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GROUPS OF GALAXIES. I. A CATALOG*

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ABSTRACT

A catalog of small groups of galaxies is generated by identifying regions of the north galactic cap ($b^{\text{II}} \geq 40°$, $\delta \geq 0°$) in which the surface number density of galaxies ($m \leq 14$) is enhanced. The determinations of both group existence and membership are accomplished by well-defined procedures and are based entirely on the distribution of galaxies in the sky. The limiting surface density enhancement of $10^{2/3}$ corresponds to a typical volume density enhancement of at least a few hundred; thus the groups are expected to be bound and relaxed systems. The members of each group are listed by NGC/IC number, along with their magnitudes, morphological types, and (where available) radial velocities. Similar data are given for those galaxies not assigned to groups (i.e., field galaxies). Various group properties such as angular size, total apparent magnitude, velocity dispersion, and apparent contamination by background or foreground objects are tabulated. A total of 737 galaxies are assigned to 103 separate groups, while 350 galaxies are assigned to the field. A map of the north galactic cap showing the galaxy distribution and the group boundaries is presented.

This sample of small groups is well suited to statistical analyses because it is complete, well defined, and statistically homogeneous. The other papers in this series report initial statistical studies of the luminosity function of galaxies in small groups (Paper II), the mass-to-light ratios and crossing times in the groups (Paper III), and the multiplicity function or spectrum of group sizes (Paper IV). Additional observations of these groups (particularly radial velocities) would be most useful.

Subject heading: galaxies: clusters of

I. INTRODUCTION

Galaxies occur in a wide variety of systems ranging from binary pairs through small groups to rich clusters. These systems in turn possess a wide range of densities, with typical separations between bright ($L \gtrsim L^* = 3.4 \times 10^{10} L_\odot$) galaxies varying from $\lesssim 10$ kpc up to ~ 1 Mpc. Among the most common of these systems are small, loose groups containing $\lesssim 10$ bright galaxies with separations $\gtrsim 100$ kpc. Such systems probably contain a substantial fraction of all galaxies (de Vaucouleurs 1975; van den Bergh 1962; Karachentseva 1973). Familiar examples include the Local Group and the M81 group.

Unfortunately, loose groups are somewhat difficult to identify (and therefore study) in the sky, precisely because they are neither dense nor populous. For this reason, a catalog of groups of galaxies is extremely useful, as witnessed by the large number of studies (e.g., Rood, Rothman, and Turnrose 1970; Field and Saslaw 1971; Gott, Wrixon, and Wannier 1973; Turner and Sargent 1974; Jackson 1975) prompted by de Vaucouleurs's (1975) unpublished but widely circulated list of groups. The problems in compiling such a catalog arise both from the uncertainty in any particular group's membership and from the difficulty in consistently identifying each group's existence. De Vaucouleurs (1975) has suggested that such groups might be suitably *defined* as enhancements in the volume number density of galaxies and might be identified as enhancements in the surface number density of galaxies on the sky. To date, however, all group catalogs (de Vaucouleurs 1975; Holmberg 1937; Sandage and Tammann 1975) have been based on a detailed, but somewhat subjective, consideration of a variety of data (e.g., redshift, position, magnitude, appearance) concerning the candidate galaxies.

In the present paper, a new catalog of groups is presented; this catalog, in contrast to earlier ones, has been generated by the "blind" application of a precisely defined group identification procedure. This procedure only considers the positions of galaxies in the sky. As a result, it sometimes makes absurd "mistakes" (e.g., assigning a dwarf spheroidal member of the Local Group to the same group as a galaxy with $cz = 4000$ km s^{-1}), but these are usually too obvious to be misleading. In addition, the shortcomings of the groups defined by our naïve method are

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offset, we feel, by their objectivity (no unconscious observer biases), homogeneity, and completeness. These attributes are critical in any statistical study of group properties. Also, the present catalog extends to fainter magnitudes (14th) than the previous studies. It is not our intention to claim that such (objective) group identifications can replace the conventional (subjective) ones, but rather that they provide a useful additional technique.

The group identification procedure and the sample of galaxies to which it has been applied are described in § II. The groups, various available data, and comments are given in § III. Data and comments on the galaxies not assigned to groups are contained in § IV. Section V briefly discusses the uses and significance of these results.

II. GROUP IDENTIFICATIONS AND MEMBERSHIP

The sample of galaxies to be searched for groups is defined by

$$\delta \geq 0^\circ\,,\quad b^{\rm II} \geq 40^\circ\,,\quad m_{\rm pg} \leq 14.0\,, \tag{1}$$

with all positions and magnitudes taken from the *Catalog of Galaxies and Clusters of Galaxies* (Zwicky *et al.* 1961–1968, hereafter CGCG). The sample contains 1087 galaxies and is shown in Figure 1. This sample is likely to be quite homogeneous and complete since the CGCG extends well beyond each of the three limits (1). Also, the accuracy of the CGCG magnitude scale has recently been confirmed by extensive multi-aperture, isophotal, photoelectric photometry (Huchra 1975).

The following group identification procedure has been applied to the sample defined by the limits (1):

1. For each galaxy in the sample, we consider the surface density σ of galaxies in a circular region of angular radius θ centered on the galaxy:

$$\sigma(\theta) = \frac{1}{2\pi} N(\leq \theta)/(1 - \cos\theta) \approx \frac{N(\leq \theta)}{\pi\theta^2}\,, \tag{2}$$

where $N(\leq \theta) - 1$ is the number of galaxies within an angular distance θ of the galaxy being considered.

2. For each galaxy, we then choose the largest possible angle θ_c such that

$$\sigma(\theta \leq \theta_c) \geq f\bar{\sigma}\,, \tag{3}$$

where $\bar{\sigma}$ is the mean surface density of galaxies in the sample (594 galaxies per steradian for our sample) and f is a surface density enhancement factor. Here we have used $f = 10^{2/3}$ in hopes of identifying groups with volume density enhancements ≥ 10 as suggested by de Vaucouleurs (1975). For computational reasons θ_c has only been determined to an accuracy of 0°.25.

3. For any galaxy with $N(\leq \theta_c) > 1$, a circle of angular radius θ_c centered on the galaxy is drawn on a map (similar to Fig. 1) of the sky. Galaxies whose nearest neighbor is more distant than $\sim(\pi f\bar{\sigma}/2)^{-1/2}$ (about 0°.75 here) have $N(\leq \theta_c) = 1$ and have no circle drawn about them.

4. When steps (1) through (3) are completed for each galaxy in the sample, a map of the sky showing all of the resulting circles is prepared. The circles fall into many (103) distinct (i.e., nonoverlapping) clumps; each clump contains from two up to $\sim$200 overlapping circles. The outside boundary of each clump of circles roughly approximates an iso-surface-density-enhancement contour; that is, the mean surface density of galaxies within the boundary is $\sim f\bar{\sigma}$. Each of these distinct clumps of circles is identified as a separate group with a boundary defined by the perimeter of the region of overlapping circles.

5. All galaxies lying within a particular group's boundary are considered (at least tentatively) to be members. Any galaxy lying outside all of the group boundaries is considered a field galaxy and not assigned to any group.

The group identifications and boundaries generated by the above procedure for the sample of galaxies defined by the limits (1) are shown in Figure 2. A total of 737 galaxies are assigned to groups, and 350 to the field. It should be noted that although the procedure was designed to locate loose groups, it also identifies large clusters, binary pairs, and generally any system which has a surface number density of galaxies $\geq f\bar{\sigma}$. All of these systems will hereafter be referred to as groups.

Before proceeding to a consideration of the individual groups (§ III) and field galaxies (§ IV), it is useful to consider several general properties of the results of the above procedures:

1. It is worth emphasizing again that these groups, defined on the basis of galaxy positions alone, will contain some bogus members as a result of chance projections. On average, about $1/f$ of the group members should be such foreground and background objects.

2. If all galaxies are characterized by a luminosity function

$$\Phi(L/L^*)d(L/L^*) = \Phi^*(L/L^*)^{-1} e^{-L/L^*} d(L/L^*) \tag{4}$$

(Schechter 1975; Turner and Gott 1976), where L^* is a characteristic luminosity, then a homogeneous spherical group of radius r and volume-density enhancement γ at a distance d would on average give rise to a surface-density enhancement β:

$$\beta = \frac{4}{\Gamma(3/2)} r d^2\, \mathrm{Ei}\,(d^2)(\gamma - 1) + 1\,, \tag{5a}$$

or, equivalently,

$$\beta = 4.514 d^3 \sin(\theta_c)\, \mathrm{Ei}\,(d^2)(\gamma - 1) + 1\,, \tag{5b}$$

where the exponential integral

$$\mathrm{Ei}\,(x) = \int_x^\infty t^{-1} e^{-t} dt = -\ln x - \gamma_E + x - \frac{x^2}{2\cdot 2!} + \frac{x^3}{3\cdot 3!} - \cdots,$$

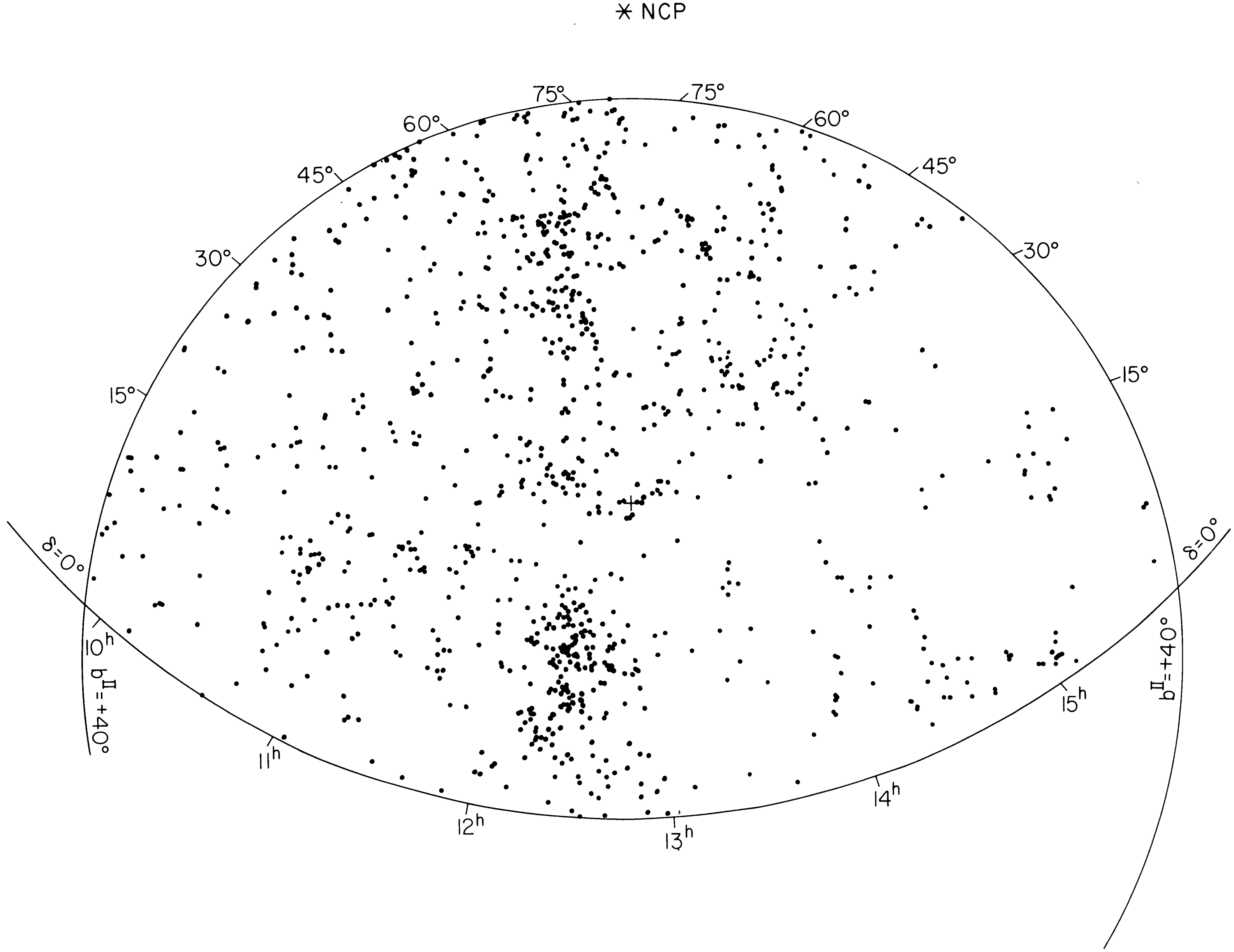

FIG. 1.—The 1087 CGCG galaxies which satisfy the limits (1). This map shows a stereographic projection of the north galactic cap about the north celestial pole (NCP). Each point represents one galaxy, although many are too close together to distinguish at this scale. Although much clustering is apparent, the exact location and definition of individual groups is far from straightforward.

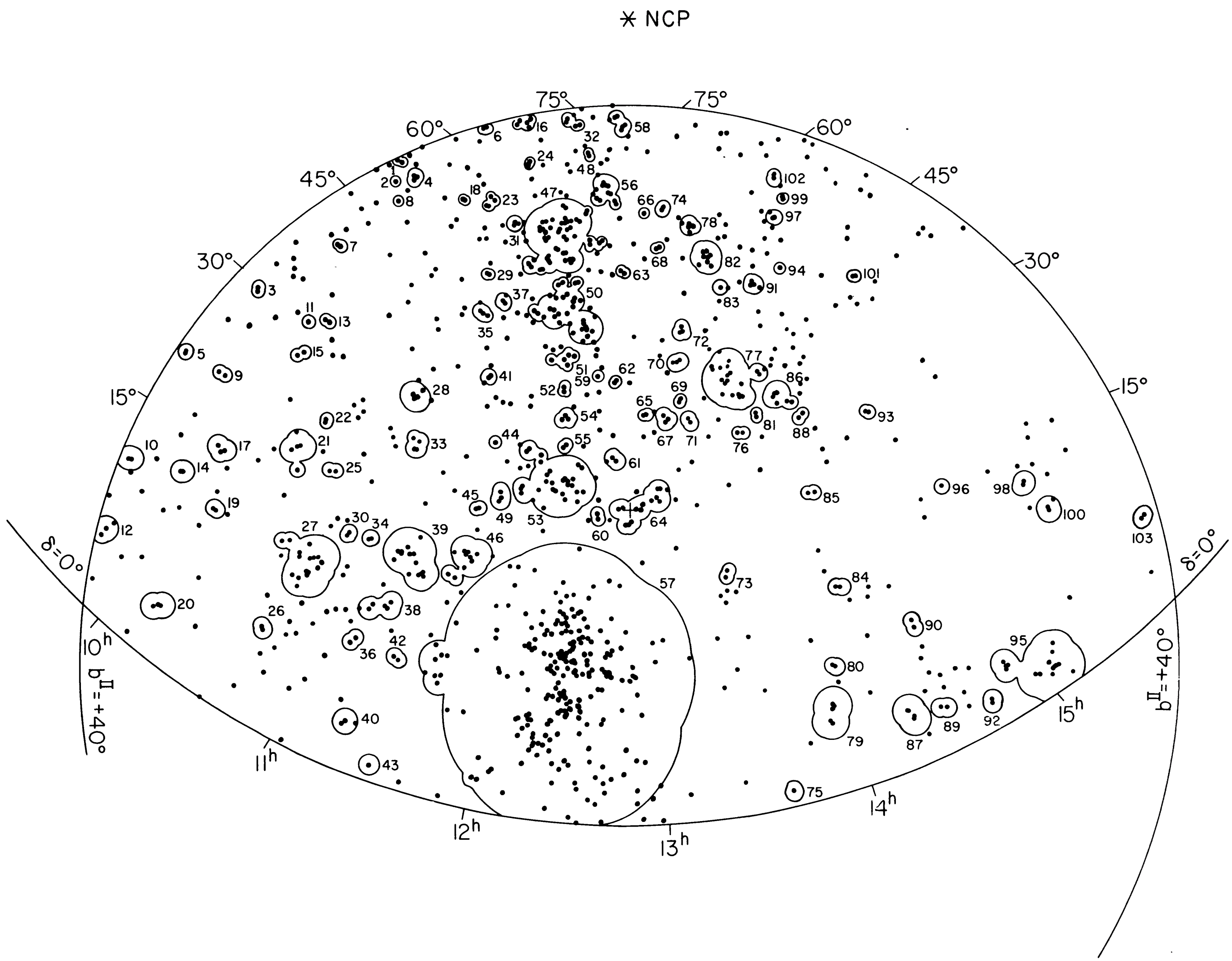

FIG. 2.—The group boundaries. On a map identical to Fig. 1, the group boundaries (iso-surface-density-enhancement contours) generated by the procedure described in § III are shown. The identifying numbers correspond to those in Table 1. The stereographic projection, in addition to being conformal, has the property that any circle on the sphere is mapped into a circle in the plane. Thus the projection is particularly well suited to our purposes.

γ_E is Euler's constant, and both r and d are measured in units of the distance at which a galaxy of luminosity L^* has an apparent magnitude equal to the sample's limiting magnitude (Gott and Turner 1976*b*). Equation (5) assumes that there is no clustering of group centers. Since the right-hand side of equation (5) has a maximum at $d = 0.66$ (corresponding to ~ 60 Mpc for the present sample if $L^* = 3.4 \times 10^{10} L_\odot$), groups at about this distance will be more readily identified than nearer or farther ones. For example, the condition for detectability in the present survey $\beta \geq 10^{2/3}$ requires $r(\gamma - 1) \geq 2.9$ if $d = 0.66$, $r(\gamma - 1) \geq 4.4$ if $d = 0.32$ (~ 30 Mpc), and $r(\gamma - 1) \geq 6.4$ if $d = 1.3$ (~ 120 Mpc). These require large volume-density enhancements γ since typically $r \approx 0.01$ (~ 1 Mpc).

3. The definition of field galaxies used here is similar but not identical to the definition of "single" galaxies used in Turner and Gott (1975). Having no neighbors within 0°.75 is a necessary but not sufficient condition for being a field galaxy, whereas it is both necessary and sufficient to being a "single." In other words, a galaxy with no neighbors within 0°.75 can still lie within a group boundary and thus be considered a group member.[1]

4. The group identifications and membership assignments generated by the above procedure depend on the somewhat arbitrarily chosen value of f. Clearly, if f is too large, there will be no groups; if it is too small (~ 1) there will be only one group containing most or all of the galaxies. Choosing a "correct" value for f is not straightforward; it depends on the desired group properties. For instance, one might wish to set f so that all resulting groups were at least dense enough to be bound, to have stopped expanding, to be virialized, et cetera. In the present case, $f = 10^{2/3}$ was chosen in order to explore de Vaucouleurs's (1975) suggested definition of a group and in hopes of producing systems in reasonable accord with the usual intuitive identifications. The resulting groups almost all have crossing times considerably shorter than the Hubble time (Gott and Turner 1976*a*), and are, therefore, probably bound and relaxed (Gott, Wrixon, and Wannier 1973).

III. GROUP DATA

Table 1 gives a list of members for each group generated by the procedure described in the last section. Also given are magnitudes, morphological types, and radial velocities for the individual galaxies. The nature, source, and reliability of these data are described below.

Column (*1*) (*Identification*).—The NGC or IC (abbreviated N and I, respectively) number of each galaxy is given, if available. Galaxies without NGC or IC numbers are designated by a Z followed by a four- to six-digit number. The three least significant digits specify the order of the galaxy in the CGCG field given by the higher order digits (e.g., Z106018 = 18th galaxy in CGCG field No. 106).

[1] Anyone wishing a separate list of all the "single" galaxies should contact the authors privately.

Column (*2*) (*Apparent magnitude*).—The CGCG magnitude of the galaxy is listed. These magnitudes have a 1 standard deviation uncertainty of ~ 0.3 magnitudes and are about ~ 0.35 magnitudes fainter than Holmberg magnitudes (Huchra 1975). Notice that in the case of some very close pairs of galaxies a composite magnitude is given.

Column (*3*) (*Morphological type*).—Simplified morphological types adapted from classifications by Nilson (1973; hereafter UGC) are listed. The simple classification scheme is described in Table 2. These classifications, made from an inspection of Palomar Sky Survey prints, range from reliable to rather tentative.

Column (*4*) (*Radial velocity*).—A radial velocity corrected to the Local Group rest frame is given, if available. These velocities are taken from the literature survey reported in the UGC. Their accuracy varies widely, but a typical uncertainty might be ~ 100 km s^{-1}. In addition to those listed, velocities in several of the groups have been obtained recently by Kirshner (1975) (see Notes section). A zero is shown if no velocity is available.

Notes.—These comments contain a variety of additional information on the individual groups and galaxies, calling particular attention to cases of apparent foreground-background contamination.

General properties and parameters of the groups are listed in Table 3 and described below.

Column (*1*): *Identification*.—Group numbers corresponding to those used in Table 1 are given.

Column (*2*): *Position*.—The mean right ascension and declination (1950) of the galaxies in each group is listed.

Column (*3*): *Number of members*.—The number of galaxies assigned to each group is tabulated.

Column (*4*): *Number of velocities*.—The number of galaxies in group with UGC velocities is given.

Column (*5*): *Angular size*.—The luminosity-weighted mean harmonic angular size ϕ of the group is calculated by

$$\phi = \left(\sum l_i\right) \left(\sum_{i \neq j} l_i l_j / \theta_{ij}\right)^{-1}, \tag{6}$$

where

$$l_i = \mathrm{dex}\,(-0.4 m_i), \tag{7}$$

m_i is the apparent magnitude of the ith group member, θ_{ij} is the angular separation between the ith and jth members, the first sum in equation (6) is over the group members, and the second is over all pairs of members.

Column (*6*): *Total magnitude*.—The total flux from the galaxies in the group is expressed as a magnitude m_{TOT}, where

$$m_{\mathrm{TOT}} = -2.5 \log \left(\sum l_i\right). \tag{8}$$

Column (*7*): *Mean radial velocity*.—For groups in which one or more members have radial velocities v_i, the luminosity-weighted mean is

$$\bar{v} = \sum l_i v_i \Big/ \sum l_i, \tag{9}$$

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TABLE 1

GROUP CATALOG

(1) ID	(2) MAG	(3) TY	(4) VEL	(1) ID	(2) MAG	(3) TY	(4) VEL
GROUP 1							
Z264033	13.6	S	0	Z264047	13.7	S	0
GROUP 2							
N2769	13.8	S	0	N2771	14.0	S	0
GROUP 3							
N2783	13.9	E	0	N2789	13.8	OS	0
GROUP 4							
Z264088	14.0	I	0	Z264091	13.4	S	0
N2800	14.0	E	0				
GROUP 5							
N2804	14.0	O	0	N2809	13.9	O	0
GROUP 6							
N2805	11.9	S	2023	N2814	14.0	I	1780
N2820	13.1	S	1799				
GROUP 7							
N2844	13.6	OS	0	N2852	14.0	U	0
GROUP 8							
N2854	13.8	S	0	N2856	13.9	S	0
GROUP 9							
N2903	9.8	S	507	N2916	12.3	S	0
GROUP 10							
N2911	13.6	U	2978	N2914	13.7	S	3208
N2919	13.6	S	0				
GROUP 11							
N2964	12.0	S	1284	N2968	13.1	I	1552
GROUP 12							
N2987	13.9	S	0	Z35050	14.0	O	0
N2990	12.5	S	0				
GROUP 13							
N3003	12.3	S	1429	N3021	12.6	S	1483
GROUP 14							
N3016	13.7	S	0	N3020	13.2	S	0
N3024	13.7	S	0				
GROUP 15							
N3026	13.8	I	0	N3032	13.0	O	1500
GROUP 16							
N2959	13.7	S	0	N2976	10.9	S	169
N3031	8.1	S	88	N3034	9.2	I	322
N3077	10.7	I	-26				
GROUP 17							
N3041	13.1	S	0	N3053	13.7	S	0
N3060	13.8	S	0				
GROUP 18							
N3073	13.8	O	0	N3079	11.2	S	1240
GROUP 19							
Z64069	14.0	S	0	Z64073	11.3	E	0
GROUP 20							
N3156	12.8	O	0	N3166	11.2	OS	1200
N3169	11.9	S	1116				
GROUP 21							
N3162	12.2	S	1361	N3177	12.8	S	1118
N3185	12.9	S	1142	N3187	13.8	S	1491
N3189	11.9	S	1255	N3193	12.4	E	1273
N3226	13.3	E	1232	N3227	12.2	S	1005
GROUP 22							
N3209	13.9	E	0	Z124004	14.0	U	0
GROUP 23							
N3182	13.0	OS	0	N3206	12.7	S	1270
N3220	13.7	U	0	N3225	13.3	S	0
GROUP 24							
N3259	12.9	S	1984	N3266	13.5	O	0

TABLE 1—*Continued*

(1) ID	(2) MAG	(3) TY	(4) VEL	(1) ID	(2) MAG	(3) TY	(4) VEL
			GROUP 25				
N3287	12.9	I	0	N3301	12.2	O	1241
			GROUP 26				
N3356	13.3	S	0	N3362	13.6	S	0
			GROUP 27				
Z65058	13.9	I	0	N3300	13.4	O	0
N3338	12.1	S	1202	Z65089	13.8	S	0
N3346	12.8	S	0	N3351	11.2	S	643
N3367	12.0	S	2753	N3368	10.0	S	800
Z66015	14.0	S	0	N3377	10.7	E	593
N3379	9.6	E	746	N3384	10.0	O	636
N3389	12.0	S	1203	N3391	13.5	U	0
N3412	10.8	O	735	N3419	13.4	O	2859
			GROUP 28				
N3395	12.1	S	1622	N3396	12.6	I	1611
N3413	13.1	S	0	N3424	13.2	S	0
N3430	12.2	S	1709	N3442	13.2	U	0
			GROUP 29				
Z241029	13.9	O	0	Z241037	14.0	U	1500
			GROUP 30				
N3455	13.1	S	1006	N3457	13.0	U	0
			GROUP 31				
N3440	14.0	S	0	N3445	12.8	I	2069
N3458	13.2	O	0	N3488	13.7	S	0
			GROUP 32				
N3348	12.0	E	3010	N3364	13.8	S	0
N3403	13.3	S	1403	N3516	12.3	O	2777
N3562	13.2	E	0				
			GROUP 33				
N3486	11.2	S	1067	N3504	11.5	S	1473
N3510	13.6	S	670	N3512	12.9	S	1449
			GROUP 34				
N3501	13.8	S	0	N3507	11.4	S	0

(1) ID	(2) MAG	(3) TY	(4) VEL	(1) ID	(2) MAG	(3) TY	(4) VEL
			GROUP 35				
N3478	13.7	S	0	Z241061	13.4	U	6000
Z241072	13.0	S	0	Z241085	14.0	S	0
			GROUP 36				
I676	13.4	O	0	I2637	13.9	U	0
			GROUP 37				
Z242009	13.6	S	0	N3583	11.6	S	0
N3595	13.0	U	0				
			GROUP 38				
N3559	13.7	S	0	I677	13.6	S	0
N3593	11.8	S	429	N3623	9.6	S	640
N3627	8.9	S	591	N3628	11.5	S	730
			GROUP 39				
N3598	13.5	EO	0	N3599	13.0	EO	0
N3605	12.7	EO	599	N3607	10.2	E	840
N3608	11.7	E	1117	Z96026	13.6	U	0
N3626	11.2	OS	1361	Z96032	14.0	S	0
N3646	11.5	S	4198	N3655	11.6	S	0
N3659	12.7	SI	0	N3681	12.2	S	1220
N3684	12.1	S	1329	N3686	11.6	S	930
N3691	13.1	U	0				
			GROUP 40				
N3630	12.8	OS	0	N3640	11.8	E	1199
N3664	13.6	S	1253				
			GROUP 41				
N3652	12.6	S	0	N3658	13.3	EO	0
N3665	11.6	EO	2010				
			GROUP 42				
N3692	12.9	S	0	N3705	11.5	S	0
			GROUP 43				
N3719	13.8	S	0	N3720	13.7	U	0
			GROUP 44				
N3786	13.5	S	2737	N3788	13.2	S	2327

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TABLE 1—*Continued*

(1) ID	(2) MAG	(3) TY	(4) VEL	(1) ID	(2) MAG	(3) TY	(4) VEL
			GROUP 45				
N3798	13.9	O	0	N3812	13.9	E	0
			GROUP 46				
Z57026	13.9	U	0	N3768	13.7	O	0
N3801	13.3	O	0	N3805	13.8	EO	0
N3816	13.6	O	0	N3821	13.8	S	0
N3827	13.6	U	0	N3842	13.3	E	0
N3862	14.0	E	0	N3884	14.0	S	0
			GROUP 47				
N3610	11.4	O	1864	N3613	11.6	EO	2150
N3619	12.6	OS	1744	N3625	13.9	S	0
N3631	11.0	S	1162	N3642	11.9	S	1725
N3656	13.4	U	0	N3657	13.1	U	0
N3669	12.9	I	0	N3674	13.1	O	0
Z291071	14.0	S	0	N3683	12.7	U	0
I694	11.8	U	3212	N3690	11.8	U	3097
Z291075	12.6	S	0	N3718	11.8	OS	1128
N3725	13.6	S	4500	N3729	12.2	S	0
N3733	13.2	S	0	N3737	13.9	U	0
N3738	11.5	I	0	N3756	12.1	S	0
N3757	13.5	O	0	N3762	13.3	S	0
N3770	13.5	S	0	Z292013	14.0	U	0
N3780	12.2	S	0	N3796	13.4	S	0
N3804	13.8	S	0	N3809	13.6	O	0
N3835	13.0	S	0	N3838	12.7	O	0
Z292026	13.5	U	0	Z292029	13.9	S	0
N3888	12.6	S	2400	Z292030	13.9	U	0
N3894	12.9	O	0	N3895	14.0	S	0
N3898	11.7	S	1135	N3921	13.4	U	6023
N3945	11.6	O	1337	N3958	13.1	S	0
N3963	12.2	S	0	N3972	12.9	S	0
N3978	13.2	S	0	N3982	11.6	S	0
N3990	13.6	O	817	N3998	11.2	O	1177
N4030	11.5	O	1507	N4041	11.6	S	1312
N4149	13.9	S	0	N4161	13.7	S	0
N4290	12.8	S	0	N4335	13.7	E	0
			GROUP 48				
Z334049	13.8	U	0	N3879	13.5	SI	0

(1) ID	(2) MAG	(3) TY	(4) VEL	(1) ID	(2) MAG	(3) TY	(4) VEL
			GROUP 49				
N3900	12.5	S	1666	N3902	14.0	S	0
N3912	13.2	SI	0				
			GROUP 50				
N3769	11.7	S	804	N3811	13.0	S	3000
N3870	13.2	O	660	N3877	11.8	S	0
N3893	10.6	S	1065	N3896	14.0	U	0
N3917	12.5	S	0	N3922	13.8	OS	0
N3928	13.1	U	1500	N3949	10.9	S	743
N3953	10.8	S	1041	Z269018	14.0	S	0
N3985	13.0	S	0	N4010	13.1	SI	0
N4026	11.5	O	956	N4047	12.8	S	0
N4068	13.3	I	0	N4085	12.8	S	0
N4088	11.2	S	812	N4096	11.6	S	0
N4100	11.7	S	0	N4102	11.8	S	985
N4144	12.3	S	0	N4157	11.9	S	0
N4217	12.4	S	0	N4218	13.2	U	0
N4220	12.4	S	1051	N4242	11.9	S	724
N4248	13.9	S	0	N4258	9.6	S	543
N4288	13.6	S	0	N4346	12.3	O	0
N4357	13.5	S	0	N4389	12.8	S	0
			GROUP 51				
I749	13.4	S	0	I750	12.7	S	0
N4111	11.4	O	841	N4138	12.1	O	1090
N4143	12.0	O	830	N4183	13.5	S	0
			GROUP 52				
N4145	12.2	S	0	N4151	11.2	S	989
			GROUP 53				
N3986	14.0	S	0	N3994	13.7	S	3126
N3995	12.9	S	3356	N4004	14.0	U	0
N4008	13.1	EO	0	N4017	13.5	S	0
N4062	11.9	S	0	Z158009	14.0	S	0
N4080	14.0	I	0	N4104	13.7	O	0
N4134	13.8	S	0	N4136	12.1	S	434
N4146	13.8	S	0	N4150	12.6	O	236
N4169	12.9	O	0	N4173	13.7	S	0
N4185	13.5	S	0	N4196	13.7	O	0
N4245	12.4	OS	882	N4251	11.5	O	1000
N4253	13.7	S	0	N4274	11.1	S	761

TABLE 1—*Continued*

(1) ID	(2) MAG	(3) TY	(4) VEL	(1) ID	(2) MAG	(3) TY	(4) VEL
N4275	13.4	S	0	N4278	11.2	E	622
N4283	13.1	E	1078	N4310	13.5	S	0
N4314	11.5	S	879	N4359	13.9	S	0
N4375	13.9	S	0	N4393	13.8	S	0
N4414	10.9	S	720	N4448	11.9	S	687
			GROUP 54				
N4163	13.7	I	0	N4190	13.5	I	0
N4214	10.3	I	311				
			GROUP 55				
N4203	11.8	O	1008	N4227	13.8	OS	4820
			GROUP 56				
N4081	13.6	S	0	N4108	13.0	S	0
Z315022	14.0	S	0	N4205	13.8	S	0
N4210	13.4	S	0	N4221	13.6	O	0
N4256	12.7	S	2728	N4332	13.2	S	0
N4391	13.8	O	0	N4441	13.5	U	0
N4521	13.0	OS	0	N4545	13.1	S	0
			GROUP 57				
I719	13.6	O	0	N3810	11.4	S	878
N3822	13.7	O	0	N3825	13.8	S	0
I724	13.8	S	0	N3839	13.6	SI	0
N3863	14.0	S	0	Z68055	13.4	S	0
N3869	13.5	S	0	N3872	12.9	E	3012
N3914	13.8	S	0	N3968	13.3	S	0
N3976	12.8	S	0	N4014	13.5	OS	0
N4032	12.7	I	0	I755	13.9	S	0
N4037	13.8	S	0	N4045	13.5	S	0
Z98035	14.0	U	0	N4058	14.0	S	0
N4067	13.2	S	0	N4065	14.0	E	0
N4064	12.5	S	967	N4073	13.8	E	0
N4078	13.9	O	0	N4116	13.0	S	1175
N4123	13.1	S	0	N4124	12.7	O	0
N4152	12.5	S	0	N4158	13.1	S	0
N4168	12.7	E	0	N4179	12.8	O	1148
N4178	12.9	S	140	N4180	13.2	S	0
N4192	11.0	S	-199	N4191	13.9	O	0
N4193	13.4	S	0	N4189	12.7	S	0
N4197	13.8	S	1927	N4206	13.8	S	0
N4207	13.7	U	0	N4212	11.9	S	2047

(1) ID	(2) MAG	(3) TY	(4) VEL	(1) ID	(2) MAG	(3) TY	(4) VEL
N4215	13.0	CS	0	N4216	11.2	S	-43
N4224	13.3	S	0	N4234	13.4	I	2024
N4235	13.2	S	0	N4233	13.2	O	0
N4237	12.3	S	0	N4239	13.5	E	0
N4241	13.6	O	0	N4246	14.0	S	0
N4254	10.2	S	2397	N4255	13.5	O	0
N4261	12.0	E	2093	N4260	13.1	S	1827
N4264	13.9	O	0	N4262	12.3	O	1280
N4268	13.9	OS	0	N4269	13.9	OS	0
N4267	12.4	O	1180	N4270	13.3	O	2237
N4273	12.3	S	2192	N4281	12.5	O	2492
N4293	11.6	OS	695	N4294	12.6	S	306
N4298	12.2	S	0	N4300	13.9	S	0
N4299	12.8	I	103	N4302	13.4	S	0
N4303	10.9	S	1559	N4307	13.4	S	0
N4305	13.8	S	0	N4312	12.9	S	0
N4313	13.2	S	0	N4316	14.0	S	0
N4321	10.6	S	1552	N4324	12.5	O	1605
N4330	14.0	S	0	N4339	13.1	E	1173
N4336	13.6	OS	0	N4343	13.5	S	0
N4342	13.0	S	613	N4340	12.4	O	0
N4344	13.7	O	0	N4350	11.5	O	1123
N4352	14.0	O	0	N4351	13.5	S	0
N4360	13.9	E	0	N4365	11.5	E	1083
N4371	12.1	O	896	N4374	10.8	O	878
N4378	13.2	S	0	N4376	13.9	I	0
N4377	12.5	O	1270	N4379	12.6	O	0
N4380	13.4	S	0	N4383	12.3	U	0
N4382	10.2	O	712	N4385	13.4	O	1225
N4387	13.2	E	435	N4390	13.7	S	0
N4388	12.2	S	0	N4394	11.9	S	719
N4396	13.7	S	0	N4402	13.6	S	0
N4405	12.9	OS	0	N4406	10.9	E	-367
N4410	13.6	U	0	N4412	13.2	S	0
N4413	13.6	S	0	N4416	13.5	S	0
N4417	12.2	O	0	N4420	12.7	S	0
N4419	11.6	S	0	N4421	12.9	OS	1628
N4424	13.1	S	0	N4425	13.3	OS	1808
N4430	13.4	S	0	N4429	11.4	O	1032
N4434	13.2	E	0	N4438	12.0	S	-105
N4435	11.9	O	796	N4440	13.0	S	0
N4442	11.2	O	493	N4445	13.7	S	0
N4450	11.2	S	1994	I3391	13.9	S	0

TABLE 1—*Continued*

(1) ID	(2) MAG	(3) TY	(4) VEL	(1) ID	(2) MAG	(3) TY	(4) VEL
N4451	13.4	U	0	N4452	13.1	O	0
I3392	13.3	S	0	N4455	13.0	SI	0
N4457	11.9	OS	627	N4458	13.3	E	311
N4461	12.2	O	1815	N4459	11.6	O	1042
N4464	13.5	S	1106	N4469	12.6	OS	0
I796	13.9	OS	0	N4470	12.9	S	0
N4472	10.2	E	855	N4473	11.2	E	2171
N4474	12.6	O	1459	N4476	13.3	O	0
N4477	11.9	C	1194	N4478	12.2	E	1407
N4479	13.9	O	753	N4480	13.4	S	0
N4483	13.4	O	0	N4488	13.8	S	0
N4486	10.4	E	1187	N4489	13.2	E	0
N4491	13.7	U	0	Z70141	11.2	E	0
N4497	13.8	O	0	N4496	13.3	S	1775
N4498	12.8	S	0	N4501	10.6	S	2056
I797	13.9	S	0	N4503	12.4	O	0
N4517	12.4	S	1095	I3476	13.5	I	0
N4515	13.3	EO	0	N4516	13.9	S	0
N4519	12.8	S	1125	N4522	13.6	S	0
N4526	10.6	O	396	N4527	12.4	S	1616
N4528	12.9	O	0	N4532	12.3	I	2058
N4535	11.1	S	1854	N4531	13.3	O	0
N4536	12.3	S	1814	N4539	13.5	OS	0
N4540	12.5	S	0	N4541	14.0	S	0
N4548	11.5	S	371	N4550	12.5	O	279
N4551	13.1	E	907	N4552	11.1	E	195
N4561	12.7	S	0	N4564	12.2	E	941
N4568	12.5	S	2204	N4567	12.5	S	2179
N4570	11.8	O	1639	N4569	11.8	S	-367
N4571	13.6	S	0	N4578	12.9	O	2201
N4580	13.1	S	0	N4579	11.5	S	1680
N4581	13.4	E	0	N4586	13.5	S	0
N4595	12.8	S	0	N4596	12.4	O	0
N4600	13.7	O	0	N4599	13.7	S	0
N4606	12.7	S	0	N4608	12.6	O	0
N4612	12.9	O	0	N4621	11.0	E	345
N4620	14.0	O	0	N4623	13.6	OS	0
N4632	12.6	S	1572	N4630	13.4	I	0
N4634	13.6	S	0	N4635	13.7	S	0
N4636	11.8	E	778	N4638	12.2	O	1010
N4639	12.4	S	0	N4643	11.9	O	1325
N4647	12.5	S	1328	N4649	10.3	E	1200
N4651	11.3	S	685	N4654	11.8	S	960

(1) ID	(2) MAG	(3) TY	(4) VEL	(1) ID	(2) MAG	(3) TY	(4) VEL
N4660	12.1	E	948	N4659	13.3	OS	0
N4665	12.4	O	684	N4685	13.8	EO	0
N4689	12.8	S	0	N4694	12.4	O	0
N4698	12.1	S	955	N4701	13.1	S	0
N4710	11.6	OS	1076	N4713	12.3	S	575
N4733	13.2	E	0	N4746	13.3	S	0
N4754	11.6	O	1398	N4762	11.1	O	876
N4765	13.0	U	0	N4771	13.3	S	0
N4772	12.9	S	0	N4779	13.5	S	0
N4795	13.5	OS	0	N4808	12.5	S	650
N4866	11.9	S	1864	N4880	13.3	O	0
N4935	13.9	S	0	N5020	13.4	S	0
			GROUP 58				
N4133	13.1	S	0	N4291	12.3	E	1994
N4319	13.0	S	1878	N4386	12.6	O	1990
Z335017	13.5	E	0	N4589	12.0	E	2003
N4648	12.6	E	0				
			GROUP 59				
N4485	12.4	I	848	N4490	10.1	S	622
			GROUP 60				
N4555	13.5	E	0	N4565	10.3	S	1171
			GROUP 61				
Z159039	14.0	S	0	N4627	13.3	E	0
N4631	9.8	S	646	N4656	10.6	S	775
			GROUP 62				
N4618	11.5	S	618	N4625	13.0	S	0
			GROUP 63				
N4646	13.8	U	0	N4686	13.7	S	0
			GROUP 64*				
N4670	12.6	U	1209	N4673	13.7	O	6990
N4692	14.0	EO	7912	N4712	13.5	S	0
N4725	10.2	S	1109	N4747	13.2	I	0
N4789	13.3	EO	8377	N4819	14.0	S	6702
N4839	13.6	E	7455	N4921	13.7	S	5472
N4944	13.3	S	7009	N4952	13.6	E	5886
N4961	13.5	S	2574	N4966	13.9	S	0

*See Notes.

TABLE 1—*Continued*

(1) ID	(2) MAG	(3) TY	(4) VEL	(1) ID	(2) MAG	(3) TY	(4) VEL
N5000	14.0	S	0				
			GROUP 65				
N4868	12.9	S	0	N4914	12.7	E	0
			GROUP 66				
Z316C11	13.8	OS	0	Z316012	13.7	S	0
			GROUP 67				
N5005	10.6	S	1078	N5014	13.5	S	0
N5033	10.9	S	956				
			GROUP 68				
I875	13.9	O	0	N5109	13.6	S	0
			GROUP 69				
N5107	13.7	U	0	N5112	12.5	S	0
			GROUP 70				
N5103	13.6	U	0	N5123	13.5	S	0
N5145	13.6	S	0				
			GROUP 71				
N5141	13.9	O	0	N5142	14.0	O	0
N5149	13.8	S	0				
			GROUP 72				
N5173	13.5	E	2508	N5194	8.8	S	552
N5195	10.6	I	634	N5198	13.2	E	2605
			GROUP 73				
Z101C61	14.0	I	0	Z102004	13.8	S	0
			GROUP 74				
N5205	13.5	S	0	N5216	14.0	U	0
N5218	13.1	S	0				
			GROUP 75				
N5257	13.7	S	6744	N5258	13.8	S	6569
			GROUP 76				
N5318	13.5	O	0	N5347	13.3	S	0
			GROUP 77				
N5289	13.5	S	0	N5290	13.0	S	0
N5303	12.9	U	0	N5311	13.7	O	0
N5313	12.4	S	0	N5320	13.1	S	0
N5326	12.9	S	0	N5336	13.6	S	0
N5337	13.4	S	0	N5351	13.1	S	0
N5330	12.4	S	0	N5353	11.8	O	2285
N5354	12.3	O	0	N5355	14.0	O	0
N5362	13.2	S	0	N5371	11.5	S	2682
N5378	13.8	S	0	N5380	13.5	O	0
N5383	12.5	S	2369	N5394	13.7	S	3648
N5395	12.6	S	0	N5406	13.1	S	0
Z219C56	13.9	S	0	N5515	13.7	S	0
N5541	13.4	S	0				
			GROUP 78				
N5322	11.3	E	2061	N5372	13.7	U	0
N5376	12.9	S	0	N5389	13.2	O	0
N5430	12.7	S	0				
			GROUP 79				
N5363	11.4	I	1103	N5364	13.2	S	1359
N5374	13.7	S	0	N5382	14.0	O	0
N5384	14.0	O	0	N5386	13.7	OS	0
			GROUP 80				
N5416	13.6	S	0	N5423	13.9	EO	0
			GROUP 81				
N5440	13.4	S	0	N5444	12.8	E	0
			GROUP 82				
N5368	13.8	S	0	N5422	13.1	OS	0
N5443	13.2	S	0	N5457	8.7	S	415
N5473	12.5	O	2195	N5474	11.9	S	395
N5475	13.4	S	0	N5485	12.4	O	2137
N5486	14.0	SI	0				
			GROUP 83				
N5480	12.6	S	1859	N5481	13.5	E	2165
N5520	13.3	S	0				

TABLE 1—*Continued*

(1) ID	(2) MAG	(3) TY	(4) VEL	(1) ID	(2) MAG	(3) TY	(4) VEL
			GROUP 84				
N5504	13.9	S	0	Z103123	14.0	S	0
			GROUP 85				
N5523	13.4	S	0	N5548	13.1	S	4990
			GROUP 86				
N5529	12.9	S	3879	N5533	13.0	S	0
N5544	13.2	S	3265	N5545	13.2	S	3275
N5557	12.2	E	3296	N5590	13.6	O	0
N5614	12.6	S	3971				
			GROUP 87				
N5560	13.7	S	0	N5566	12.0	S	1581
N5574	13.4	O	1694	N5576	12.3	E	1507
N5577	13.6	S	0				
			GROUP 88				
N5611	13.5	O	0	N5623	13.7	E	0
			GROUP 89				
N5638	12.5	E	1663	I1024	14.0	O	0
			GROUP 90				
N5669	13.2	S	0	N5666	13.5	U	0
			GROUP 91				
N5660	12.2	S	0	N5673	14.0	S	0
I1029	13.7	S	0	N5676	11.7	S	2395
N5689	12.7	S	2355				
			GROUP 92				
N5740	13.2	S	0	N5746	12.3	S	1826
			GROUP 93				
N5789	13.9	S	0	N5798	13.5	I	0
			GROUP 94				
N5797	13.6	OS	0	N5804	14.0	S	0
			GROUP 95				
I1067	13.6	S	0	N5770	13.3	O	0
N5774	13.9	S	1534	N5775	13.0	S	1574

(1) ID	(2) MAG	(3) TY	(4) VEL	(1) ID	(2) MAG	(3) TY	(4) VEL
N5806	12.9	S	1309	N5813	12.5	E	1891
N5831	13.1	E	1693	N5838	12.1	O	1441
N5839	13.9	U	0	N5845	13.8	E	0
N5846	11.9	E	1784	Z20061	11.9	E	2304
N5850	13.6	S	2385	N5854	13.1	O	1644
N5864	12.9	O	1639	N5865	13.5	O	0
			GROUP 96				
N5857	13.6	S	4785	N5859	13.1	S	4745
			GROUP 97				
N5905	13.6	S	0	N5906	11.4	S	725
N5908	13.5	S	0				
			GROUP 98				
N5951	13.8	S	0	N5953	12.7	O	2188
N5954	12.7	S	2228				
			GROUP 99				
N5963	13.0	S	0	N5965	13.4	S	0
			GROUP 100				
N5956	13.3	S	0	N5957	13.3	S	0
N5970	12.2	S	2136				
			GROUP 101				
I4562	13.8	E	6036	I4567	13.5	S	0
			GROUP 102				
N5982	12.4	E	3072	N5985	12.0	S	2673
N5989	13.6	S	0				
			GROUP 103				
N6014	13.8	O	0	N6017	13.8	U	0

NOTES

In the notes listed below, "UGC" indicates that part or all of the group is identified by Nilson (1973), and dV followed by a number indicates that the group is similar to one of de Vaucouleurs's (1975) groups. NGC and IC numbers indicate possible additional group members. A K indicates that Kirshner (1975) has obtained new, and as yet unpublished, redshifts for some or all of the group's members.

2 UGC
3 UGC
5 UGC
6 UGC, IC 2458, interaction
7 UGC, NGC 2853
8 UGC, Arp 285, interaction
10 UGC, Arp 137 and Arp 232
11 UGC, NGC 2970
12 NGC 2990 foreground?
14 UGC, NGC 3019, K
16 UGC, dV 2, M81 group, NGC 3959, NGC 3961
18 UGC
19 Z64073 = Regulus system, foreground
20 UGC, interaction
21 UGC, dV 47, odd distribution of velocities
22 UGC
23 NGC 3214
25 UGC
26 UGC
27 UGC, dV 11, Leo group plus background objects, clumpy
28 UGC, dV 43, interaction
30 NGC 3454
31 UGC, dV 28, interaction
32 NGC 3403 foreground
33 Two pairs projected together
34 UGC
37 NGC 3677
38 dV 9, Leo group
39 UGC, dV 49, NGC 3592, NGC 3649, NGC 3646 background and overluminous?
40 UGC, NGC 3641
42 UGC
43 UGC
44 UGC, interaction
45 UGC, NGC 3815
46 UGC, Abell 1367, NGC 3764, NGC 3832, NGC 3837, IC 2955, IC 732, NGC 3768 and NGC 3801 a separate pair?, K
47 UGC, dV 34, may consist of several subsystems at different distances, part of Ursa Major cloud
50 UGC, dV 32, part of Ursa Major cloud, several background members
52 UGC, dV 17
53 UGC, contains NGC 3995 group in the background
55 Projected pair, large velocity difference
56 UGC, NGC 4512, K
57 UGC, Virgo cluster, dV 18, dV 19, dV 25, dV 26, dV 46, includes a number of foreground and background groups
58 UGC
59 UGC, interaction
61 UGC, dV 10, NGC 4657, possibly two pairs projected together
62 UGC, IC 3675
63 UGC
64 UGC, the brighter galaxies of the Coma cluster, NGC 4670, 4725, and 4961 are foreground; due to an error in the CGCG magnetic tape, three bright Coma galaxies were omitted. The data for these are (N4874, 13.7, O, 7183), (N4889, 13.0, E, 6456), and (N4911, 13.7, S, 8018).
65 UGC
67 UGC
71 UGC
72 UGC, two pairs projected together, interaction
74 UGC, interaction
75 UGC, interaction
76 UGC
77 UGC, probably two groups projected together, K
78 NGC 5379, K
79 UGC, two groups projected together?, subclumps
81 UGC
82 two groups superposed
83 UGC
84 UGC
86 UGC, NGC 5589, NGC 5613, NGC 5615, interaction
87 UGC
89 UGC
91 UGC, dV 37, K
92 UGC
93 UGC
95 UGC, dV 50, NGC 5868, IC 1066
96 UGC
97 UGC, NGC 5906 probably foreground, K
98 UGC, interaction
100 NGC 5970 may be foreground
101 UGC
102 UGC

where the sums are only over the members with velocities.

Column (8): Velocity dispersion.—For groups with two or more velocities, the luminosity weighted velocity dispersion is given by

$$\sigma_v = \left[\sum l_i(v_i - \bar{v})^2 \Big/ \sum l_i\right]^{1/2}, \qquad (10)$$

with sums over the members with velocities. The usually small values of σ_v are a good confirmation of the general validity of our group identification procedure.

Column 9: Faint members.—Although these groups were chosen solely from galaxies with $m_{pg} \leq 14.0$, the CGCG extends to $m_{pg} \approx 15.7$. The distribution of galaxies with $14.0 < m_{pg} \leq 15.7$ in the CGCG was compared with the group boundaries generated in § II, and each group was classified according to the number of faint galaxies within the boundaries. The classification scheme is described in Table 4.

Column 10: Contamination rating.—Each group has been assigned a number from 1 to 4 intended to reflect

TABLE 2

MORPHOLOGICAL TYPE NOTATION

Type	Table 1 Abbreviation
Early:	
Elliptical	E
	E0*
Lenticular (S0)	0
Late:	
	0S*
Spiral/Barred Spiral	S
Irregular	SI*
	I
Peculiar or Unclassified	U

* Intermediate or uncertain.

TABLE 3

GROUP PARAMETERS

(1) Group	(2) Position h^{α} m $°^{\delta}$ '	(3) No. of Members	(4) No. of Velocities	(5) Angular Size ϕ	(6) m_{TOT}	(7) $\bar{V}$	(8) σ_V	(9) Faint Members	(10) Rating
1	8 55 52 30	2	0	2.72	12.9	...	...	S	1
2	9 07 50 37	2	0	0.23	13.1	...	...	F	1
3	9 11 30 03	2	0	1.58	13.1	...	...	S	1
4	9 14 52 59	3	0	1.20	12.6	...	...	S	1
5	9 14 20 20	2	0	0.58	13.2	...	...	M	1
6	9 17 64 25	3	3	0.78	11.5	1949	108	S	1
7	9 19 40 22	2	0	1.10	13.0	...	...	S	1
8	9 21 49 26	2	0	0.19	13.1	...	...	S	1
9	9 31 21 50	2	1	7.91	9.7	507	...	F	1
10	9 32 10 24	3	2	0.48	12.4	3088	115	S	1
11	9 40 32 07	2	2	0.59	11.7	1355	118	S	1
12	9 43 5 14	3	0	3.45	12.0	...	...	F	2
13	9 47 33 43	2	2	2.11	11.7	1452	27	N	1
14	9 47 12 59	3	0	0.41	12.3	...	...	S	1
15	9 49 29 07	2	1	3.37	12.6	1500	...	N	1
16	9 49 69 02	5	4	2.91	7.6	141	106	F	1
17	9 52 16 53	3	0	1.95	12.3	...	...	S	1
18	9 58 55 53	2	1	2.28	11.1	1240	...	S	1
19	10 05 12 32	2	0	3.46	11.2	...	...	S	4
20	10 11 3 35	3	2	0.74	10.6	1171	40	S	1
21	10 16 21 37	8	8	0.90	10.3	1217	128	S	2
22	10 18 25 41	2	0	0.59	13.2	...	...	S	1
23	10 19 57 50	4	1	2.12	11.6	1270	...	S	1
24	10 29 65 10	2	1	1.34	12.4	1984	...	S	1
25	10 33 22 02	2	1	2.48	11.7	1241	...	N	1
26	10 42 6 56	2	0	0.86	12.7	...	...	F	1
27	10 43 13 29	16	10	1.29	8.1	817	413	S	3
28	10 49 33 20	6	3	0.48	10.7	1650	44	S	1
29	10 52 49 57	2	1	0.69	13.2	1500	...	M	1
30	10 52 17 43	2	1	1.34	12.3	1006	...	M	1
31	10 53 57 30	4	1	1.00	11.8	2069	...	F	1
32	10 54 73 08	5	3	2.93	11.0	2689	543	S	3
33	11 00 28 44	4	4	2.31	10.4	1233	236	S	2
34	11 00 18 19	2	0	2.33	11.3	...	...	F	1
35	11 01 45 40	4	1	2.18	12.0	6000	...	M	1
36	11 11 9 36	2	0	2.56	12.9	...	...	N	1
37	11 12 48 04	3	0	3.18	11.2	...	...	M	1
38	11 14 13 04	6	4	1.54	8.3	607	51	S	1
39	11 19 18 08	15	8	1.48	8.9	1380	1031	S	2
40	11 19 3 26	3	2	1.72	11.3	1208	20	M	1
41	11 21 38 38	3	1	1.96	11.1	2010	...	S	1
42	11 27 9 36	2	0	2.68	11.2	...	...	M	1
43	11 30 1 05	2	0	0.14	13.0	...	...	F	1
44	11 37 32 12	2	2	0.21	12.6	2504	203	F	1
45	11 38 25 03	2	0	1.01	13.1	...	...	S	1
46	11 39 19 47	10	0	2.35	11.2	...	...	M	2
47	11 39 57 54	54	17	4.49	8.1	1762	872	S	2
48	11 43 69 50	2	0	1.66	12.9	...	...	N	1
49	11 47 26 49	3	1	2.13	11.9	1666	...	S	1
50	12 01 49 04	34	13	5.56	8.0	831	343	S	2
51	12 04 43 20	6	3	2.11	10.3	900	110	M	1
52	12 08 39 55	2	1	2.45	10.8	989	...	M	1
53	12 10 29 38	32	12	3.28	8.8	851	553	S	2
54	12 11 36 40	3	1	6.93	10.2	311	...	S	1
55	12 13 33 38	2	2	3.83	11.6	1530	1310	S	4
56	12 17 65 19	12	1	2.81	10.6	2728	...	S	1
57	12 24 10 52	238	94	7.32	6.4	1106	700	M	2

TABLE 3—*Continued*

(1) Group	(2) Position α h m	δ ° ′	(3) No. of Members	(4) No. of Velocities	(5) Angular Size ϕ	(6) m_{TOT}	(7) $\bar{v}$	(8) σ_v	(9) Faint Members	(10) Rating
58	12 25	75 04	7	4	1.50	10.5	1980	42	S	1
59	12 28	41 57	2	2	0.65	10.0	646	70	S	1
60	12 33	26 31	2	1	11.97	10.2	1171	...	M	1
61	12 39	32 37	4	2	1.43	9.3	688	60	F	2
62	12 39	41 30	2	1	1.01	11.3	618	...	S	1
63	12 42	54 58	2	0	2.50	13.0	...	...	M	1
64	12 54	27 38	15	11	3.69	9.6	2513	2506	M	3
65	12 58	37 34	2	0	1.28	12.0	...	...	N	1
66	13 07	62 34	2	0	0.21	13.0	...	...	S	1
67	13 10	36 54	3	2	2.62	9.9	1025	60	S	1
68	13 17	57 52	2	0	2.12	13.0	...	...	S	1
69	13 19	38 54	2	0	1.25	12.2	...	...	N	1
70	13 21	43 23	3	0	1.59	12.4	...	...	S	1
71	13 23	36 30	3	0	0.48	12.7	...	...	S	1
72	13 28	47 11	4	4	0.54	8.6	615	314	S	4
73	13 29	19 58	2	0	2.39	13.1	...	...	N	1
74	13 30	62 55	3	0	0.53	12.3	...	...	S	1
75	13 37	1 05	2	2	0.11	13.0	6661	88	N	1
76	13 50	33 51	2	0	2.48	12.6	...	...	S	1
77	13 53	40 05	25	4	0.80	9.4	2552	326	M	2
78	13 54	59 44	5	1	3.13	10.7	2061	...	S	1
79	13 55	6 10	6	2	1.63	10.9	1144	94	S	3
80	14 00	9 38	2	0	0.72	13.0	...	...	M	1
81	14 01	35 11	2	0	1.68	12.3	...	...	S	1
82	14 02	55 08	9	4	6.01	8.5	513	405	S	4
83	14 07	50 51	3	2	0.48	11.9	1952	141	F	1
84	14 11	15 58	2	0	2.05	13.2	...	...	M	1
85	14 14	25 28	2	1	2.93	12.5	4990	...	S	1
86	14 16	36 07	7	5	1.24	10.8	3546	319	S	1
87	14 18	3 48	5	3	0.56	11.0	1569	60	S	1
88	14 24	33 22	2	0	2.68	12.8	...	...	S	1
89	14 28	3 20	2	1	2.98	12.3	1663	...	M	1
90	14 30	10 25	2	0	2.56	12.6	...	...	S	1
91	14 31	49 45	5	2	1.74	10.8	2384	18	F	1
92	14 42	2 02	2	1	1.48	11.9	1826	...	S	1
93	14 55	30 17	2	0	1.44	12.9	...	...	F	1
94	14 55	49 53	2	0	0.49	13.0	...	...	M	1
95	15 00	2 24	16	11	0.77	9.8	1781	323	S	1
96	15 05	19 46	2	2	0.12	12.6	4760	20	F	1
97	15 15	55 56	3	1	4.00	11.1	725	...	F	2
98	15 32	15 17	3	2	0.10	11.8	2208	20	S	1
99	15 33	56 49	2	0	0.59	12.4	...	...	S	1
100	15 34	12 10	3	1	2.34	11.6	2136	...	S	2
101	15 35	43 34	2	1	1.17	12.9	6036	...	S	1
102	15 39	59 39	3	2	0.61	11.3	2836	196	S	1
103	15 54	6 06	2	0	1.41	13.0	...	...	N	1

the apparent degree of contamination by foreground and background galaxies. A group which shows no evidence of contamination is rated 1. Groups which show evidence for some contamination but which are probably not dominated by projected members are assigned a rating of 2. A rating of 3 indicates that, although some physical association probably exists, the system is dominated by foreground or background objects. Groups rated 4 are nearly completely the result of chance projections. These ratings are based on a subjective appraisal of a variety of data including the group's appearance in the sky, the distribution of apparent magnitudes, the distribution of members' radial velocities, and so on. The explanation for high ratings can generally be found in the Notes section of Table 1. It is worth emphasizing that, in addition to being subjective, these ratings depend on the amount of data available for each particular group. Clearly,

TABLE 4

FAINT MEMBER CLASSIFICATION

Abbreviation	Meaning	$N(m_{pg} \leq 14)/N(m_{pg} > 14)$
N............	None	$\gg 1$
F............	Few	$\gtrsim 1$
S............	Some	< 1
M............	Many	$\ll 1$

TABLE 5
Field Galaxies

(1) ID	(2) MAG	(3) TY	(4) VEL	(1) ID	(2) MAG	(3) TY	(4) VEL	(1) ID	(2) MAG	(3) TY	(4) VEL	(1) ID	(2) MAG	(3) TY	(4) VEL
N2684	13.4	U	0	N2693	13.1	E	4998	Z266055	13.2	U	1680	N3274*	13.3	I	0
N2701	12.3	S	0	N2710	13.8	S	0	N3277*	12.3	S	1399	Z266059	14.0	OS	0
N2712	12.3	S	1849	Z264057	13.6	S	0	N3294	11.5	S	1453	N3306*	13.7	S	0
Z180031	14.0	O	0	N2756	13.2	S	0	N3310*	11.0	S	1090	N3319*	12.0	S	832
N2770	12.1	S	0	N2768*	11.1	EO	1495	N3320	13.1	S	0	N3325*	14.0	E	0
N2776	12.1	S	2682	N2778*	13.1	E	0	N3332	13.7	O	0	Z212042	14.0	S	0
N2782	12.3	S	2514	Z238024	14.0	S	0	N3344	11.1	S	504	N3353	12.9	U	1098
N2793	13.9	S	1623	Z121049	14.0	O	0	N3359	11.0	S	1120	N3365	13.6	S	0
N2798*	12.9	S	1702	N2832*	13.3	E	6897	N3370	12.4	S	1290	I642	14.0	U	0
N2841	9.9	S	671	Z238045	14.0	SI	0	N3380*	13.6	S	0	N3385*	13.7	O	0
N2859*	11.8	O	1649	N2862	13.8	S	0	N3381	12.8	S	0	N3394*	13.1	S	0
N2870	13.9	S	0	N2880*	12.6	O	1614	Z241022	13.2	U	1800	N3414*	12.1	O	1391
N2893*	13.6	S	0	N2918	13.6	E	0	N3423	12.1	S	0	N3427	14.0	OS	0
N2939*	13.5	S	0	N2943*	14.0	E	0	N3415*	13.2	OS	0	N3406*	13.7	U	0
N2948	13.8	S	0	Z239019	13.5	U	0	N3426	13.9	U	0	N3434*	13.4	S	0
N2954	13.5	E	0	N2958	13.9	S	0	N3433*	13.6	S	0	N3432*	11.7	S	594
N2955	13.9	S	0	N2950	11.8	O	1475	N3441	13.9	S	0	N3437	12.6	S	0
Z63058	13.8	S	0	Z265042	14.0	S	0	N3451	13.5	S	0	N3448*	12.2	I	1476
N2998*	13.3	S	0	N3044	12.4	S	1132	N3462	13.4	O	0	Z66076	13.7	U	0
N3049	13.5	S	0	N3043	13.3	S	0	N3471*	13.0	S	3500	Z184041	13.3	U	0
N3055	12.3	S	1730	N3070	13.2	E	0	N3485*	12.8	S	0	N3489*	10.9	O	570
N3067*	12.7	S	1455	Z36012	12.2	I	0	N3492*	14.0	U	0	N3495	13.1	S	831
N3094	13.5	S	0	N3098	13.0	OS	0	N3523*	13.8	S	0	N3506*	12.9	S	0
N3106	14.0	O	0	Z64048	13.6	U	0	Z184050	13.1	U	0	N3509	14.0	S	7443
Z290008	13.6	U	0	N3111	14.0	EO	0	N3517*	13.8	S	0	N3521	10.1	S	614
Z64068	13.5	I	0	Z266024	13.8	S	0	N3524*	13.4	OS	0	N3526	13.7	S	0
Z266025	13.9	S	0	N3126	13.5	S	0	N3547*	12.8	S	0	N3549*	12.8	S	0
N3131	14.0	S	0	Z93068	14.0	S	0	N3556	10.7	S	763	N3596*	11.7	S	0
Z8063	14.0	S	0	I598	13.8	OS	0	N3600*	12.6	S	0	N3611	12.4	S	1603
N3153*	13.6	S	0	N3158*	13.4	E	7009	Z268016	13.7	S	0	N3615*	14.0	E	0
N3184*	10.4	S	418	I602*	13.4	S	0	N3614*	12.7	S	0	N3622	13.7	S	0
N3191*	13.9	S	0	N3198*	10.7	S	670	N3629	12.9	S	0	N3648	13.5	O	0
N3239	13.5	I	761	N3246	13.8	S	0	N3654	13.4	S	0	N3666*	12.5	S	0
N3245*	11.6	O	1198	I2574	11.2	S	179	N3668*	13.1	S	0	N3675	10.4	S	727
N3248	13.9	O	0	N3254*	12.4	S	1170	N3677*	13.5	S	0	N3682	13.4	OS	0

TABLE 5—*Continued*

(1) ID	(2) MAG	(3) TY	(4) VEL	(1) ID	(2) MAG	(3) TY	(4) VEL	(1) ID	(2) MAG	(3) TY	(4) VEL	(1) ID	(2) MAG	(3) TY	(4) VEL
N3687	13.0	S	0	N3689	12.9	S	0	I4182	14.0	S	0	N4999	13.5	S	0
N3694	13.5	U	0	N3752	13.7	S	0	N5012*	13.6	S	0	N5023	13.2	S	0
Z185080	14.0	S	0	Z314032	13.3	S	0	N5032*	13.6	S	0	Z245036	14.0	I	0
N3726	11.2	S	998	Z242046	13.9	I	0	N5055	9.7	S	600	N5056*	13.6	S	0
N3735	12.4	S	0	N3755	13.9	S	0	N5116	13.7	S	0	N5127*	13.9	E	0
N3773	13.1	U	0	N3782	13.1	I	0	N5144*	13.2	S	3000	N5125*	13.5	S	0
N3800*	13.1	S	3469	N3813	12.6	S	0	N5129*	13.3	E	0	N5147	12.7	S	1042
Z12061	13.7	U	0	N3832*	14.0	S	0	N5158	13.8	S	0	N5174	13.7	S	0
N3853*	13.5	E	0	N3891	13.7	S	0	N5172	12.7	S	0	N5204*	11.7	S	0
N3930	13.5	S	0	N3935	14.0	S	0	N5190	13.7	S	0	N5217*	14.0	E	0
N3937	14.0	EO	0	N3938*	11.0	S	919	Z190028	13.8	S	0	N5230*	13.4	S	0
N3941*	11.3	O	969	I745	13.7	U	0	N5243	14.0	S	0	N5250	14.0	U	0
N3971*	13.9	O	0	N3992*	10.7	S	1147	N5248	11.4	S	1144	N5263	14.0	S	0
N4013	12.4	S	0	N4020	13.2	S	0	N5273*	12.7	U	1094	N5279	13.6	S	7708
N4051	11.5	S	709	N4125	10.9	E	1504	N5297	12.3	S	0	N5301	13.0	S	1816
N4128	12.7	U	2548	N4127	13.5	S	0	N5308	12.5	OS	2199	N5300	13.7	S	0
N4162	12.6	S	2510	N4194	13.0	U	2684	N5377	12.5	S	1953	N5375	13.2	S	0
N4236	10.7	S	185	N4244	10.8	S	269	I962*	14.0	U	0	N5417	13.8	S	0
N4250	13.0	OS	0	Z243069	13.7	OS	0	N5433*	14.0	SI	0	N5448	12.7	S	2103
N4271	13.7	EO	0	N4369	12.3	OS	0	N5490*	13.4	E	0	N5492	13.7	S	0
N4384	13.5	S	2400	N4395*	11.7	S	0	N5491*	13.9	S	0	N5525	14.0	U	0
N4449*	10.0	I	269	N4460	12.5	O	0	N5532*	13.3	O	0	N5585*	11.7	S	467
N4494*	10.7	E	1305	N4500	13.2	S	3000	N5582	13.0	E	0	N5607	13.9	U	7800
Z216009	13.9	S	0	Z216010	13.7	I	0	N5587	14.0	OS	0	N5602	13.5	S	0
Z188007	13.4	S	0	N4525	13.0	S	0	Z19012	13.6	S	0	N5603*	14.0	U	0
N4534	13.2	S	0	N4559*	10.7	S	852	N5600	11.9	S	0	Z247026	13.9	I	0
N4566	13.9	S	0	N4605	10.8	S	276	N5619*	14.0	S	0	N5631	12.4	OS	2146
N4615*	13.8	S	0	N4619	13.5	S	0	N5630	13.6	SI	0	N5633	12.9	S	2484
N4693	14.0	S	0	N4750	11.8	S	1823	N5635	13.9	S	3894	Z220019	14.0	S	0
N4736*	8.7	S	362	N4793	12.3	S	0	N5641	13.6	S	0	N5653	12.7	S	3648
N4800	12.0	S	832	Z15037	13.6	S	0	N5645	12.8	S	0	N5656	12.7	S	0
N4814	12.4	S	2661	N4826*	8.9	S	352	N5649*	14.0	S	0	N5652	13.8	S	0
N4845	12.9	S	0	N4861*	12.8	U	831	N5667	13.1	U	0	N5665	12.6	S	2256
N4900	12.8	S	962	N4904	13.2	S	0	N5675	14.0	S	0	N5678	12.1	S	2472
N4956	13.5	O	0	N4964	14.0	S	0	N5668	12.7	S	1732	N5674	13.7	S	0

TABLE 5—*Continued*

(1) ID	(2) MAG	(3) TY	(4) VEL	(1) ID	(2) MAG	(3) TY	(4) VEL
N5687	13.3	O	2284	N5690	13.1	S	0
N5698	14.0	S	0	N5695	13.9	S	0
N5692	13.3	U	0	N5707	13.3	S	0
N5708	13.9	SI	0	N5701	12.9	O	0
N5731*	14.0	S	0	Z220047	13.6	O	0
Z248018	13.9	S	0	N5735	13.8	S	0
I1048	14.0	S	0	N5739	13.7	OS	0
N5751	13.9	S	0	N5772	13.9	S	0
N5783	14.0	S	0	N5784	13.7	O	0
I1076*	13.9	U	0	Z105082	14.0	S	0
N5820*	13.0	EO	3445	N5832	13.3	S	0
N5827	13.7	S	0	N5866*	11.1	O	972
N5875	13.4	S	0	N5876	13.9	S	0
Z318018	13.6	E	0	N5879*	11.9	S	1064
N5894	13.2	SI	0	N5899	12.6	S	2706
N5918	14.0	S	0	N5921	12.7	S	1429
N5928*	13.8	O	0	N5929*	13.0	EO	2683
N5939	13.7	S	0	Z222010	14.0	S	0
N5949	12.7	S	589	N5936	13.0	S	0
I1129	13.7	S	0	N5958	13.2	S	0
N5961*	14.0	U	0	N5966	13.9	E	0
N5962	12.2	S	2088	N5987	13.3	S	0
N5980*	13.3	S	0	N5984*	13.5	S	0
N5993*	13.9	S	0	N5990	13.1	S	0
N5996*	13.2	S	0	N6004	13.4	S	0
Z250014	13.6	S	0	N6015	11.7	S	889
N6012	13.1	S	0	I1153	13.6	O	0
I1151	13.4	S	0	Z319036	13.9	E	0
Z223038	13.6	U	0	I1210	13.8	S	0
I1211	13.8	E	0	N6127	13.0	E	0
N6143	13.9	S	0	N6146	13.8	E	0
N6154	14.0	S	0	N6155	13.0	S	0
N6166*	13.9	E	9082	N6173	14.0	E	0
N6189	13.3	S	0	N6190	13.2	S	0
Z251034	13.9	EO	0	N6207	11.9	S	1072

foreground and background objects are most easily identified in the groups possessing the most velocity data.

IV. FIELD GALAXY DATA

Table 5 gives data for the galaxies which were not assigned to groups; the same data are given as for the group galaxies in Table 1.

The assignment of a galaxy to the field is probably less reliable than a group membership assignment. It is possible to miss a group either because it is too nearby (large angular separations between members) or because it is too distant (all but brightest member beyond the magnitude cutoff). Those galaxies in Table 5 which are suspected of actually being group members for one of the above reasons are marked with an asterisk; these suspicions are based on a subjective appraisal of available data similar to that which gave rise to the ratings in column (10) of Table 3.

The truly isolated galaxies listed in Table 5 are an interesting and probably insufficiently studied class of objects (Turner and Gott 1975; Karachentseva 1973). It is hoped that this list will prompt investigations of some of these systems.

V. DISCUSSION

An inspection of Tables 1 and 5 reveals a need for a great deal of observational work on both the groups and the field galaxies. Particularly pressing is the need for more and better velocity data. Better photometry as well as more reliable and detailed morphological types would also be very useful.

Despite the shortcomings of the presently available (from the literature) data, a number of interesting statistical investigations of the groups' properties are possible. Three such investigations are currently being published in separate papers of this series. They are studies of the luminosity function of galaxies in small groups (Turner and Gott 1976), the dynamics and virial masses of the groups (Gott and Turner 1976*a*), and the group multiplicity function (Gott and Turner 1976*b*). Such statistical studies profit from the well-defined group identification criteria described in § II.

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