85	1.15
9		2 56 30.3	13 24 24	272	S+	16.93	1.25
95		2 56 16.4	13 24 32	107		18.30	1.17
140		2 56 29.1	13 24 40	261		18.73	0.94
5		2 56 15.3	13 24 41	108	EL	16.66	1.19
135		2 56 10.4	13 24 43	107		18.64	1.03
97		2 56 18.1	13 24 44	132		18.32	1.28
75		2 56 10.3	13 24 55	118		18.03	1.01
46		2 55 25.3	13 25 7	700		17.70	1.18
56		2 56 6.8	13 25 32	172		17.79	1.15
138		2 56 33.5	13 25 41	345		18.71	1.06
108		2 56 19.2	13 25 42	189		18.40	0.96
87		2 55 26.5	13 25 45	690		18.22	0.98
50		2 56 11.1	13 25 53	174		17.72	0.67
84		2 56 25.1	13 26 2	257		18.18	1.11
139		2 56 35.0	13 26 2	374		18.72	0.93
68		2 55 48.4	13 26 3	396		17.99	1.07
123		2 56 19.3	13 26 15	218		18.56	1.02
45		2 56 7.2	13 26 22	261		17.70	
38		2 56 9.7	13 26 27	211		17.54	1.14
17		2 56 31.9	13 26 43	359	SP	17.13	1.18
37		2 56 43.9	13 26 50	511		17.51	1.17
57		2 56 1.4	13 26 57	287		17.80	1.09
116		2 56 14.8	13 27 5	246		18.50	
130		2 56 10.3	13 27 25	266		18.63	0.94
22		2 56 1.1	13 27 37	323	?	17.22	1.11
94		2 56 19.6	13 27 40	298		18.26	1.23
109		2 56 37.5	13 27 43	460		18.41	0.90
41		2 56 17.6	13 27 54	302		17.56	1.18
12		2 56 10.5	13 27 55	296	S0/a	17.09	1.25
115		2 56 33.9	13 27 57	429		18.49	1.08
93		2 56 35.9	13 27 58	452		18.25	1.19
63		2 55 29.5	13 28 3	698		17.89	1.12
80		2 56 49.7	13 28 4	620		18.14	1.16
78		2 55 57.2	13 28 6	379		18.08	1.06
128		2 55 25.7	13 28 13	752		18.61	1.03
113		2 56 44.1	13 28 28	563		18.48	0.98
23		2 56 27.8	13 28 32	398	SP	17.22	1.09
67		2 56 41.9	13 28 35	542		17.99	0.94
2		2 55 25.4	13 28 38	767	E	16.09	1.17
77		2 56 27.5	13 28 52	413		18.08	1.18
28		2 55 41.6	13 28 53	573	S−	17.34	0.97
133		2 55 27.3	13 28 55	749		18.64	1.10
88		2 56 27.1	13 29 1	417		18.23	0.82
18		2 55 37.2	13 29 37	652	Sc	17.14	1.08
42		2 55 43.8	13 29 41	581		17.59	1.12
35		2 56 44.7	13 29 52	620	S−	17.50	
122		2 56 21.4	13 30 20	457		18.55	1.05
59		2 56 47.4	13 30 33	679		17.82	1.30
53		2 56 25.6	13 30 43	499		17.77	1.19
125		2 55 59.7	13 30 45	502		18.59	1.24
112		2 56 24.1	13 31 2	509		18.46	1.00
34		2 56 15.4	13 31 16	496	S−	17.47	1.17
126		2 56 27.7	13 31 17	542		18.59	1.14
86		2 55 42.5	13 31 27	671		18.21	1.12
82		2 56 35.0	13 32 11	639		18.18	1.21
89		2 56 14.3	13 32 18	558		18.23	0.98
29		2 56 24.2	13 32 18	582	Sc	17.35	1.08
105		2 56 16.9	13 33 1	604		18.40	1.15
25		2 56 9.1	13 33 28	630	S−	17.26	1.04
70		2 56 38.4	13 33 30	732		18.02	1.10
74		2 56 4.0	13 34 31	702		18.03	1.02
90		2 56 19.4	13 34 37	703		18.23	0.93

TABLE 5

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Object	Ident	R.A.(1950)	Dec(1950)	Radius	Type	J	J−F
72		11 42 48.3	19 26 6	2635	S0/a	15.85	0.80
68		11 43 10.3	19 26 26	2634	S0	15.77	0.96
141		11 43 6.0	19 32 40	2257		16.75	0.86
105		11 42 49.9	19 34 32	2129		16.35	0.86
160		11 41 2.0	19 35 29	2546		16.99	0.78
155		11 44 11.8	19 36 14	2353		16.93	0.58

TABLE 5—*Continued*

Object	Ident	R.A.(1950)	Dec(1950)	Radius	Type	J	J-F
54		11 40 41.8	19 39 59	2520	EL	15.45	1.08
35	N3864	11 42 40.2	19 40 12	1792	Sb	15.00	0.82
100		11 41 9.9	19 40 26	2240		16.27	1.06
6	N3867	11 42 54.3	19 40 35	1769	Spec	13.91	0.85
80		11 42 59.8	19 41 38	1713	E	15.99	0.82
135		11 40 43.9	19 42 18	2400		16.68	0.91
134		11 40 39.2	19 42 32	2439		16.65	1.11
71		11 40 16.3	19 42 44	2679	S0?	15.81	0.93
60		11 43 27.7	19 42 48	1733	S0	15.53	0.84
73		11 41 15.2	19 43 0	2071	S	15.87	0.84
26	N3868	11 42 54.5	19 43 20	1605	S0	14.72	1.00
18	N3859	11 42 16.6	19 43 58	1619	Spec	14.52	0.73
157		11 43 8.0	19 44 17	1573		16.95	0.68
152		11 43 46.4	19 45 36	1690		16.88	0.77
86		11 42 20.3	19 46 21	1468		16.06	1.06
148		11 41 25.3	19 46 46	1805		16.81	0.71
44		11 43 23.4	19 48 20	1401	S0/a	15.21	0.93
90		11 42 35.2	19 48 41	1291		16.14	1.08
25	N3857	11 42 14.6	19 48 43	1355	S0	14.71	1.05
107		11 42 33.8	19 49 57	1217		16.36	0.89
81		11 42 12.5	19 51 36	1204		16.01	0.81
139		11 41 3.4	19 51 40	1821		16.72	1.00
52		11 41 1.2	19 53 11	1792	E	15.40	1.03
1	N3862	11 42 29.1	19 53 17	1033	E	13.10	0.93
79		11 43 17.6	19 53 18	1096	S0	15.96	0.80
76		11 42 16.6	19 53 20	1085	S0	15.93	0.90
28	I2955	11 42 28.0	19 54 11	980	E	14.80	
31		11 40 55.4	19 54 33	1816	Sb?	14.94	0.85
65		11 43 31.0	19 54 39	1117	S0	15.70	0.92
138		11 42 30.0	19 54 57	932		16.71	0.88
158		11 43 22.9	19 55 35	1009		16.96	0.58
37		11 40 26.0	19 56 2	2145	Sb	15.02	0.95
113		11 42 29.2	19 57 38	781		16.39	0.97
57		11 42 12.4	19 58 3	861	S0/a	15.47	0.76
110		11 42 9.9	19 58 36	854		16.38	0.61
144		11 40 32.2	19 58 53	2000		16.80	0.66
132		11 43 50.9	19 59 44	1103		16.62	0.91
36		11 42 21.5	20 0 44	655	S0	15.00	1.05
67		11 41 52.8	20 0 53	928	E	15.72	1.21
41		11 41 32.0	20 1 5	1172	E	15.20	0.95
116		11 42 23.2	20 1 9	660		16.40	
117		11 41 17.9	20 1 14	1348		16.40	0.97
153		11 41 27.3	20 1 16	1225		16.90	0.98
29		11 44 23.4	20 1 20	1467	S0	14.82	1.24
39		11 40 40.5	20 1 53	1833	S0	15.09	0.99
136		11 42 1.0	20 1 53	800		16.70	0.99
7	I2951	11 40 49.0	20 1 56	1716	Sa	13.99	1.15
114		11 42 38.3	20 2 3	490		16.40	0.92
77		11 42 11.0	20 2 13	679	S0	15.96	1.10
13	N3875	11 43 13.1	20 2 40	584	S0	14.17	1.02
85		11 43 5.7	20 2 51	513		16.03	1.05
98		11 43 54.5	20 3 0	1054		16.24	0.92
5	N3873	11 43 10.7	20 3 7	542	E	13.70	0.98
70		11 42 12.1	20 3 9	630	Irr	15.81	0.61
128		11 41 46.6	20 3 17	928		16.57	0.99
49		11 42 19.1	20 3 17	553		15.29	0.89
46		11 41 23.9	20 3 35	1217	S0	15.25	1.08
127		11 43 28.3	20 3 48	704		16.56	0.90
61		11 41 26.2	20 3 54	1180	Irr	15.54	0.63
111		11 40 41.9	20 3 55	1784		16.39	1.03
50		11 43 30.8	20 4 0	729	S0/a	15.35	1.03
8	N3860	11 42 13.6	20 4 27	564	Sb	14.00	0.88
88		11 43 23.2	20 4 47	613		16.09	0.87
69		11 41 27.5	20 4 55	1144	E	15.78	1.02
121		11 42 13.4	20 5 13	540		16.45	0.72
106		11 42 50.0	20 5 46	263		16.36	0.77
33		11 41 45.1	20 6 22	882	S0	14.96	1.05
63		11 41 49.5	20 6 30	820	S0	15.57	1.08
9	N3886	11 44 30.0	20 6 48	1480	S0	14.03	1.18
102		11 39 42.2	20 7 21	2588		16.31	0.71
21		11 42 39.3	20 7 26	180	EL	14.68	0.92
22		11 41 43.3	20 7 30	891	S0	14.68	1.05
78		11 43 36.6	20 7 45	729	S0/a	15.96	0.80
123		11 42 28.2	20 8 17	267		16.48	1.13
92		11 44 55.8	20 8 45	1833		16.15	0.98
147		11 42 49.6	20 9 18	70		16.81	1.06
51		11 42 11.9	20 9 21	476	S0	15.37	1.05
159		11 41 5.4	20 10 5	1410		16.98	0.94

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TABLE 5—*Continued*

Object	Ident	R.A.(1950)	Dec(1950)	Radius	Type	J	J−F
142		11 41 23.1	20 10 23	1161		16.76	1.03
10	N3837	11 41 20.7	20 10 33	1194	E	14.05	1.12
34		11 45 4.2	20 12 45	1958	Sa	14.96	0.86
145		11 41 21.8	20 13 1	1191		16.80	0.98
75		11 40 30.5	20 13 20	1910	S0	15.91	1.03
2	N3842	11 41 26.5	20 13 53	1134	E	13.11	1.08
95		11 40 10.2	20 13 56	2196		16.21	0.94
118		11 45 45.0	20 14 3	2537		16.41	1.03
45		11 41 21.7	20 14 6	1203	S0	15.22	1.14
58		11 42 31.5	20 14 33	355	Sc	15.50	
89		11 40 20.6	20 14 54	2058		16.11	0.53
3	N3861	11 42 28.4	20 15 0	381	Sbc	13.34	0.97
125		11 40 20.5	20 15 6	2061		16.52	0.60
12		11 41 12.9	20 15 6	1337	S+	14.12	0.76
17	N3841	11 41 26.4	20 15 10	1153	E	14.51	1.03
43		11 39 38.3	20 15 37	2653	S+	15.21	0.83
38	N3851	11 41 44.8	20 15 40	917	E	15.08	1.15
130		11 43 14.6	20 15 54	541		16.61	1.03
96		11 41 0.7	20 16 28	1521		16.24	1.41
27	N3845	11 41 29.6	20 16 38	1135	S+	14.76	1.03
20		11 45 28.3	20 16 43	2326	EL	14.64	1.09
62		11 40 37.3	20 17 18	1852	Irr	15.55	0.58
140		11 42 19.0	20 17 47	593		16.75	0.63
133		11 42 42.2	20 17 53	472		16.62	
151		11 40 55.5	20 17 56	1615		16.85	0.76
66		11 42 41.6	20 17 63	482	EL	15.71	
48		11 43 9.2	20 18 30	609	Sc	15.27	0.67
23	N3844	11 41 25.2	20 18 42	1239	S0	14.69	1.13
120		11 40 35.1	20 18 46	1903		16.42	1.10
24		11 40 9.2	20 18 58	2259	Sb	14.71	0.84
64		11 41 10.9	20 19 15	1436	S0	15.62	1.01
82		11 39 39.8	20 20 1	2676		16.02	0.63
30		11 41 54.9	20 21 25	982	S0	14.83	1.18
16	N3840	11 41 23.2	20 21 33	1342	Sb	14.42	0.98
53		11 40 23.2	20 22 15	2125	S0	15.40	1.21
112		11 41 28.1	20 22 48	1326		16.39	1.08
149		11 41 50.3	20 22 57	1091		16.82	0.80
154		11 39 42.5	20 23 0	2680		16.90	
108		11 41 56.5	20 23 12	1043		16.36	1.08
137		11 43 58.2	20 23 12	1296		16.70	0.96
47		11 41 49.5	20 23 14	1112	E	15.25	1.01
11		11 42 11.5	20 24 16	974	Sbc	14.11	0.91
104		11 39 48.2	20 24 26	2632		16.34	0.62
156		11 40 37.4	20 24 53	2002		16.93	0.82
74		11 42 31.0	20 26 6	983	SP	15.89	0.72
119		11 40 17.3	20 27 47	2332		16.42	0.84
40		11 41 22.4	20 28 2	1584	S+	15.12	0.78
83		11 40 24.6	20 29 32	2292		16.02	1.06
93		11 41 40.8	20 29 43	1483		16.20	0.54
15		11 41 41.3	20 30 9	1500	Sb	14.33	1.03
131		11 45 11.8	20 30 52	2415		16.62	1.14
91		11 41 30.0	20 31 45	1672		16.15	1.01
129		11 41 13.2	20 31 50	1834		16.61	0.85
126		11 40 45.3	20 32 46	2162		16.53	0.83
32		11 41 8.2	20 33 17	1944	S0	14.95	1.11
87		11 42 52.6	20 34 21	1461		16.09	1.03
122		11 43 21.4	20 34 48	1572		16.46	0.90
59		11 41 21.7	20 34 55	1892	S0	15.52	1.08
115		11 40 6.0	20 35 2	2686		16.40	1.03
124		11 41 43.3	20 35 3	1729		16.49	0.84
19		11 42 48.3	20 36 14	1572	Sa?	14.54	1.18
109		11 41 54.5	20 36 34	1739		16.37	1.00
143		11 40 36.6	20 37 8	2423		16.77	0.88
84		11 41 12.0	20 38 42	2154		16.03	0.73
99		11 41 21.3	20 39 31	2119		16.26	1.12
4	N3884	11 43 36.9	20 40 16	1957	Sa	13.58	1.08
97		11 41 19.1	20 41 27	2232		16.24	1.25
101		11 42 2.5	20 42 24	2027		16.29	0.67
55		11 43 24.4	20 42 56	2052		15.45	1.06
14		11 42 30.4	20 43 3	1989	Sb	14.26	0.86
150		11 44 7.6	20 43 8	2304		16.83	0.98
56	I732	11 43 24.0	20 43 22	2074	S	15.45	1.06
103		11 43 33.6	20 43 27	2120		16.34	0.94
161		11 42 4.7	20 45 26	2194		17.00	0.74
94		11 42 53.0	20 53 29	2610		16.20	
146		11 42 30.3	20 54 21	2610		16.80	
42		11 43 18.0	20 55 0	2670	S−	15.20	

TABLE 6

Coma Cluster

Object	Ident	R.A.(1950)	Dec(1950)	Radius	Type	J	J–F
108		12 57 53.0	27 39 24	2122	Spec	15.63	0.81
53		12 56 48.7	27 40 20	2105	S0	15.06	1.02
35		12 58 25.2	27 40 26	2171	SBa	14.71	1.01
136		12 56 6.9	27 43 37	2130	S0	15.88	0.99
151		12 56 12.9	27 44 5	2068		16.01	0.97
60		12 55 36.3	27 45 40	2265	SBa	15.19	1.09
175		12 58 8.8	27 46 20	1765		16.29	0.58
314		12 57 39.2	27 46 53	1654		17.43	0.87
116		12 58 4.5	27 46 57	1714	Spec	15.73	0.72
246		12 56 53.5	27 47 0	1701		16.97	0.96
115		12 58 2.1	27 47 1	1700	E	15.72	1.00
176		12 56 36.6	27 48 24	1696		16.30	0.91
154		12 56 13.3	27 48 53	1816		16.04	0.98
236		12 55 44.5	27 49 14	2032		16.87	0.97
238		12 58 0.4	27 49 14	1568		16.87	0.96
91		12 57 54.3	27 49 19	1542	EL	15.45	0.92
156		12 56 3.3	27 49 48	1847		16.05	0.98
89		12 58 11.0	27 50 32	1539	Sa	15.44	0.93
135		12 57 15.0	27 50 45	1425	Sb	15.88	0.77
212		12 55 41.6	27 50 53	1986		16.69	1.00
239		12 55 18.0	27 50 58	2215		16.88	1.01
172		12 55 31.1	27 51 10	2076		16.26	0.58
242		12 59 13.3	27 51 28	1959		16.92	1.07
268		12 56 53.6	27 51 48	1425		17.16	0.68
174		12 57 45.6	27 51 49	1372		16.28	0.93
110		12 56 33.1	27 51 54	1527	S0	15.69	1.06
13	N4853	12 56 10.1	27 52 4	1684	pec	14.25	0.88
132		12 59 23.9	27 52 12	2032	S0	15.86	0.96
144		12 58 47.7	27 52 18	1695	S0	15.96	0.92
20	N4840	12 55 7.6	27 52 57	2253	E	14.41	1.03
87		12 55 29.5	27 53 16	2009	E	15.43	0.99
141	RB224	12 56 45.3	27 53 23	1375	E	15.91	1.00
6	N4926	12 59 29.2	27 53 26	2041	S0	13.65	1.06
222		12 57 57.6	27 53 30	1312		16.76	1.06
217		12 55 17.6	27 53 35	2122		16.73	1.06
286		12 58 2.9	27 53 37	1328		17.30	0.79
173		12 55 38.3	27 54 17	1880		16.26	1.13
70		12 58 9.0	27 54 21	1318	Sc	15.31	0.65
297		12 55 2.2	27 54 30	2260		17.35	0.96
40	RB219	12 56 40.5	27 54 51	1323	Sa	14.81	0.83
51		12 59 43.5	27 54 53	2144	Spec	15.02	0.91
306		12 55 25.3	27 54 56	1992		17.39	0.87
133		12 59 36.6	27 55 9	2060	SB0	15.86	0.93
123		12 58 33.8	27 55 11	1446	Sa	15.77	0.95
147		12 57 16.4	27 55 45	1124	Sa	15.97	1.03
300		12 55 0.8	27 55 54	2233		17.36	0.92
224		12 58 50.6	27 56 11	1548		16.79	0.96
162	RB188	12 56 6.5	27 56 40	1507		16.12	1.05
25	N4854	12 56 22.4	27 56 44	1362	EL	14.49	1.06
255		12 55 38.4	27 57 14	1770		17.07	1.09
130		12 57 41.5	27 57 15	1042	E	15.85	1.02
294		12 55 2.9	27 58 23	2138		17.32	1.05
267		12 59 12.0	27 58 29	1679		17.15	0.94
262		12 55 28.0	27 58 44	1836		17.14	1.41
23		12 57 22.3	27 58 47	936	S0	14.47	1.06
318	RB226	12 56 53.5	27 59 8	1017		17.46	0.98
182		12 55 22.8	27 59 50	1862		16.37	1.07
194		12 57 36.7	28 0 0	869		16.51	0.98
200	RB182	12 55 51.8	28 0 4	1527		16.59	0.96
299		12 57 20.2	28 0 23	842		17.36	0.80
131	RB230	12 57 0.0	28 0 30	905	S0	15.85	1.04
250		12 58 26.5	28 0 38	1134		17.04	1.03
249		12 59 18.4	28 0 51	1676		17.03	0.86
206		12 57 31.4	28 0 56	806		16.64	0.68
303		12 54 53.0	28 1 12	2188		17.37	0.90
244		12 55 12.9	28 1 16	1943		16.94	0.95
86		12 55 20.9	28 1 45	1834	S0	15.41	1.02
202	RB199	12 56 17.6	28 1 52	1187		16.61	0.70
203	RB183	12 55 54.2	28 1 59	1437		16.62	1.23
159		12 58 7.8	28 2 4	910		16.10	1.02
97		12 54 58.2	28 2 19	2099	S0	15.56	0.98
61	I3957	12 56 42.4	28 2 22	932	E	15.19	1.01
233		12 55 22.7	28 2 29	1794		16.86	1.02
228		12 57 44.2	28 2 29	0		16.80	
287	RB221	12 50 41.9	28 2 39	923		17.30	(1.06)
74		12 57 41.8	28 2 39	727	S0	15.32	1.02
66	I3963	12 56 48.6	28 2 42	865	S0	15.28	1.00
196		12 57 13.0	28 2 46	719		16.52	1.05

TABLE 6—*Continued*

Object	Ident	R.A.(1950)	Dec(1950)	Radius	Type	J	J–F
102		12 59 35.7	28 2 55	1830	S0	15.60	1.02
179		12 57 47.9	28 3 2	731		16.33	1.02
292		12 57 53.0	28 3 10	751		17.31	1.10
67		12 58 29.4	28 3 10	1064	S0	15.30	
269	RB231	12 57 2.4	28 3 17	740		17.16	0.94
38	I3959	12 56 43.3	28 3 17	882	E	14.77	1.05
79	I3947	12 56 27.1	28 3 20	1034	S0	15.34	1.02
188	RB214	12 56 32.7	28 3 21	978		16.44	0.95
4	N4911	12 58 31.5	28 3 34	1066	Sb	13.49	0.96
171	RB234	12 57 5.8	28 3 40	701		16.24	0.92
213		12 57 30.1	28 3 54	627		16.69	0.98
315	RB210	12 56 29.8	28 3 59	981		17.44	(1.11)
96		12 58 46.1	28 4 13	1206	S0	15.55	1.03
31	N4919	12 58 53.4	28 4 28	1283	S0	14.63	1.00
95		12 57 40.8	28 4 33	614	S0	15.54	1.01
41	I3946	12 56 23.7	28 4 51	1014	S0	14.81	1.08
129		12 54 52.6	28 5 1	2120	S0	15.84	0.92
180	RB209	12 56 28.1	28 5 2	961		16.33	1.08
195		12 57 53.9	28 5 2	660		16.52	1.02
93		12 58 44.8	28 5 13	1162	EL	15.54	0.93
106		12 55 38.4	28 5 14	1539	S0	15.60	0.97
261	RB213	12 56 31.6	28 5 32	905		17.14	0.96
187		12 58 8.7	28 5 32	761		16.43	0.95
321	RB196	12 56 13.1	28 5 36	1111		17.50	0.83
237		12 57 12.1	28 5 43	554		16.87	0.97
231	RB198	12 56 15.9	28 5 53	1071		16.84	1.02
199		12 55 51.4	28 5 54	1364		16.58	1.03
201	RB60	12 57 26.2	28 6 8	492		16.60	1.06
278	RB118	12 58 20.8	28 6 12	860		17.25	1.09
29	I3949	12 56 31.1	28 6 14	887	S0	14.59	1.16
99		12 55 22.1	28 6 19	1722	S0	15.58	1.13
230		12 58 30.2	28 6 35	953		16.83	1.01
256		12 57 55.5	28 6 43	591		17.07	0.96
18	N4923	12 59 7.4	28 6 52	1397	EL	14.34	1.07
254		12 55 53.1	28 7 11	1315		17.05	0.78
80	I3976	12 57 4.6	28 7 11	523	S0	15.34	1.10
289		12 59 3.6	28 7 17	1334	S0	17.30	
111		12 55 37.5	28 7 22	1508	EL	15.70	
161		12 55 36.8	28 7 27	1516		16.10	1.11
158	RB41	12 57 15.0	28 7 27	444		16.08	1.04
59	I3960	12 56 43.0	28 7 33	712	S0	15.17	1.31
94	RB49	12 57 21.3	28 7 36	412	S0	15.54	1.05
281	RB131	12 58 54.8	28 7 40	1225		17.28	0.74
105	RB83	12 57 45.5	28 7 51	458	S0	15.60	
257		12 54 56.0	28 7 52	2036		17.08	1.01
251	RB31	12 57 10.4	28 7 59	441		17.04	1.07
78	RB82	12 57 44.8	28 8 3	444	?	15.33	0.89
270	RB90	12 57 48.9	28 8 9	469		17.16	1.08
209	RB47	12 57 19.4	28 8 13	382		16.67	1.01
253	RB223	12 56 44.7	28 8 15	670		17.05	1.10
3	N4921	12 59 1.8	28 9 0	1290	Sb	12.93	1.11
119		12 55 25.5	28 9 5	1639	S0	15.74	1.03
49	I3973	12 57 6.2	28 9 8	417	S0	15.00	1.09
150		12 54 56.5	28 9 11	2015	E	15.99	1.04
52		12 55 22.9	28 9 19	1669	S0	15.04	1.10
320	RB240	12 55 57.3	28 9 20	1225		17.49	0.99
117	RB6	12 56 55.3	28 9 21	517	E	15.74	1.01
295	RB126	12 58 40.3	28 9 33	1008		17.33	1.09
57		12 59 25.8	28 9 36	1593	E	15.14	1.06
235	RB112	12 58 16.5	28 9 47	707		16.86	0.93
218	RB239	12 55 56.9	28 9 48	1222		16.74	1.14
317	RB123	12 58 31.4	28 9 59	887		17.46	0.97
128	RB8	12 56 57.8	28 10 0	467	EL	15.82	1.08
311	RB95	12 57 57.0	28 10 1	472		17.42	0.94
64	RB124	12 58 34.7	28 10 4	929	S0	15.21	1.09
252	RB204	12 56 21.6	28 10 21	898		17.05	(1.45)
82	N4875	12 57 13.1	28 10 37	290	S0	15.40	1.10
305		12 59 9.4	28 10 41	1368		17.38	1.06
142	RB262	12 56 39.7	28 10 52	660	S0	15.92	1.11
152	RB129	12 58 49.1	28 10 54	1103		16.03	0.96
54	N4876	12 57 19.6	28 10 54	229	E	15.06	1.04
15	N4869	12 56 58.5	28 10 54	431	E	14.28	1.11
137	RB119	12 58 22.8	28 11 24	756	S0	15.89	0.99
27	N4906	12 58 14.9	28 11 31	653	E	14.51	1.09
301	RB134	12 59 4.0	28 11 36	1290		17.37	1.01
165	RB43	12 57 17.5	28 11 39	205		16.16	1.00
220	RB55	12 57 25.4	28 11 39	163		16.76	1.14
109	RB64	12 57 32.0	28 11 58	156	S0	15.67	1.03
197		13 0 7.6	28 12 4	2124		16.53	1.02

TABLE 6—*Continued*

Object	Ident	R.A.(1950)	Dec(1950)	Radius	Type	J	J−F
291	RB11	12 57 0.5	28 12 15	373		17.31	1.05
276	RB1	12 56 34.6	28 12 17	704		17.22	1.14
153	RB94	12 57 54.1	28 12 20	376		16.03	1.02
302	RB68	12 57 34.8	28 12 34	147		17.37	0.92
227		12 55 46.4	28 12 41	1334		16.80	1.02
275	RB71	12 57 36.2	28 12 52	149		17.21	0.93
85		13 0 10.5	28 12 53	2160	S0	15.41	1.07
28	N4872	12 57 9.7	28 12 55	245	S0	14.52	1.13
103	RB40	12 57 14.7	28 13 15	176	S0	15.60	(1.01)
1	N4874	12 57 11.8	28 13 25	209	E	12.28	1.09
17	N4898	12 57 53.1	28 13 27	347	E	14.33	1.02
124	RB99	12 58 3.3	28 13 28	482	S0	15.78	1.04
241	RB245	12 56 14.0	28 13 29	967		16.91	1.08
112		12 59 21.6	28 13 36	1513	EL	15.70	
22	N4871	12 57 5.4	28 13 36	0	S0	14.45	(1.09)
163	RB46	12 57 19.4	28 13 40	109		16.12	1.03
215	RB261	12 56 39.3	28 13 46	632		16.72	1.06
76	RB113	12 58 18.2	28 13 53	676	S0	15.33	1.08
168	RB42	12 57 18.0	28 14 0	0		16.20	(1.02)
243	RB73	12 57 39.1	28 14 1	160		16.93	0.87
164	RB257	12 56 30.3	28 14 7	749		16.14	1.12
118	N4894	12 57 51.8	28 14 10	327	S0	15.74	1.06
186	RB260	12 56 35.2	28 14 16	685		16.42	1.10
178	RB13	12 57 0.6	28 14 19	350		16.32	1.10
36	N4850	12 55 56.8	28 14 20	1191	S0	14.76	1.07
34	I4012	12 58 18.2	28 14 22	675	S0	14.69	1.03
42	N4867	12 56 50.4	28 14 24	476	E	14.90	(1.02)
100	RB100	12 58 3.8	28 14 27	485	S0	15.59	1.03
120	RB14	12 57 0.6	28 14 31	350	S0	15.75	1.11
148		12 55 38.1	28 14 32	1439	SBb	15.98	1.08
2	N4889	12 57 43.0	28 14 35	210	E	12.46	1.10
214	RB7	12 56 56.6	28 14 36	403		16.70	1.12
84	I3998	12 57 22.0	28 14 37	68	S0	15.41	1.03
26	N4864	12 56 48.9	28 14 41	503	E	14.50	
104	RB77	12 57 35.0	28 15 0	184	S0	15.60	
285		12 55 37.8	28 15 0	1443		17.29	1.07
37	N4873	12 57 8.0	28 15 12	256	EL	14.76	0.99
138	RB38	12 57 13.6	28 15 24	188	S0	15.89	1.03
33	N4886	12 57 39.8	28 15 27	181	E	14.66	0.99
229		12 55 31.5	28 15 49	1528		16.80	0.60
121	RB45	12 57 19.0	28 15 51	139	E	15.76	1.00
75	I4041	12 58 16.3	28 15 53	656	EL	15.33	1.01
191	RB133	12 59 2.8	28 15 59	1268		16.49	1.12
48	I3955	12 56 41.2	28 16 1	613	S0	14.99	1.04
181	RB18	12 57 1.8	28 16 6	349		16.35	1.06
264	RB37	12 57 13.2	28 16 14	214		17.15	1.03
9	N4927	12 59 33.3	28 16 22	1672	S0	13.97	1.10
90	I4011	12 57 41.8	28 16 23	229	E	15.45	1.01
10	I4051	12 58 29.8	28 16 40	841	E	13.99	1.04
309	RB267	12 56 46.7	28 16 46	551		17.42	0.98
126	RB110	12 58 14.2	28 17 0	642	S0	15.80	
24	RB241	12 56 5.3	28 17 9	1092	E	14.48	1.08
160	RB74	12 57 40.7	28 17 36	266		16.10	1.00
208	RB128	12 58 44.9	28 18 2	1053		16.66	1.08
39	N4883	12 57 31.3	28 18 14	239	S0	14.77	1.17
19	N4908	12 58 26.9	28 18 35	831	E	14.41	1.04
92	I4021	12 57 50.1	28 18 36	398	E	15.49	1.03
143	RB22	12 57 3.9	28 18 37	397	E	15.94	1.05
263	RB226	12 56 44.6	28 18 40	615		17.15	1.07
274		12 55 52.4	28 18 41	1275		17.19	0.94
290		12 55 12.1	28 18 46	1801		17.30	1.01
62	I4026	12 57 57.6	28 18 57	489	S0	15.21	1.00
68	RB26	12 57 6.7	28 19 3	388	S0	15.30	0.95
265	RB263	12 56 40.0	28 19 14	686		17.15	1.02
167		12 56 6.9	28 19 15	1096		16.19	1.13
47	I4040	12 58 13.3	28 19 34	687	Sa	14.97	0.89
146	RB91	12 57 52.4	28 19 57	475	S0	15.96	1.04
83		12 55 32.7	28 19 59	1545	Irr	15.40	0.97
258	RB66	12 57 32.9	28 20 3	351		17.09	1.01
113	RB87	12 57 48.4	28 20 34	468	S0	15.70	1.07
211	RB59	12 57 26.8	28 20 34	372		16.68	1.06
207	RB271	12 56 55.4	28 20 40	562		16.65	1.13
58	RB268	12 56 49.1	28 20 48	631	S0	15.15	1.14
98	I4012	12 57 43.3	28 20 51	445	E	15.57	1.04
177		12 55 11.3	28 20 58	1833		16.31	1.06
12	N4865	12 56 55.1	28 21 16	590	E	14.15	1.07
134	RB252	12 56 25.9	28 21 17	906	S0	15.87	1.16
185	RB21	12 57 3.7	28 21 19	518		16.41	1.03
32	I4045	12 58 24.2	28 21 31	870	E	14.63	1.00
46		12 59 22.7	28 21 42	1591	S0	14.97	1.07
272		12 55 54.5	28 21 58	1302		17.16	0.69
260	RB58	12 57 27.1	28 22 4	463		17.13	1.06

TABLE 6—*Continued*

Object	Ident	R.A.(1950)	Dec(1950)	Radius	Type	J	J–F
183		12 59 50.1	28 22 4	1946		16.39	0.89
155	RB116	12 58 20.1	28 22 7	843		16.05	1.00
50		13 0 14.3	28 22 48	2267	SBa?	15.01	1.04
45	I3943	12 56 11.4	28 23 5	1125	S0	14.95	1.12
65	N4858	12 56 37.2	28 23 10	842	Sb	15.23	0.82
11	N4860	12 56 39.0	28 23 38	841	E	14.11	1.10
283		12 58 54.7	28 23 44	1288		17.29	1.10
145		12 56 28.6	28 23 48	955	E	15.96	1.17
107		12 55 50.0	28 23 51	1398	S0	15.63	1.11
139	RB155	12 57 30.4	28 23 51	572	S0	15.90	1.06
193		12 56 0.6	28 24 1	1278		16.50	0.86
304		12 59 27.5	28 24 20	1702		17.38	0.97
190		12 55 21.6	28 24 47	1766		16.48	1.05
273	RB153	12 57 25.6	28 24 49	628		17.19	0.93
55		12 58 11.2	28 24 49	858	S0	15.07	1.25
307		12 59 10.9	28 24 50	1510		17.39	1.03
77	N4851	12 55 56.7	28 25 10	1355	S0	15.33	1.14
125	I839	12 55 57.1	28 25 22	1355	S0	15.80	1.10
282	RB163	12 57 39.6	28 25 30	689		17.28	1.00
5	N4907	12 58 24.2	28 25 31	1010	Sb	13.62	1.08
166	RB166	12 57 44.1	28 25 44	720		16.18	1.04
210	RB144	12 57 12.8	28 26 8	730		16.67	1.05
248		12 59 24.4	28 26 20	1711		17.00	
127		12 59 47.5	28 26 20	1990	Irr	15.81	0.68
234		12 55 25.2	28 26 33	1763		16.86	0.63
43		12 55 3.1	28 27 1	2041	S0	14.90	1.12
71		12 55 23.6	28 27 9	1797	S0	15.32	1.06
69		12 55 48.8	28 27 15	1506	S0	15.30	1.04
319	RB148	12 57 16.1	28 27 17	788		17.48	1.19
308		12 56 16.7	28 27 24	1210		17.40	1.18
266	RB140	12 57 1.1	28 27 25	853		17.15	1.11
157		12 59 46.0	28 27 29	1999		16.06	0.95
247		12 59 29.9	28 27 38	1809		16.98	1.08
30		12 55 4.8	28 27 38	2035	S0	14.62	1.10
81		12 58 58.3	28 27 50	1453	S0	15.38	1.05
170	RB136	12 56 55.4	28 28 5	921		16.24	1.09
7	N4895	12 57 53.5	28 28 9	899	S0	13.72	1.04
72		12 59 48.5	28 28 51	2063	Spec	15.32	0.83
240		12 59 19.9	28 28 52	1728		16.91	1.07
44		12 56 37.0	28 29 45	1132	S0	14.91	1.09
56		12 59 57.3	28 29 48	2192	S0	15.13	1.01
288		12 56 28.3	28 30 16	1226		17.30	1.37
204		12 56 6.0	28 30 18	1431		16.62	1.10
312		12 55 11.2	28 30 21	2029		17.43	0.99
192	RB160	12 57 38.4	28 30 34	984		16.50	1.02
280		12 59 14.8	28 30 46	1732		17.27	0.99
284	RB174	12 57 57.7	28 30 57	1076		17.29	1.08
14	N4881	12 57 33.1	28 30 59	1001	E	14.27	1.09
8	N4848	12 55 40.3	28 31 2	1723	Spec	13.95	0.91
88	RB167	12 57 44.5	28 26 21	757	E	15.43	1.03
219		12 56 50.2	28 31 16	1122		16.75	0.80
298	RB165	12 57 41.6	28 31 16	1033		17.35	0.84
73		12 59 57.4	28 31 19	2234	S0	15.32	1.05
189		12 56 11.0	28 32 35	1480		16.48	0.73
205		12 56 19.1	28 33 13	1440		16.63	0.96
198	RB139	12 57 1.5	28 33 29	1194		16.58	1.06
313		12 56 28.8	28 33 35	1383		17.43	0.90
277		12 58 18.3	28 34 16	1376		17.24	0.91
184		12 56 4.6	28 34 21	1615		16.40	0.99
63		12 58 19.8	28 36 20	1493	EL	15.21	1.05
16	N4896	12 58 6.3	28 37 1	1456	S0	14.30	1.03
245		12 56 59.4	28 37 2	1406		16.95	1.12
122		12 58 44.7	28 37 39	1736	S0	15.76	1.08
21		12 58 27.7	28 38 3	1634	S0	14.45	1.03
221		12 55 40.9	28 38 34	2012		16.76	1.04
293		12 56 7.4	28 38 58	1807		17.32	0.75
226		12 57 57.7	28 40 11	1602		16.79	1.06
296		12 58 23.3	28 40 28	1736		17.33	0.80
310		12 58 24.1	28 40 56	1766		17.42	1.30
223		12 58 19.4	28 41 4	1748		16.79	1.14
259		12 59 2.4	28 42 11	2095		17.10	1.10
232		12 57 37.3	28 42 15	1679		16.85	1.09
271		12 56 56.3	28 42 42	1746		17.16	0.93
316		12 55 37.1	28 43 43	2275		17.45	1.08
149		12 56 31.4	28 44 1	1921	Spec	15.99	0.89
216		12 56 6.8	28 44 11	2073		16.73	1.14
225		12 58 35.1	28 44 27	2019		16.79	1.02
169		12 56 58.5	28 45 31	1905		16.21	0.85
140		12 57 16.7	28 46 38	1940	S0?	15.91	1.09
101		12 58 16.2	28 47 15	2080	S+	15.60	0.84
279		12 58 50.7	28 47 22	2270		17.25	0.83
114		12 57 11.1	28 49 17	2105	S0	15.71	1.07

TABLE 7

ABELL 1904

Object	Ident	R.A.(1950)	Dec(1950)	Radius	Type	J	J−F
79		14 20 59.8	48 33 38	778		18.57	0.92
102		14 20 47.3	48 33 43	748		18.84	0.72
85		14 20 15.1	48 34 44	706		18.67	0.59
100		14 19 49.2	48 34 57	790		18.81	0.18
13		14 20 13.2	48 35 8	688	S	16.81	0.67
46		14 21 19.1	48 36 34	734		18.04	0.83
26		14 20 38.3	48 36 52	571		17.46	0.85
23		14 21 13.3	48 38 6	647		17.36	0.96
16		14 20 21.0	48 38 17	495		17.03	0.99
84		14 19 43.0	48 38 40	631		18.63	0.78
15		14 19 27.6	48 38 53	726		17.01	0.97
73		14 21 21.5	48 39 7	668		18.42	0.98
77		14 20 45.4	48 39 11	470		18.52	0.61
63		14 21 4.2	48 39 12	555		18.25	0.77
20		14 19 25.4	48 39 20	722		17.10	0.87
59		14 20 33.3	48 39 37	420		18.23	0.75
45		14 20 26.8	48 40 5	390		18.01	1.00
52		14 20 0.0	48 40 8	459		18.12	0.82
6		14 20 12.6	48 40 8	408	SO	16.34	1.00
29		14 19 30.3	48 40 13	648		17.49	0.73
28		14 19 30.0	48 40 21	644		17.47	0.81
12		14 20 17.5	48 40 23	382	SO	16.80	0.86
93		14 19 38.0	48 40 27	580		18.73	0.41
113		14 21 25.6	48 40 34	665		18.97	0.99
44		14 20 21.3	48 40 35	240		18.00	
21		14 20 18.5	48 40 39	365		17.19	0.84
108		14 20 10.3	48 40 45	381		18.93	0.85
81		14 20 26.6	48 41 2	339		18.62	0.64
38		14 20 47.0	48 41 11	388		17.76	0.90
47		14 20 42.3	48 41 26	356		18.06	0.67
48		14 20 6.7	48 41 27	357		18.06	0.88
68		14 20 42.8	48 41 40	348		18.35	0.63
25		14 20 8.4	48 41 59	321		17.42	0.90
7		14 20 21.6	48 42 7	280	E	16.35	
75		14 20 2.5	48 42 16	334		18.49	
95		14 20 37.7	48 42 20	298		18.76	0.72
67		14 19 49.8	48 42 28	405		18.31	0.73
61		14 20 6.2	48 42 33	299		18.24	0.60
2		14 20 23.6	48 42 42	246	E	15.70	0.98
4		14 20 6.1	48 42 49	287	SO	16.05	0.96
5		14 19 31.7	48 43 6	523	EL	16.31	1.06
82		14 19 58.4	48 43 24	303		18.62	0.60
40		14 20 21.8	48 43 26	206		17.82	0.70
110		14 20 9.0	48 43 41	225		18.96	0.83
65		14 19 40.2	48 44 33	401		18.30	0.74
72		14 20 30.9	48 44 40	170		18.41	0.90
71		14 19 55.0	48 44 48	268		18.41	0.72
112		14 20 40.2	48 44 55	226		18.97	0.71
55		14 20 24.5	48 44 57	130		18.14	0.63
86		14 20 36.5	48 45 3	195		18.69	0.91
62		14 20 18.3	48 45 10	112		18.25	0.88
90		14 21 7.4	48 45 27	458		18.72	0.63
99		14 20 6.1	48 45 28	154		18.80	0.52
33		14 20 53.3	48 45 28	332		17.60	1.08
9		14 20 25.5	48 45 29	111	E	16.51	0.86
17		14 20 53.2	48 45 35	330		17.07	1.03
18		14 20 59.5	48 46 16	389		17.08	0.98
109		14 20 36.1	48 46 30	174		18.94	0.56
43		14 20 23.0	48 46 35	60		17.99	0.87
34		14 20 11.5	48 46 36	66		17.64	0.91
98		14 20 58.8	48 46 36	385		18.79	0.36
103		14 19 38.8	48 46 41	361		18.84	0.35
87		14 20 15.1	48 46 41	36		18.69	0.38
91		14 19 37.2	48 46 53	372		18.72	0.45
56		14 19 46.8	48 46 54	284		18.19	0.85
24		14 19 39.3	48 46 58	352		17.38	0.66
111		14 20 0.8	48 47 4	151		18.96	0.80
19		14 20 15.4	48 47 9	16		17.10	
53		14 19 59.0	48 47 13	166		18.14	0.86
1		14 20 16.7	48 47 14	1	cD	14.86	1.05
74		14 20 45.1	48 47 15	264		18.47	0.59
51		14 19 2.3	48 47 22	691		18.12	0.75
105		14 19 58.7	48 47 48	163		18.88	0.89
10		14 20 44.4	48 47 50	267	E	16.51	0.97
96		14 20 59.9	48 47 52	411		18.78	0.75
14		14 19 48.2	48 47 54	260	S−	16.93	0.87
76		14 19 58.2	48 47 58	168		18.50	0.29
32		14 19 24.1	48 48 7	481		17.57	0.88

TABLE 7—*Continued*

Object	Ident	R.A.(1950)	Dec(1950)	Radius	Type	J	J–F
41		14 20 10.3	48 48 15	74		17.85	0.93
49		14 19 54.1	48 48 20	206		18.10	0.45
42		14 20 18.9	48 48 24	75		17.86	0.79
106		14 21 1.2	48 48 27	434		18.89	0.74
30		14 21 18.6	48 48 30	596		17.51	0.95
107		14 19 58.3	48 48 36	172		18.91	0.73
54		14 20 30.0	48 48 58	174		18.14	0.96
39		14 20 18.6	48 49 5	110		17.80	0.90
22		14 20 36.8	48 49 20	243		17.28	0.82
89		14 19 19.6	48 49 28	518		18.69	0.85
70		14 20 41.0	48 49 39	289		18.39	0.69
94		14 19 58.3	48 49 42	196		18.76	0.55
83		14 19 19.0	48 49 47	524		18.63	0.77
31		14 20 39.3	48 49 51	283		17.52	0.95
69		14 19 5.3	48 50 9	647		18.35	1.00
8		14 21 20.5	48 50 15	653		16.35	1.02
35		14 20 29.6	48 50 23	236		17.69	0.91
104		14 20 3.6	48 50 35	202		18.87	0.97
66		14 20 25.7	48 50 59	245		18.31	0.75
88		14 21 21.0	48 51 5	681		18.69	
78		14 20 20.1	48 51 30	251		18.54	0.52
57		14 21 14.1	48 51 43	641		18.20	0.89
11		14 20 29.0	48 52 31	343	S0	16.54	0.96
3		14 20 21.4	48 52 50	329	S	16.01	0.83
92		14 19 44.7	48 53 5	393		18.73	
27		14 20 9.6	48 53 9	326		17.46	0.75
50		14 19 1.3	48 53 40	714		18.12	0.75
101		14 20 30.2	48 53 56	426		18.83	0.70
80		14 20 28.6	48 54 31	450		18.57	0.79
36		14 20 16.9	48 55 51	488		17.71	0.71
60		14 20 42.1	48 56 49	637		18.24	0.86
64		14 20 49.0	48 57 49	727		18.28	1.04
97		14 20 38.1	48 59 2	737		18.78	
37		14 20 43.3	48 59 20	777		17.73	
114		14 19 30.0	49 0 17	767		18.98	
58		14 19 33.1	49 0 35	771		18.22	

TABLE 8

HERCULES CLUSTER

Object	Ident	R.A.(1950)	Dec(1950)	Radius	Type	J	J–F
100		16 3 30.8	17 42 51	1462		17.16	0.67
22	I1181	16 3 18.8	17 43 23	1419	S0p	15.30	
3	I1178	16 3 18.9	17 43 41	1402	S0p	14.30	1.13
107		16 2 57.7	17 43 50	1421		17.28	0.59
143		16 3 22.6	17 43 50	1394		17.90	0.87
103		16 3 52.7	17 44 3	1467		17.20	1.03
76		16 3 1.3	17 44 9	1392		16.74	1.00
57		16 2 28.0	17 46 10	1439		16.36	1.11
89		16 2 34.2	17 46 31	1380		17.00	1.13
78		16 2 52.3	17 46 50	1265		16.78	0.89
101		16 3 3.9	17 47 14	1204		17.17	1.06
112		16 4 19.1	17 48 25	1416		17.43	1.02
36		16 3 15.0	17 48 44	1099	Sa	15.78	1.04
114		16 3 8.4	17 48 50	1100		17.46	0.97
64		16 2 27.2	17 48 53	1306		16.52	0.98
113		16 2 36.6	17 48 58	1234		17.46	1.05
93		16 3 18.7	17 49 12	1070		17.04	0.89
81		16 3 41.8	17 49 31	1105		16.84	1.06
70		16 3 11.6	17 49 42	1044		16.63	0.79
75		16 4 21.4	17 49 44	1376		16.73	1.10
134		16 2 11.7	17 49 44	1401		17.72	0.87
10	N6042	16 2 24.7	17 49 55	1277	E	14.80	1.01
79		16 3 48.4	17 50 3	1108		16.81	1.04
129		16 3 55.7	17 50 5	1150		17.65	0.78
61		16 3 1.1	17 50 21	1030		16.42	0.92
25		16 2 20.5	17 50 49	1272	S0	15.43	0.94
23		16 4 17.7	17 50 51	1291	E?	15.31	1.24
8	I1185	16 3 30.0	17 50 57	980	Sa	14.68	1.22
98		16 2 55.4	17 50 59	1015		17.13	1.19
27		16 2 17.1	17 51 5	1291	S0	15.49	1.00
1	N6041	16 2 20.9	17 51 12	1250	E	14.21	1.09
51		16 4 21.3	17 51 19	1305		16.18	0.92

TABLE 8—*Continued*

Object	Ident	R.A.(1950)	Dec(1950)	Radius	Type	J	J–F
85		16 2 20.3	17 51 34	1239		16.91	0.74
2	N6047	16 2 54.2	17 51 34	987	E	14.27	1.07
88		16 3 21.1	17 51 45	918		16.95	0.95
17		16 2 11.3	17 52 6	1273	S0/a	15.20	
105		16 3 7.6	17 52 27	887		17.23	0.87
138		16 2 47.3	17 52 31	974		17.77	1.02
110		16 2 42.4	17 52 31	1007		17.38	0.99
9	N6040	16 2 12.3	17 52 38	1273	Sc	14.70	
141		16 3 5.4	17 52 42	879		17.88	0.88
140		16 4 23.0	17 52 47	1259		17.83	0.91
29	I1179	16 3 6.6	17 52 56	838	Sc	15.60	0.84
18	N6050	16 3 8.3	17 53 15	838	Sc	15.20	0.84
5	N6045	16 2 52.5	17 53 18	901	Sc	14.55	0.98
95		16 2 55.5	17 53 32	901		17.10	
11	I1194	16 4 24.9	17 53 38	1246	S0p	14.91	1.24
131		16 2 27.8	17 53 44	1070		17.69	0.74
16	I1184	16 3 23.3	17 53 56	790	S0	15.09	1.09
41	N6054	16 3 15.8	17 54 2	780	Sc	15.91	0.92
109		16 3 19.5	17 54 6	776		17.34	1.06
108		16 2 45.7	17 54 17	876		17.30	
91		16 3 25.5	17 54 26	763		17.00	0.97
12	N6043	16 2 46.7	17 54 28	876	EL	15.00	1.14
33		16 4 18.4	17 54 36	1138	S–	15.69	1.19
147		16 3 6.3	17 54 48	752		17.96	0.77
37		16 4 24.1	17 54 58	1187	S–	15.85	1.03
71		16 4 6.0	17 55 15	983		16.64	1.17
66		16 4 33.1	17 55 24	1276		16.58	1.01
74		16 4 21.9	17 55 46	1132		16.71	1.14
53		16 2 59.8	17 55 52	718		16.30	0.88
15	I1182	16 3 22.2	17 56 2	662	Pec	15.06	1.12
126		16 2 7.7	17 56 23	1187		17.59	1.04
96		16 2 25.3	17 56 26	984		17.11	1.02
137		16 2 53.3	17 56 48	708		17.76	0.87
142		16 3 12.9	17 56 52	614		17.89	0.89
120		16 2 49.4	17 56 55	731		17.54	0.91
83		16 4 46.5	17 57 13	1389		16.88	0.91
102		16 1 53.0	17 57 38	1336		17.19	0.99
58		16 3 12.8	17 57 44	563		16.36	1.02
52		16 2 46.9	17 57 45	713		16.22	1.21
39		16 2 22.9	17 58 1	953	Sc	15.87	1.04
38		16 4 51.5	17 58 58	1415	S0	15.85	1.09
111		16 4 23.9	17 59 0	1053		17.41	0.94
119		16 2 55.8	17 59 7	571		17.51	0.47
84		16 4 47.2	17 59 8	1354		16.90	1.03
40		16 3 7.9	17 59 12	492	S0	15.88	0.96
82		16 4 42.6	17 59 26	1285		16.86	0.65
136		16 3 7.1	17 59 50	460		17.76	0.55
13	N6044	16 2 44.9	18 0 5	631	S0	15.00	1.07
48		16 2 8.1	18 0 31	1070		16.07	0.98
124		16 3 54.5	18 0 32	646		17.57	0.58
65		16 2 59.7	18 0 56	450		16.55	1.39
32		16 4 20.8	18 1 32	950	Sab	15.66	0.91
30		16 3 11.9	18 2 32	283	S	15.61	0.99
115		16 2 22.4	18 2 35	838		17.47	1.12
132		16 2 12.9	18 3 17	956		17.70	1.15
139		16 3 30.5	18 3 28	275		17.78	0.79
47		16 3 14.7	18 3 36	211		16.05	1.17
45		16 4 7.9	18 3 42	734		16.02	1.00
123		16 4 54.4	18 5 5	1373		17.55	0.97
49		16 3 59.2	18 5 13	592		16.16	0.62
7	I1176	16 3 16.7	18 5 46	78	Sb	14.62	1.14
72		16 3 7.2	18 6 5	166		16.64	1.00
60		16 1 55.2	18 6 41	1182		16.39	1.04
55		16 2 11.3	18 7 4	952		16.31	0.94
28		16 3 31.6	18 8 55	220	Sbc	15.56	0.88
117		16 4 29.3	18 9 8	1016		17.49	0.91
35		16 4 47.1	18 9 21	1269	Sb	15.75	0.97
56		16 2 25.0	18 9 46	776		16.33	1.17
128		16 2 24.1	18 10 0	792		17.61	0.67
63		16 3 50.6	18 10 8	495		16.47	0.90
19		16 3 25.5	18 11 10	267	S–	15.22	1.09
90		16 3 34.7	18 11 40	361		17.00	1.04
80		16 3 59.1	18 12 36	667		16.83	1.01
46		16 3 17.5	18 12 41	339		16.03	1.04
54		16 3 45.5	18 12 47	517		16.30	1.07
122		16 3 25.9	18 13 12	384		17.55	0.89
146		16 2 40.6	18 13 33	665		17.95	1.19
106		16 2 3.3	18 13 59	1148		17.24	1.12
86		16 2 37.5	18 14 8	722		16.93	0.97

TABLE 8—*Continued*

Object	Ident	R.A. (1950)	Dec (1950)	Radius	Type	J	J−F
42		16 3 26.2	18 14 21	453	E	15.92	1.05
44		16 3 47.3	18 14 41	615	Sbc	16.00	0.81
97		16 3 34.4	18 15 8	535		17.12	0.85
135		16 1 46.6	18 15 30	1401		17.73	1.00
121		16 1 60.0	18 15 33	1228		17.54	0.72
77		16 2 6.8	18 16 7	1156		16.76	0.68
144		16 2 25.8	18 16 24	937		17.91	1.02
6	N6055	16 3 17.8	18 17 28	626	S0/a	14.57	1.16
24	N6057	16 3 25.0	18 17 46	651	E	15.42	1.08
125		16 3 17.3	18 17 59	657		17.58	0.78
68		16 4 1.6	18 18 13	907		16.61	1.03
99		16 3 10.8	18 18 19	686		17.15	1.04
14	I1189	16 4 0.3	18 18 56	928	S0/a	15.03	1.12
127		16 4 2.7	18 18 58	950		17.60	0.53
73		16 2 43.8	18 19 5	876		16.68	0.79
145		16 4 7.9	18 19 16	1014		17.92	0.74
20		16 3 45.5	18 19 41	850	Sc	15.25	0.90
94		16 2 13.7	18 20 22	1221		17.05	0.93
21		16 3 37.6	18 21 10	890	Sb	15.27	1.03
34		16 4 38.4	18 21 23	1424	S0	15.74	1.19
130		16 4 30.1	18 22 44	1385		17.66	0.58
4	N6061	16 4 1.5	18 22 58	1133	E	14.34	1.09
118		16 3 51.2	18 23 0	1064		17.50	1.04
31		16 4 14.7	18 24 3	1295	S+	15.62	1.06
26		16 3 21.8	18 24 17	1037	Sc	15.44	0.88
67		16 3 22.6	18 24 18	1303		16.60	
133		16 2 20.2	18 24 58	1360		17.71	0.76
59		16 3 40.1	18 26 39	1215		16.38	1.08
92		16 2 19.4	18 26 41	1450		17.03	0.66
43		16 3 5.0	18 26 48	1202	S	15.98	1.04
116		16 4 12.0	18 26 51	1409		17.48	0.95
62		16 3 57.0	18 27 41	1353		16.44	0.79
50		16 3 12.8	18 28 18	1280		16.18	0.90
87		16 3 27.3	18 29 23	1347		16.94	1.06
104		16 3 27.8	18 29 49	1374		17.21	0.89
69		16 3 1.3	18 29 50	1392		16.63	1.09

TABLE 9

ABELL 2199

Object	Ident	R.A. (1950)	Dec (1950)	Radius	Type	J	J−F
10		16 26 55.3	39 11 53	1661	Sc	14.80	
58		16 26 48.1	39 12 38	1619		16.07	1.04
111		16 25 58.7	39 12 39	1737		16.84	0.86
130		16 25 39.1	39 14 0	1762		17.11	0.73
75		16 25 53.3	39 14 33	1658		16.30	0.97
120		16 26 40.4	39 14 46	1498		16.98	0.88
35		16 25 34.0	39 14 56	1744	EL	15.63	1.09
142		16 27 5.4	39 15 29	1453		17.27	0.85
47		16 27 24.1	39 15 30	1488	S0	15.89	0.97
134		16 25 56.0	39 16 14	1553		17.15	0.94
89		16 27 11.4	39 16 49	1382		16.61	0.82
93		16 27 30.1	39 17 30	1390		16.65	0.92
62		16 26 34.1	39 17 38	1338		16.11	0.78
149		16 27 53.4	39 19 29	1388		17.37	1.10
78		16 28 5.7	39 20 20	1421		16.39	0.93
124		16 26 10.1	39 20 20	1264		17.02	0.77
118		16 26 17.3	39 20 53	1202		16.91	0.73
69		16 26 14.0	39 21 31	1181		16.25	1.32
42		16 25 36.7	39 21 51	1393	S0	15.78	0.98
5		16 26 12.0	39 21 53	1170	E	14.14	1.02
43		16 25 53.1	39 22 34	1244	SBc	15.80	0.49
88		16 27 20.0	39 23 6	1033		16.60	
20		16 26 12.4	39 23 19	1092	E	15.23	1.09
132		16 28 28.6	39 24 35	1412		17.13	0.85
36		16 26 15.4	39 24 37	1007	S−	15.64	0.92
48		16 25 27.4	39 24 39	1350	S0	15.89	0.97
28		16 25 16.2	39 25 31	1418	S0	15.44	1.05
64		16 24 40.2	39 25 38	1766		16.17	0.90
71		16 28 42.8	39 25 42	1503		16.29	0.89
18		16 27 14.8	39 25 44	864	S−	15.21	0.96
104		16 27 21.5	39 26 17	856		16.76	0.94
125		16 25 54.2	39 26 37	1048		17.04	0.67

TABLE 9—*Continued*

Object	Ident	R.A.(1950)	Dec(1950)	Radius	Type	J	J-F
147		16 26 17.5	39 26 45	884		17.35	0.89
96		16 26 8.6	39 26 57	928		16.69	1.02
156		16 27 27.3	39 27 31	816		17.43	0.31
152		16 27 40.5	39 27 37	891		17.39	0.62
79		16 24 49.5	39 28 48	1588		16.41	0.74
94		16 27 53.9	39 28 53	936		16.65	0.90
155		16 26 47.7	39 28 59	643		17.42	0.87
70		16 25 59.0	39 28 59	908		16.27	0.96
52		16 25 13.6	39 29 15	1326	Sc	15.96	0.62
2	N6158	16 25 57.6	39 29 21	905	E	14.03	0.97
67		16 25 33.1	39 29 25	1127		16.23	1.05
17		16 28 49.7	39 29 49	1449	S0/a	15.20	1.03
98		16 26 59.6	39 29 50	588		16.70	0.94
31		16 24 35.7	39 29 53	1713	S0	15.53	1.08
63		16 25 57.5	39 30 9	875		16.15	0.72
16		16 27 33.3	39 30 41	694	S0	15.17	1.07
158		16 25 48.2	39 31 26	917		17.46	0.93
72		16 26 51.0	39 31 38	481		16.29	1.05
82		16 25 20.6	39 32 20	1178		16.46	0.89
9		16 27 36.9	39 32 24	647	SBa	14.78	1.03
60		16 29 23.9	39 32 38	1767		16.08	1.02
30		16 27 1.9	39 32 46	417	S0	15.52	1.06
91		16 24 48.1	39 33 8	1520		16.62	0.85
117		16 26 54.2	39 33 18	379		16.91	0.83
161		16 27 20.4	39 33 28	468		17.48	0.98
29		16 27 3.7	39 34 15	335	S0	15.50	
153		16 25 2.9	39 34 30	1336		17.39	0.80
4		16 27 1.6	39 34 50	295	S-	14.14	0.98
83		16 25 52.0	39 35 24	776		16.46	0.77
51		16 27 1.2	39 35 39	246	S0	15.95	0.91
109		16 26 52.0	39 36 6	214		16.82	0.98
34		16 27 24.1	39 36 19	384	EL	15.60	0.91
154		16 27 10.0	39 36 23	254		17.41	0.92
148		16 26 56.8	39 36 49	168		17.36	0.94
61		16 27 1.4	39 37 29	144		16.10	1.21
12		16 26 56.2	39 37 38	118	S0/a	15.00	1.03
24		16 26 48.0	39 37 49	140	S0	15.30	
105		16 26 24.7	39 37 52	373		16.80	
144		16 26 48.0	39 37 54	140		17.30	
8		16 25 20.4	39 37 59	1105	E	14.53	1.00
95		16 27 2.6	39 38 12	115		16.67	1.06
57		16 28 16.6	39 38 26	935		16.06	1.16
74		16 26 53.8	39 38 51	52		16.30	
46		16 26 0.9	39 39 0	635	S0	15.87	1.13
87		16 26 31.2	39 39 13	286		16.59	0.86
84		16 26 51.7	39 39 25	49		16.50	
1	N6166	16 26 55.5	39 39 44	8	cD	12.71	1.00
115		16 28 28.8	39 39 47	1072		16.86	0.87
110		16 26 27.6	39 40 6	328		16.83	1.08
53		16 27 10.2	39 40 11	167	Sc	15.96	0.61
25		16 26 13.0	39 40 32	499	E	15.30	1.01
27		16 29 20.5	39 40 34	1669	S0	15.42	0.96
44		16 25 49.2	39 40 38	773	S0	15.83	1.00
123		16 27 0.2	39 40 39	78		17.01	0.65
15		16 26 40.3	39 40 44	193	E	15.12	1.05
119		16 25 46.6	39 41 1	806		16.96	0.75
157		16 27 1.4	39 41 3	105		17.45	0.94
101		16 26 55.6	39 41 20	103		16.71	0.92
92		16 25 26.1	39 41 32	1044		16.64	0.89
135		16 27 31.3	39 41 35	422		17.16	0.85
136		16 24 36.3	39 42 27	1623		17.17	0.85
23		16 26 15.8	39 42 41	501	S0/a	15.26	1.09
41		16 26 40.9	39 42 49	261	EL	15.74	1.10
97		16 28 52.0	39 42 57	1337		16.70	
129		16 28 51.4	39 43 5	1330		17.10	
140		16 27 13.8	39 43 8	292		17.23	0.72
73		16 27 3.1	39 43 8	225		16.29	1.04
55		16 25 0.5	39 43 24	1354		16.04	0.93
66		16 27 6.5	39 43 30	261		16.21	1.09
151		16 25 34.3	39 43 32	974		17.38	1.01
99		16 27 39.7	39 43 49	560		16.70	
100		16 27 41.4	39 43 49	575		16.70	
139		16 27 43.3	39 43 52	599		17.22	0.81
141		16 26 17.9	39 44 3	516		17.25	0.80
138		16 24 52.8	39 44 3	1449		17.20	0.73
106		16 27 24.7	39 44 14	428		16.80	0.95
7		16 28 46.2	39 44 20	1299	Sa	14.39	0.96
163		16 27 51.9	39 44 28	704		17.49	0.85
116		16 26 9.6	39 44 30	612		16.90	

TABLE 9—*Continued*

Object	Ident	R.A.(1950)	Dec(1950)	Radius	Type	J	J–F
150		16 27 2.5	39 44 44	315		17.37	0.86
32		16 29 1.9	39 44 47	1480	S0	15.55	0.92
108		16 27 1.7	39 44 53	322		16.82	0.99
126		16 28 57.3	39 44 55	1431		17.04	1.01
137		16 29 5.1	39 45 18	1523		17.18	0.88
121		16 27 15.2	39 45 26	410		17.00	0.95
102		16 27 4.8	39 45 33	368		16.71	0.82
107		16 27 3.5	39 45 54	385		16.81	1.04
40		16 24 31.0	39 46 17	1724		15.68	1.07
113		16 27 21.2	39 46 46	514		16.85	0.92
131		16 26 57.6	39 46 49	431		17.13	0.98
49		16 27 29.8	39 46 51	579	S+	15.94	0.86
38		16 27 17.1	39 47 37	534	S0	15.64	1.10
39		16 26 54.5	39 48 28	531	SP	15.67	0.82
45		16 27 14.6	39 49 5	604	E	15.83	1.06
127		16 25 47.1	39 49 38	1003		17.05	0.83
65		16 28 5.4	39 49 40	994		16.19	0.94
162		16 26 53.2	39 49 43	607		17.49	0.88
50		16 26 48.5	39 50 11	641	S0	15.94	0.97
68		16 26 11.4	39 50 38	843		16.23	0.85
128		16 27 54.2	39 50 47	940		17.09	0.87
33		16 26 42.0	39 51 0	703	S0	15.59	1.01
90		16 26 1.2	39 51 3	939		16.62	1.05
76		16 27 58.8	39 51 34	1010		16.31	1.00
80		16 27 8.6	39 51 54	748		16.42	0.93
133		16 29 2.7	39 52 24	1639		17.13	0.67
6		16 28 8.3	39 52 41	1135	Sc	14.26	0.81
112		16 27 34.9	39 53 22	932		16.85	0.76
56		16 27 16.4	39 54 46	935		16.05	0.96
21		16 28 37.8	39 54 59	1481	S0	15.24	1.02
26		16 28 2.7	39 55 19	1206	EL	15.37	1.10
86		16 27 24.4	39 55 21	993		16.53	0.66
3		16 26 29.0	39 55 49	1024	Sbc	14.10	0.91
19		16 27 38.3	39 55 51	1082	S0	15.21	1.10
81		16 28 34.6	39 56 8	1495		16.45	0.73
11		16 27 7.6	39 56 41	1030	Sb	14.81	0.78
14		16 28 50.9	39 56 42	1661	S+	15.10	0.92
143		16 24 56.3	39 56 50	1735		17.28	0.49
160		16 28 37.0	39 57 27	1567		17.48	0.53
114		16 27 50.8	39 57 31	1236		16.85	0.84
146		16 25 42.3	39 57 34	1381		17.35	0.62
85		16 27 29.0	39 57 41	1143		16.53	0.96
37		16 25 4.3	39 58 58	1746	SP	15.64	0.70
22		16 28 35.2	40 0 7	1665	S0	15.25	0.97
77		16 26 1.2	40 0 40	1420		16.31	0.83
59		16 27 50.8	40 0 50	1412		16.07	1.14
13		16 28 14.4	40 3 21	1672	EL	15.08	1.00
54		16 26 37.5	40 4 3	1484		16.00	1.03
159		16 26 58.9	40 4 20	1482		17.47	0.83
122		16 27 53.1	40 5 34	1679		17.00	0.91
145		16 28 6.2	40 6 1	1765		17.32	1.04
103		16 27 54.3	40 7 23	1785		16.73	0.86

TABLE 10

ABELL 2634

Object	Ident	R.A.(1950)	Dec(1950)	Radius	Type	J	J–F
30		23 35 42.3	26 13 2	1957	S0	15.98	0.88
17		23 35 14.9	26 13 43	1997	S0	15.47	1.08
42		23 36 31.4	26 17 16	1740		16.31	1.15
41		23 35 30.6	26 18 14	1678		16.31	1.12
26		23 35 59.7	26 19 13	1571	S+	15.80	0.93
54		23 35 40.9	26 20 27	1520		16.62	1.08
34		23 34 57.5	26 21 25	1666		16.15	1.16
94		23 34 16.2	26 23 15	1924		17.27	0.68
56		23 37 24.6	26 23 42	1728		16.64	1.17
75		23 37 15.6	26 24 35	1611		16.91	0.87
98		23 36 39.4	26 24 54	1340		17.32	0.97
100		23 34 10.6	26 25 0	1910		17.33	0.76
86		23 34 55.7	26 26 13	1437		17.11	1.11
39		23 36 50.1	26 28 28	1221		16.26	1.09
88		23 34 59.7	26 29 26	1251		17.14	1.01
61		23 35 34.6	26 29 34	1009		16.72	1.30

TABLE 10—*Continued*

Object	Ident	R.A.(1950)	Dec(1950)	Radius	Type	J	J–F
8		23 36 12.4	26 29 46	997	S–	15.00	
48		23 38 6.5	26 30 43	1916		16.50	1.02
99		23 37 34.4	26 32 16	1496		17.33	1.27
53		23 35 4.8	26 32 21	1074		16.59	1.02
40		23 35 45.7	26 32 25	801		16.26	1.28
13		23 35 58.5	26 32 32	773	EL	15.23	1.21
12		23 37 28.0	26 33 18	1390	S0	15.20	1.24
3		23 38 16.2	26 33 18	1970	S0	14.50	1.05
67		23 35 1.3	26 33 40	1052		16.81	1.17
35		23 33 47.2	26 33 53	1904		16.15	1.11
69		23 36 47.4	26 33 59	939		16.84	0.88
28		23 36 13.8	26 34 24	688	EL	15.88	1.11
77		23 38 2.6	26 34 34	1774		16.93	0.90
89		23 37 43.1	26 34 52	1526		17.15	0.83
87		23 35 46.3	26 35 27	624		17.13	1.04
24		23 34 49.7	26 36 11	1087	S0	15.60	1.12
20		23 35 48.1	26 36 36	551	EL	15.49	1.14
44		23 37 37.9	26 37 12	1408		16.42	1.11
95		23 34 8.6	26 38 5	1548		17.28	1.15
81		23 35 46.8	26 39 5	416		17.00	1.23
76		23 36 22.1	26 39 41	460		16.92	1.02
108		23 36 31.0	26 40 51	505		17.48	1.19
96		23 36 46.7	26 41 8	685		17.30	0.80
57		23 34 39.1	26 41 31	1099		16.65	1.24
45		23 36 4.0	26 42 8	207		16.42	1.32
11		23 35 58.6	26 42 8	199	E	15.20	1.11
36		23 35 16.2	26 42 17	607		16.20	1.11
10		23 35 56.4	26 42 28	179	E	15.20	1.11
101		23 33 44.2	26 42 58	1814		17.34	1.10
18	I5342	23 36 8.3	26 44 3	147	E	15.47	1.11
55		23 36 20.1	26 44 19	288		16.64	1.25
84		23 35 3.1	26 45 1	750		17.04	1.07
27		23 36 5.8	26 45 8	90	E	15.85	1.26
1	N7720	23 35 59.0	26 45 12	13	cD	13.46	1.21
70		23 37 0.1	26 45 14	816		16.84	1.27
82		23 35 48.2	26 45 31	146		17.01	1.33
102		23 33 57.2	26 45 49	1633		17.35	1.04
59		23 35 50.3	26 46 26	132		16.70	1.34
37		23 34 31.7	26 47 11	1175		16.23	0.94
90		23 35 25.7	26 47 36	465		17.21	1.07
83		23 36 8.5	26 47 37	182		17.03	1.32
22		23 34 55.8	26 47 43	858	SP	15.59	1.15
72		23 35 23.3	26 48 45	518		16.88	1.22
60		23 35 56.6	26 48 49	205		16.71	1.24
4		23 36 31.7	26 49 18	495	E	14.53	1.34
51		23 35 24.9	26 49 28	516		16.57	1.09
104		23 38 14.2	26 49 32	1827		17.42	
29		23 37 57.5	26 49 43	1607	S0?	15.91	1.06
7		23 36 40.6	26 50 6	624	SP	15.00	1.23
58		23 36 11.5	26 50 29	347		16.67	1.33
66		23 36 18.7	26 50 44	413		16.80	1.28
38		23 38 12.4	26 50 58	1817		16.23	1.09
109		23 38 16.4	26 51 6	1872		17.49	
71		23 37 33.5	26 51 18	1314		16.88	1.18
2	N7728	23 37 30.1	26 51 18	1270	E	14.00	1.28
92		23 38 18.0	26 52 13	1904		17.22	
15		23 35 51.9	26 52 53	457	E	15.42	1.16
49		23 36 41.3	26 52 56	723		16.51	1.20
43		23 36 25.7	26 53 2	580		16.34	1.28
78		23 37 3.0	26 53 15	978		16.96	1.28
32		23 37 32.5	26 53 17	1338		16.08	1.25
50		23 36 15.7	26 53 42	544		16.51	1.11
47		23 38 11.7	26 53 52	1849		16.48	1.30
33		23 37 51.4	26 54 19	1598		16.10	1.06
64		23 37 34.8	26 54 35	1396		16.78	1.04
79		23 35 25.1	26 54 39	713		16.99	1.11
62		23 35 39.3	26 55 33	660		16.72	0.55
65		23 36 36.4	26 55 41	795		16.79	1.12
19		23 36 19.5	26 56 19	710	S0/a	15.48	1.22
103		23 36 10.9	26 56 20	673		17.40	
6		23 36 12.7	26 56 20	679	S0	14.96	1.11
31		23 36 31.1	26 56 37	798		16.03	1.11
106		23 38 16.9	26 56 58	1974		17.43	
107		23 34 12.6	26 57 21	1590		17.48	1.07
21		23 38 2.8	26 57 46	1818	EL	15.49	1.14
14		23 36 48.4	26 58 4	1008	S0/a	15.33	1.22

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TABLE 10—*Continued*

Object	Ident	R.A.(1950)	Dec(1950)	Radius	Type	J	J–F
23		23 35 27.3	26 59 18	932	EL	15.59	1.11
5		23 36 20.0	26 59 25	886	EL	14.75	1.24
68		23 34 11.9	27 1 0	1706		16.81	0.72
46		23 36 30.9	27 1 21	1048		16.46	1.13
93		23 37 42.4	27 1 38	1695		17.25	0.76
52		23 35 50.3	27 1 39	979		16.58	1.12
80		23 36 38.6	27 1 47	1117		16.99	1.31
73		23 34 26.0	27 1 53	1583		16.89	0.96
85		23 38 4.7	27 1 58	1957		17.10	0.61
105		23 36 5.4	27 4 23	1141		17.42	1.18
91		23 36 0.9	27 4 31	1146		17.21	1.12
9		23 37 18.6	27 5 56	1632	Sa?	15.16	
63		23 35 28.1	27 6 17	1314		16.74	0.69
25		23 35 43.0	27 8 16	1385	EL	15.68	1.29
97		23 37 40.2	27 9 0	1963		17.32	
16		23 36 42.7	27 16 15	1942	E	15.43	1.06
74		23 36 44.0	27 17 11	2002		16.89	0.55

TABLE 11

ABELL 2670

Object	Ident	R.A.(1950)	Dec(1950)	Radius	Type	J	J–F
96		23 51 37.1	−10 54 6	738		18.06	0.41
62		23 51 10.9	−10 52 16	757		17.59	0.71
30		23 51 34.0	−10 51 28	585		16.90	0.76
124		23 51 8.3	−10 50 36	700		18.44	0.85
17		23 51 11.3	−10 50 31	668		16.55	0.86
117		23 52 0.4	−10 50 27	601		18.39	0.61
14		23 51 45.1	−10 49 42	479		16.52	0.88
11		23 51 44.3	−10 49 18	453		16.42	0.92
41		23 51 56.5	−10 48 23	465		17.14	0.73
25		23 50 55.1	−10 48 19	763		16.80	0.78
126		23 52 10.6	−10 47 41	577		18.48	1.18
54		23 50 53.5	−10 47 13	752		17.42	0.89
19		23 51 18.7	−10 47 1	437		16.55	
127		23 51 55.6	−10 46 59	389		18.49	0.78
91		23 51 42.9	−10 46 39	293		18.02	0.37
49		23 51 17.6	−10 46 32	429		17.32	0.90
18		23 51 36.1	−10 46 32	286		16.55	0.91
99		23 51 31.8	−10 46 20	293		18.12	0.73
103		23 51 30.8	−10 46 14	293		18.15	0.73
95		23 51 36.0	−10 46 2	257		18.05	0.91
105		23 50 51.8	−10 45 57	745		18.17	0.89
94		23 51 52.7	−10 45 39	300		18.04	0.70
121		23 51 20.8	−10 45 23	348		18.43	0.97
65		23 51 28.4	−10 45 21	267		17.61	0.85
57		23 51 4.4	−10 45 9	553		17.55	0.72
68		23 51 40.4	−10 45 2	192		17.66	0.69
104		23 51 28.4	−10 44 55	247		18.16	0.52
58		23 52 17.5	−10 44 53	590		17.56	0.76
12		23 51 1.1	−10 44 44	592		16.49	0.99
111		23 51 28.6	−10 44 35	230		18.26	0.76
79		23 51 39.3	−10 44 29	159		17.87	0.95
101		23 51 35.9	−10 44 28	167		18.14	0.84
77		23 51 36.4	−10 43 46	125		17.84	0.78
114		23 51 58.6	−10 43 43	304		18.36	0.46
64		23 51 39.4	−10 43 20	89		17.59	0.80
22		23 51 41.4	−10 43 12	87		16.73	0.78
90		23 51 49.4	−10 43 9	167		18.02	0.82
56		23 51 58.8	−10 42 58	293		17.51	0.90
92		23 51 42.9	−10 42 41	72		18.03	0.58
33		23 51 27.7	−10 42 39	179		17.01	0.83
74		23 51 45.2	−10 42 36	97		17.77	0.69
20		23 52 14.2	−10 42 33	515		16.68	0.84
40		23 51 30.2	−10 42 30	141		17.12	0.68
43		23 51 5.6	−10 42 25	499		17.19	0.81
118		23 51 45.6	−10 42 19	96		18.41	0.54
100		23 51 47.3	−10 42 11	118		18.14	0.83
24		23 52 5.2	−10 42 8	381		16.77	0.92
7		23 51 32.0	−10 42 8	110		16.23	0.87

TABLE 11—*Continued*

Object	Ident	R.A.(1950)	Dec(1950)	Radius	Type	J	J−F
115		23 51 40.8	−10 41 57	22		18.37	0.46
16		23 51 32.6	−10 41 57	100		16.53	0.90
21		23 51 47.1	−10 41 53	114		16.68	0.80
31		23 51 44.1	−10 41 51	69		16.93	0.84
1		23 51 39.3	−10 41 51	1		14.99	1.04
76		23 51 18.5	−10 41 48	307		17.81	0.59
52		23 51 43.7	−10 41 38	65		17.36	0.77
70		23 51 42.8	−10 41 38	51		17.70	1.11
84		23 51 14.0	−10 41 32	375		17.90	0.93
29		23 51 40.4	−10 41 30	25		16.88	0.94
59		23 51 51.6	−10 41 23	182		17.56	0.60
80		23 50 52.4	−10 41 18	693		17.87	0.76
87		23 51 36.9	−10 41 11	52		17.93	0.74
72		23 51 35.7	−10 41 7	68		17.73	0.89
45		23 51 34.8	−10 41 4	80		17.20	0.75
86		23 51 32.6	−10 40 59	111		17.92	0.69
3		23 51 6.1	−10 40 56	493		15.88	1.02
42		23 51 53.0	−10 40 42	212		17.17	0.94
109		23 51 20.3	−10 40 29	292		18.20	0.65
81		23 51 42.6	−10 40 21	101		17.88	0.80
113		23 52 0.9	−10 40 19	331		18.31	1.05
8		23 51 39.3	−10 40 6	103		16.29	0.85
119		23 50 50.4	−10 40 4	728		18.42	0.75
67		23 51 44.6	−10 40 1	133		17.65	0.74
6		23 51 39.0	−10 39 52	118		16.21	0.84
122		23 51 34.3	−10 39 51	139		18.44	1.15
69		23 51 22.8	−10 39 29	280		17.68	0.67
85		23 51 29.4	−10 39 19	210		17.91	1.16
75		23 50 50.3	−10 39 18	738		17.79	0.95
37		23 51 22.8	−10 39 8	292		17.06	0.80
93		23 51 10.0	−10 39 7	462		18.03	0.51
27		23 51 39.3	−10 39 3	167		16.84	0.90
36		23 51 53.0	−10 38 59	265		17.05	0.68
89		23 51 32.5	−10 38 56	200		17.99	0.86
123		23 51 33.6	−10 38 36	210		18.44	0.82
66		23 52 22.8	−10 38 28	673		17.62	0.56
32		23 51 25.9	−10 38 25	283		16.97	0.86
28		23 51 40.0	−10 38 9	220		16.85	0.85
98		23 51 21.4	−10 37 53	353		18.11	0.75
47		23 51 29.1	−10 37 38	292		17.27	0.82
61		23 51 49.0	−10 37 31	296		17.57	0.80
102		23 51 45.1	−10 37 22	281		18.15	0.85
112		23 51 41.9	−10 36 59	293		18.31	0.81
48		23 51 44.0	−10 36 56	302		17.28	1.10
125		23 51 39.0	−10 36 43	307		18.48	0.63
10		23 51 29.5	−10 36 42	339		16.42	0.89
88		23 52 19.2	−10 36 18	678		17.95	0.85
107		23 51 30.4	−10 36 11	362		18.19	0.65
26		23 52 14.6	−10 36 5	627		16.84	0.93
97		23 51 7.0	−10 36 0	589		18.06	0.93
50		23 51 38.4	−10 35 57	353		17.36	0.86
23		23 52 3.8	−10 35 53	509		16.75	0.80
82		23 52 16.9	−10 35 43	666		17.89	0.89
116		23 51 36.2	−10 35 38	374		18.38	0.90
73		23 52 7.7	−10 35 16	576		17.73	0.71
15		23 51 31.3	−10 35 11	415		16.52	0.98
60		23 52 2.4	−10 34 43	548		17.56	0.73
38		23 51 23.6	−10 34 40	487		17.06	0.74
120		23 52 3.4	−10 34 31	566		18.43	0.84
53		23 51 2.7	−10 34 21	700		17.37	0.82
110		23 51 14.6	−10 34 14	581		18.24	1.17
2		23 52 19.9	−10 34 4	761		15.70	0.94
83		23 51 23.8	−10 33 47	533		17.90	0.70
39		23 52 9.9	−10 33 44	665		17.07	0.94
51		23 51 56.6	−10 33 41	553		17.36	0.71
63		23 51 27.6	−10 33 16	541		17.59	0.64
78		23 52 16.6	−10 33 8	761		17.85	0.61
13		23 51 21.6	−10 32 53	595		16.51	0.89
4		23 51 12.2	−10 32 53	667		15.95	0.96
35		23 51 43.7	−10 32 48	547		17.04	0.61
55		23 51 14.4	−10 32 18	678		17.43	0.98
9		23 51 22.6	−10 31 52	643		16.30	0.97
106		23 52 5.4	−10 31 48	716		18.18	0.64
5		23 51 42.2	−10 31 36	616		16.18	0.82
108		23 51 37.9	−10 30 53	657		18.20	1.07
71		23 51 40.5	−10 30 52	658		17.72	0.86
46		23 51 44.0	−10 30 34	680		17.24	1.06
34		23 51 56.5	−10 30 8	748		17.01	0.82

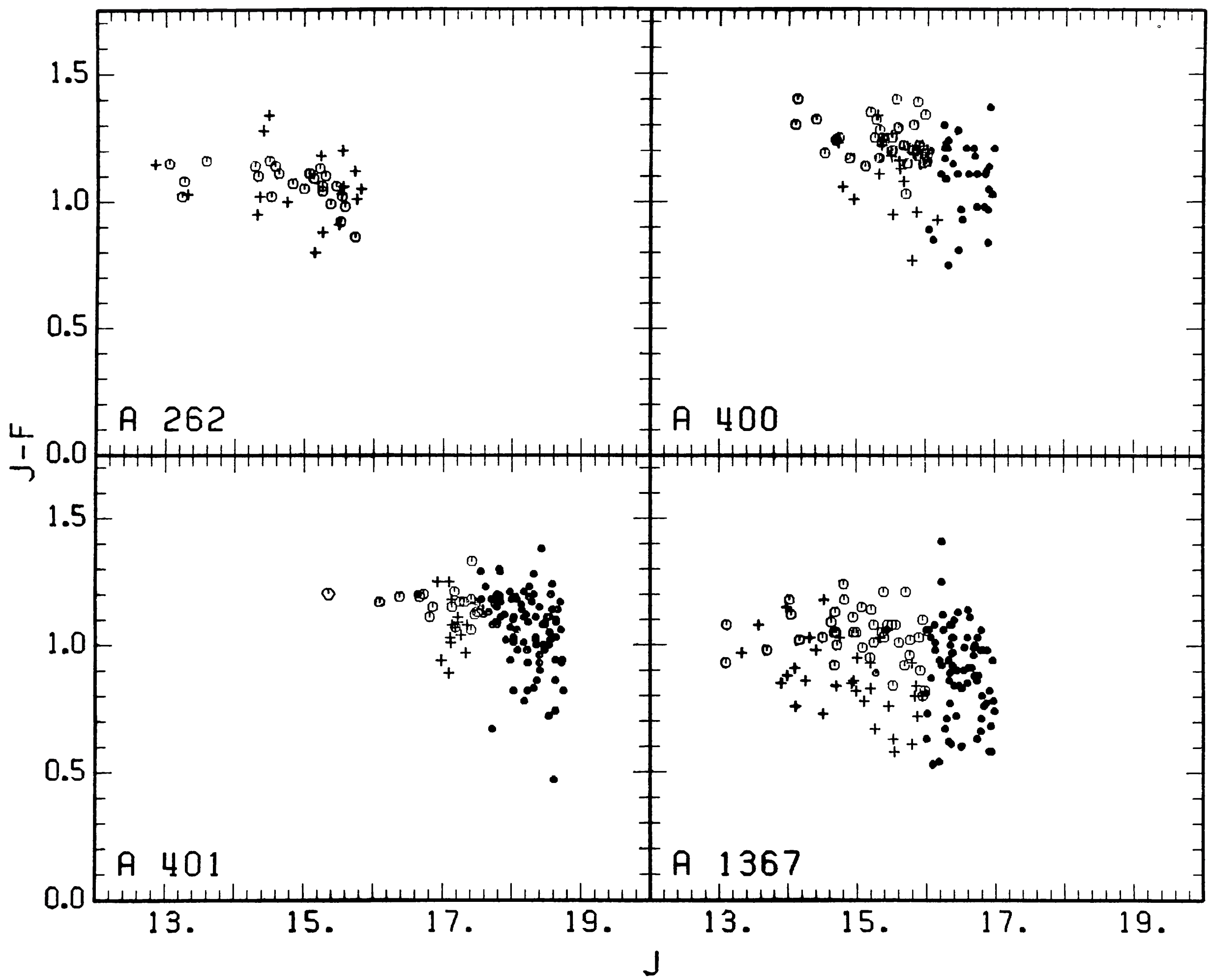

FIG. 3.—Color-magnitude distributions of galaxies in the 10 clusters. *Open circles*, E and S0 galaxies. *Crosses*, spirals and irregulars. *Filled circles*, unclassified.

are unusually red for a cluster of moderately high galactic latitude. However, H I measurements suggest that galactic extinction in its direction may be quite high (Bothun 1984).

c) *Abell 401*

The zero-point calibration of A401 is based only on the Hoessel, Gunn, and Thuan (1980) photometry of the brightest cluster member and is uncertain to 0.05 mag. There is no other published photometry of this cluster.

d) *Abell 1367*

The calibration of A1367 is based on BV photometry of 14 galaxies from the compilation of Longo and de Vaucouleurs (1983, hereafter LdV). The color zero point should be accurate to 0.04 mag. Our photometry of this cluster is among the poorest of the ten. A comparison of our $J-F$ colors with the $B-V$ photometry of LdV and of Bothun, Schommer, and Sullivan (1984) is included in Figure 1. The standard deviation of the $J-F$ colors about the expected relation is 0.10 mag, slightly higher than the predicted dispersion of 0.08 mag.

e) *The Coma Cluster*

The Coma photometry was calibrated using BV photoelectric photometry of 54 galaxies from Sandage (1972) and LdV. Comparison of this photometry with the raw photographic photometry revealed a color scale error in the latter with a maximum amplitude of 0.15 mag. This was corrected in the final photometry. The color zero point should be accurate to 0.02 mag. The comparison of the $J-F$ and the $B-V$ colors is included in Figure 1. The scatter in $J-F$ has a standard deviation of 0.08 mag, or 0.05 mag if the four bluest objects are excluded. This is consistent with an expected error in our colors of 0.04 mag, if we assume a reasonable value for the errors in the photoelectric photometry.

Godwin, Metcalfe, and Peach (1982) have published extensive photographic photometry of the Coma Cluster in the B and F (which they call r) bands. A comparison of the two sets of color measurements is presented in Figure 4. The smooth curve is the calculated relation between the colors, shifted up by 0.24 mag. The reason for this shift is unclear but is probably due to the particular choice of zero point used by Godwin *et al.* Aside from this difference, the agreement be-

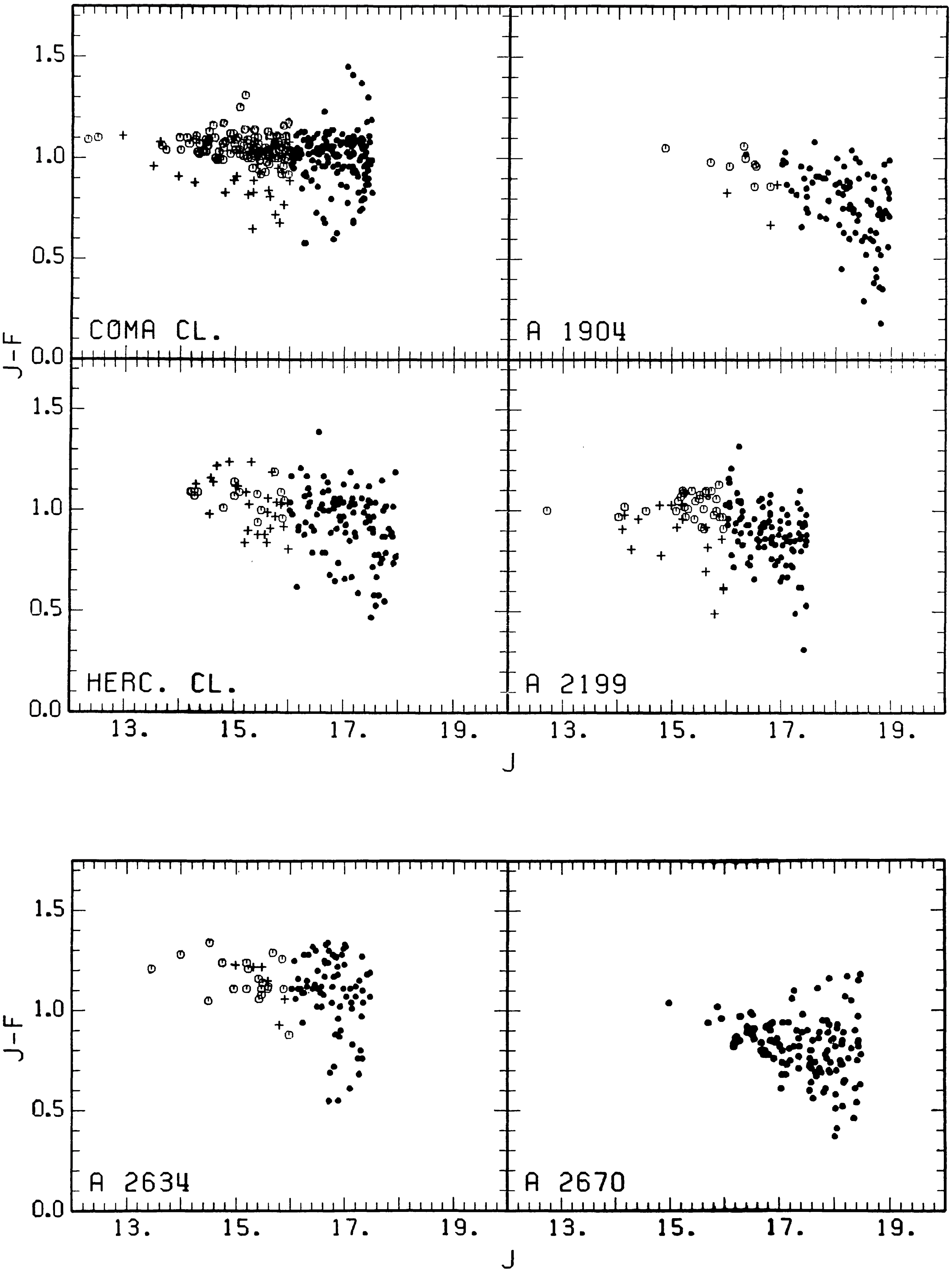

FIG. 3—*Continued*

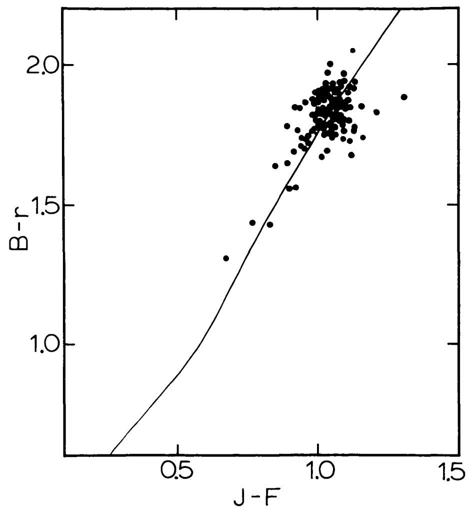

FIG. 4.—Relation between Godwin *et al.* $B-R$ colors of Coma Cluster galaxies and our $J-F$ colors. The smooth curve is the expected relation, shifted up by 0.24 mag.

tween the two sets of photometry is remarkably good. The standard deviation of $J-F$ about the mean line ranges from 0.04 mag at $J=14.$ to 0.07 mag at $J=17.5$. This is scarcely larger than the scatter predicted from our errors alone and is smaller than the scatter predicted from the stated errors ($\sigma=0.15$) in the Godwin *et al.* colors alone. Apparently the Godwin *et al.* colors are much better, and ours somewhat better, than had been estimated. We have used the published $B-V$ and $B-R$ photometry, and the relation between these and $J-F$ shown in Figures 1 and 4, to estimate colors for some of our galaxies without measured $J-F$ colors. These values are given in Table 7 within parentheses.

A comparison of our J magnitudes with the B magnitudes of Godwin *et al.* is presented in Figure 5. The departure from linearity at the faint end is probably due to the difference between their isophotal and our total magnitudes of these faint galaxies. Otherwise, the agreement is quite satisfactory; $\sigma=0.18$ mag, compared with $\sigma=0.16$ mag predicted from our and their error estimates (0.10 and 0.13 mag respectively).

f) *Abell 1904*

The calibration of A1904 is based on JF photoelectric photometry of two galaxies; the uncertainty in the color zero point is about 0.04 mag. There is no published photometry of this cluster other than that summarized in Oemler (1974).

g) *The Hercules Cluster*

Calibration of the Hercules photometry is based on BV photometry of 22 galaxies from LdV; the zero point should be accurate to 0.02 mag. The $B-V$ data for Hercules is included in Figure 1. The standard deviation of $J-F$ about the mean line is 0.07 mag, somewhat larger than the dispersion of 0.05 mag predicted from the estimated errors in the photoelectric and photographic photometry.

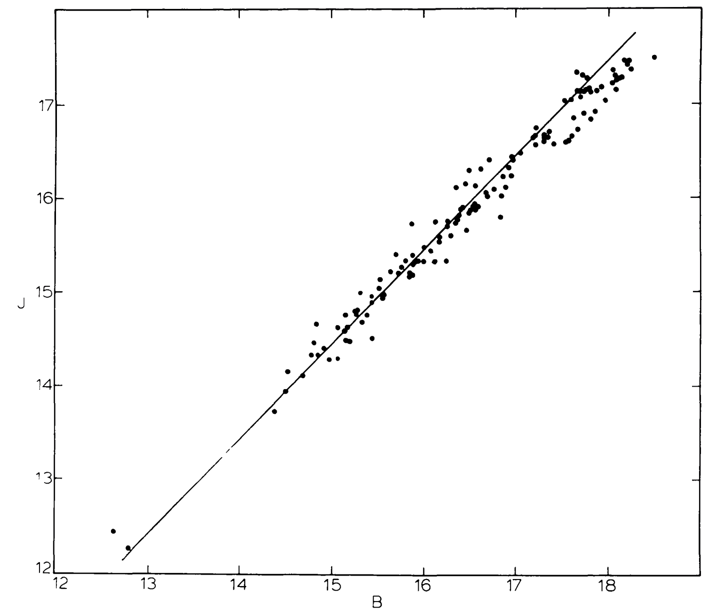

FIG. 5.—Relation between Godwin *et al.* B magnitudes of Coma Cluster Galaxies and our J magnitudes.

h) *Abell 2199*

A2199 was calibrated using JF photometry of two galaxies and BV photometry of five galaxies from Strom and Strom (1978). The color zero point should be good to 0.03 mag. Strom and Strom have measured photographic $U-R$ colors of a large number of early-type galaxies in A2199. Our photometry is compared with theirs in Figure 6. The solid line is the expected relation between the colors, calculated using the relation in Figure 1 between $B-V$ and $J-F$ and the established relations between $B-V$ and $U-B$ and $V-R$ for galaxies. The deviation of points from the line is plotted versus J

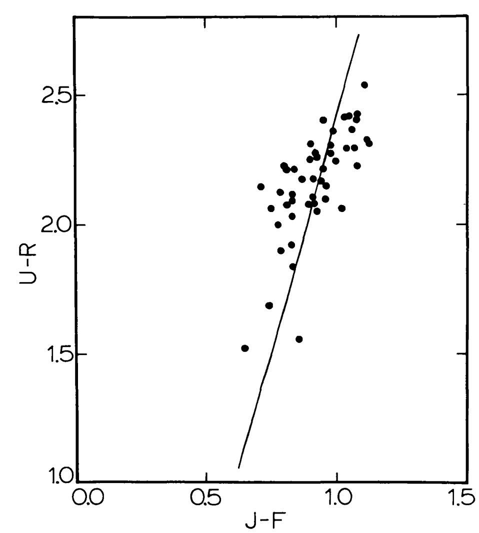

FIG. 6.—Relation between Strom and Strom $U-R$ colors of A2199 galaxies and our $J-F$ colors. The smooth curve is the expected relation.

magnitude in Figure 7. A systematic color difference is apparent fainter than 16.0; it is not obvious which set of photometry is at fault. In Figure 8 we compare our F magnitudes with the Strom and Strom R photometry. The relation is linear with a scatter of $\sigma = 0.16$ mag. The zero point agrees with that expected to better than 0.03 mag.

i) Abell 2634

A2634 was photometered on one 5×7 inch (12.7×17.78 cm) and one 10 inch (25.4 cm) square Schmidt plate. Because of the field flattener used with 5×7 inch plates on the Palomar 48 inch Schmidt telescope, the two plates have slightly different scales. Our standard photometry routines depend on a perfect match of the two plates and could not be used for this cluster. Because of this, the colors of the A2634 galaxies are less accurate than those of most other clusters. The calibration is based on JF photometry of two galaxies; the zero point is uncertain to 0.05 mag.

j) Abell 2670

The calibration of A2670 is based on Sandage's (1973) photometry of the brightest cluster member; the color zero point is uncertain to 0.05 mag. Dressler (1978) has also published F band photometry of this cluster. A comparison of the photometry is presented in Figure 9. The scatter is 0.17 mag, close to the expected value. The difference in zero point and the slight upturn at the faint end are both probably due to the difference between Dressler's isophotal and our total magnitudes.

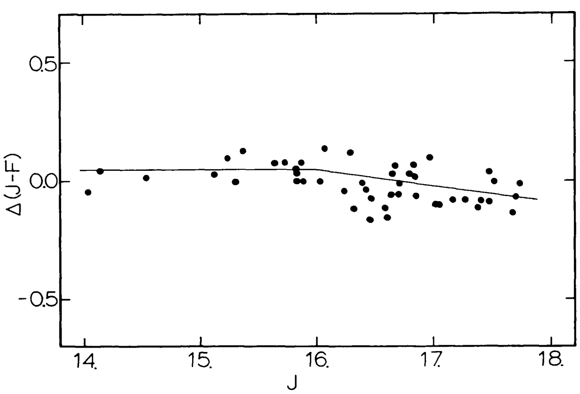

FIG. 7.—Deviation of points in Fig. 6 from the curve, vs. their J magnitude.

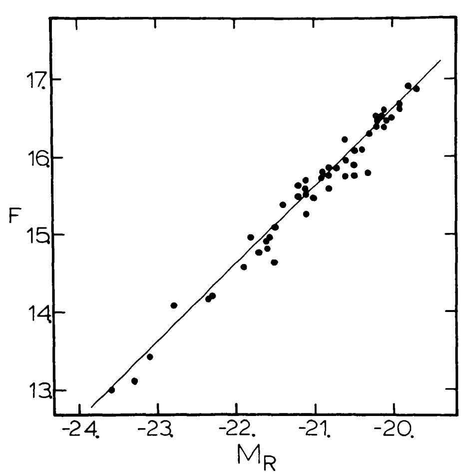

FIG. 8.—Relation between Strom and Strom absolute R magnitudes of A2199 galaxies and our apparent F magnitudes; straight line is the expected relation.

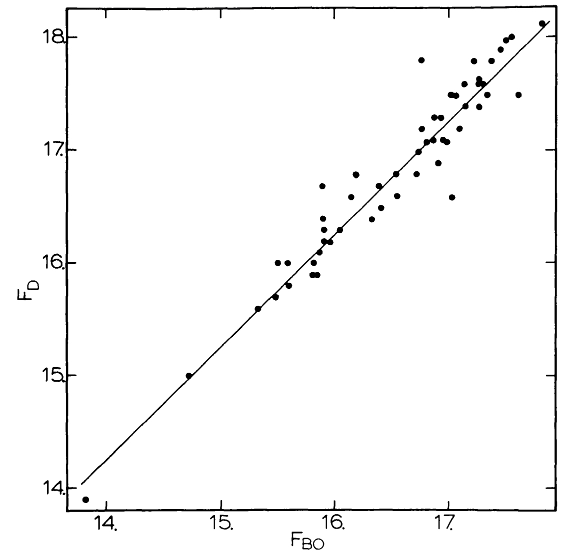

FIG. 9.—Relation between Dressler's and our F magnitudes for A2670 galaxies.

IV. FOREGROUND AND BACKGROUND GALAXIES

The apparent galaxy population of a cluster is always contaminated by foreground and background galaxies on the line of sight to the cluster. Redshift measurements will allow one to eliminate these objects, but in many cases this is neither practical nor necessary. A statistical correction for field contamination can be made if the density of field galaxies at the position of the cluster is known. Ideally this should be determined beyond but in the immediate vicinity of each cluster, but this is not possible for most of our clusters because their large angular size leaves little or no "field" area on the plates.

Fortunately, because they are nearby, the field contamination of these clusters is small. Since most are at high galactic latitude, a sufficiently accurate estimate of field contamination may be obtained from a mean determination of the field galaxy density at high latitude. For this we have used the surveys of KOS and KOSS. These have been extended to fainter magnitudes by a remeasurement of the NP7 and SP4 fields. From these data we have constructed a smoothed, mean distribution of the density of galaxies versus color and magnitude. This distribution, in numbers of galaxies per square degree, is presented in Table 13, binned in intervals of 0.1 in color and 0.25 in magnitude.

We are grateful to Greg Bothum for the use of his unpublished data and Bill van Altena for the availability of the Yale PDS. This research was partially supported by NSF grant AST81-19986.

TABLE 13

BACKGROUND CORRECTIONS (GALAXIES PER SQUARE DEGREE)

J \ J−F	0.0–0.1	0.1–0.2	0.2–0.3	0.3–0.4	0.4–0.5	0.5–0.6	0.6–0.7	0.7–0.8	0.8–0.9	0.9–1.0	1.0–1.1	1.1–1.2	1.2–1.3	1.3–1.4	1.4–1.5	1.5–1.6
13.50–13.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.03
13.75–14.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.03
14.00–14.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.01	0.04
14.25–14.50	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.04	0.04	0.02	0.03	0.03	0.01	0.00	0.00	0.00
14.50–14.75	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.02	0.01	0.03	0.06	0.05	0.02	0.01	0.00	0.00
14.75–15.00	0.00	0.00	0.00	0.01	0.01	0.01	0.04	0.04	0.03	0.03	0.06	0.05	0.03	0.01	0.00	0.00
15.00–15.25	0.00	0.00	0.01	0.03	0.03	0.02	0.04	0.05	0.06	0.05	0.03	0.03	0.04	0.03	0.01	0.00
15.25–15.50	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.05	0.12	0.12	0.09	0.10	0.08	0.02	0.00	0.00
15.50–15.75	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.08	0.16	0.17	0.15	0.12	0.06	0.01	0.00	0.00
15.75–16.00	0.00	0.00	0.00	0.00	0.00	0.02	0.04	0.09	0.16	0.21	0.23	0.18	0.09	0.02	0.00	0.00
16.00–16.25	0.00	0.00	0.00	0.00	0.01	0.05	0.09	0.14	0.18	0.22	0.28	0.26	0.14	0.04	0.00	0.00
16.25–16.50	0.00	0.00	0.00	0.00	0.01	0.06	0.14	0.21	0.22	0.27	0.36	0.33	0.19	0.07	0.01	0.00
16.50–16.75	0.00	0.00	0.00	0.01	0.02	0.07	0.16	0.26	0.33	0.41	0.48	0.42	0.23	0.09	0.03	0.01
16.75–17.00	0.00	0.00	0.01	0.05	0.10	0.11	0.13	0.20	0.31	0.48	0.66	0.62	0.39	0.20	0.09	0.02
17.00–17.25	0.00	0.00	0.00	0.06	0.17	0.23	0.26	0.38	0.48	0.61	0.81	0.77	0.47	0.18	0.04	0.00
17.25–17.50	0.00	0.00	0.00	0.12	0.38	0.44	0.40	0.65	0.84	0.82	0.82	0.73	0.49	0.23	0.06	0.00
17.50–17.75	0.00	0.00	0.00	0.00	0.07	0.27	0.68	1.33	1.52	1.12	0.89	0.85	0.69	0.41	0.13	0.01
17.75–18.00	0.00	0.00	0.01	0.02	0.15	0.52	0.76	0.69	0.76	1.07	1.28	1.57	1.95	1.45	0.42	0.01
18.00–18.25	0.00	0.00	0.03	0.10	0.36	0.63	0.85	0.77	1.07	1.17	2.32	2.52	2.07	1.28	0.40	0.03
18.25–18.50	0.00	0.03	0.16	0.38	0.51	0.74	0.68	0.99	1.28	2.43	3.22	3.40	2.99	1.80	0.60	0.09
18.50–18.75	0.00	0.07	0.31	0.67	0.95	1.24	1.50	1.91	2.73	3.57	3.91	3.52	2.61	1.54	0.62	0.12
18.75–19.00	0.00	0.21	0.65	1.05	1.24	1.66	2.80	4.66	5.56	4.50	3.21	3.01	2.85	1.73	0.52	0.05

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