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CLUSTERS OF GALAXIES FROM THE SHANE-WIRTANEN COUNTS

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ABSTRACT

A sample of 646 clusters of galaxies has been selected from the Shane-Wirtanen counts in 10′ bins by finding local density maxima above a threshold value, after lightly smoothing the data to reduce the effect of the sampling grid. The procedure finds 70% of Abell clusters at distance class 4, and 10% at distance class 5, but only 40% of the Shane-Wirtanen clusters are members of the Abell catalog. A sample of 97 redshifts of Shane-Wirtanen clusters exhibits the same distribution as Abell distance class $D \leq 4$ clusters. The Shane-Wirtanen clusters have a higher space density than Abell clusters and may provide a clearer picture of the spatial distribution of clusters. The two-point angular correlation function for Shane-Wirtanen clusters is a factor of 2 weaker than the angular correlation of Abell $D \leq 4$ clusters.

Subject heading: galaxies: clustering

I. INTRODUCTION

Bahcall and Soneira (1983) summarize the numerous investigations of the spatial distribution of the Abell (1958) clusters of galaxies and go on to analyze the three-dimensional distribution of a sample of 104 Abell clusters with redshifts obtained by Hoessel, Gunn, and Thuan (1980, hereafter HGT). The low density of objects in the HGT sample makes it difficult to study structure in the spatial distribution of clusters. The HGT sample does not include most of the poorer Abell clusters of richness class 0, while the Abell catalog in turn excludes clusters which are likely to exist but which do not meet Abell's selection criteria.

Seldner *et al.* (1977) present a new reduction of the Shane and Wirtanen (1967) galaxy counts in 10′ bins. The reliability of the counts is at least partially demonstrated by the correct scaling of the two-point angular correlation function (Groth and Peebles 1977). Clusters of galaxies can be selected directly from the Shane-Wirtanen counts. This paper presents a list of such clusters and a comparison to clusters in the Abell catalog.

II. CLUSTER SELECTION

The Seldner *et al.* (1977) reduction of the Shane-Wirtanen counts provides a 36×36 data array of corrected counts for each of the plates in the Lick survey. In order to reduce the effect of the sampling grid, the counts are smoothed using weights:

1/16	1/8	1/16
1/8	1/4	1/8
1/16	1/8	1/16

The resolution of the smoothed counts, 30′, is comparable to the counting diameter used by Abell, 35′ at distance class $D = 4$.

Figure 1 shows the distribution of smoothed count values at the positions of all $D = 4$ clusters north of galactic latitude 52° in Abell's statistical sample (Leir and van den Bergh 1977). In order to allow for uncertainty in the cluster positions and in the placement of the counting grid, the count value is the maximum in a 3×3 grid centered on the cluster position. Figure 1 also shows the distribution of smoothed count values in a single randomly chosen bin on each of the Lick survey plates north of galactic latitude 52°. The median random count is 1.3 galaxies.

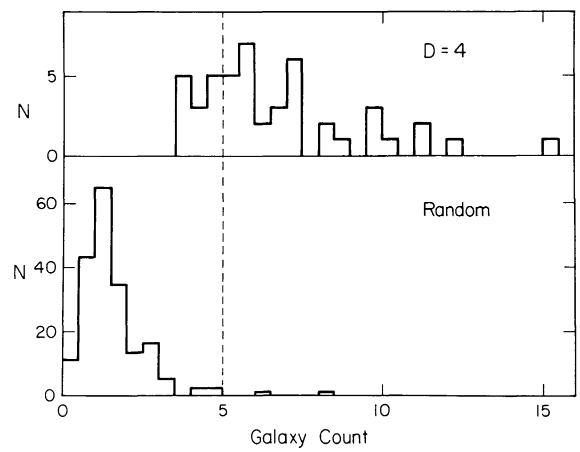

FIG. 1.—Histograms of smoothed Shane-Wirtanen galaxy counts. *Top*: galaxy counts at positions of Abell clusters of distance class 4. *Bottom*: galaxy counts at random positions.

A threshold of five counts succeeds in detecting 70% of the $D = 4$ clusters, but is well out on the tail of the random distribution. Because of the smoothing, a minimum of 20 galaxies must be counted by Shane and Wirtanen in order to result in the detection of a cluster. Only 10% of $D = 5$ clusters are detected above the same threshold.

Table 1 is a catalog of all clusters detected in the smoothed Shane-Wirtanen counts above a threshold of five. The smoothed count value for each cluster center must also be

TABLE 1A

SHANE-WIRTANEN CLUSTERS OF GALAXIES: NORTH GALACTIC CAP

NO	RA 1950.		DEC		L2	B2	PSS FLD			X MM	Y	S-W FLD	X	Y	C1	C2	C3	ABELL	D	R
1	8	55.3	38	44	184	41	42	9	0	286	20	887	10	26	111	56	36	0724	5	1
2	8	56.2	39	34	183	41	42	9	0	275	64	887	9	21	83	66	49	0727	5	1
3	8	59.5	52	12	166	41	54	8	52	167	97	1008	30	5	60	53	42	0736	6	2
4	9	3.8	52	24	166	42	54	8	52	132	108	1008	26	4	103	61	46			
5	9	9.5	47	55	172	43	48	9	4	181	190	1008	21	31	123	58	33	0757	3	0
6	9	14.7	20	15	209	41	18	9	12	207	315	605	26	17	53	52	38			
7	9	21.1	22	35	207	43	24	9	6	54	120	605	17	3	74	66	51			
8	9	29.8	9	54	224	40	12	9	36	322	85	461	4	19	134	59	37	0819	5	0
9	9	41.0	6	5	230	41	6	9	36	173	201	390	17	12	148	53	30	0858	5	0
10	9	43.5	54	44	161	47	54	9	30	120	237	1063	12	20	102	53	35			
11	9	48.0	29	4	200	50	30	9	32	50	149	750	8	24	154	59	31	0879	5	1
12	9	54.3	0	25	238	40	0	10	0	314	220	319	27	16	98	51	34			
13	9	55.3	38	45	184	52	42	10	0	282	25	890	24	26	86	59	46			
14	9	56.8	42	25	178	52	42	10	0	262	221	890	22	4	102	52	33			
15	9	56.9	41	55	179	52	42	10	0	262	195	890	22	7	103	51	38			
16	9	58.3	0	15	239	41	0	10	0	261	212	319	21	17	112	66	45	0912	4	0
17	10	2.1	37	55	185	54	36	9	48	84	302	890	16	31	75	56	42			
18	10	3.0	7	35	232	46	6	10	0	199	283	391	14	3	60	60	44	0921	5	0
19	10	4.8	40	35	181	54	42	10	0	182	122	890	13	15	115	66	49			
20	10	5.9	17	35	219	51	18	10	0	163	176	535	10	3	174	62	35	0934	5	1
21	10	9.7	6	45	234	47	6	10	0	110	239	391	4	8	156	62	39	0949	5	0
22	10	11.0	-0	35	243	43	0	10	0	90	168	320	32	22	264	129	74			
23	10	11.1	20	4	216	53	18	10	0	99	310	608	31	18	137	61	38	0952	5	1
24	10	14.8	15	15	224	52	18	10	0	48	52	536	26	17	97	58	39			
25	10	15.0	-1	55	245	43	0	10	0	36	96	320	26	30	107	62	42			
26	10	17.7	-6	25	250	40	-6	10	24	321	177	248	22	27	74	79	59	0978	3	1
27	10	17.7	-2	15	246	43	0	10	24	323	79	320	22	32	163	74	43			
28	10	18.3	14	15	226	53	12	10	24	313	321	536	21	23	80	51	39	0986	6	1
29	10	18.3	-4	25	248	42	-6	10	24	313	284	248	21	15	97	59	49			
30	10	19.3	38	45	183	57	42	10	0	30	27	891	24	26	86	59	46			
31	10	19.7	15	55	224	54	18	10	24	295	88	536	19	13	79	64	44			
32	10	19.7	15	15	225	53	18	10	24	295	53	536	19	17	132	59	38	0996	6	1
33	10	19.7	-4	35	249	42	-6	10	24	295	275	248	19	16	83	59	48	0993	3	0
34	10	20.2	52	35	160	53	54	10	8	124	124	1011	22	3	80	53	38	0985	5	1
35	10	20.3	13	5	228	52	12	10	24	287	258	536	18	30	99	57	41			
36	10	20.8	42	25	177	56	42	10	30	319	225	891	22	4	102	52	33			
37	10	20.9	41	55	178	57	42	10	30	320	198	891	22	7	103	51	38			
38	10	22.4	8	55	234	51	12	10	24	261	34	464	15	25	135	52	31			
39	10	25.1	10	55	232	52	12	10	24	225	141	464	11	13	172	92	65	1020	4	1
40	10	25.7	3	55	241	49	6	10	24	216	88	392	10	25	88	56	41	1024	5	1
41	10	26.1	37	55	184	58	36	10	16	125	303	891	16	31	75	56	42	1021	5	1
42	10	26.5	47	25	168	56	48	10	12	95	169	951	16	4	125	54	36			
43	10	27.7	-2	55	249	44	0	10	24	188	43	248	7	6	113	50	36			
44	10	27.7	4	15	241	49	6	10	24	189	106	392	7	23	109	53	42	1032	4	0
45	10	28.5	11	25	232	53	12	10	24	180	168	464	6	10	149	58	36			
46	10	28.6	35	24	189	59	36	10	16	96	168	824	8	16	160	62	33	1033	5	2
47	10	28.8	40	35	179	58	42	10	30	241	124	891	13	15	115	66	49	1035	3	2
48	10	29.4	53	23	158	53	54	10	8	51	170	1065	28	28	100	54	34			
49	10	30.1	57	20	153	51	60	10	16	116	58	1108	33	34	119	55	36			
50	10	33.4	45	1	171	58	48	10	12	25	44	952	34	18	189	85	54	1050	5	2
51	10	36.7	45	2	170	58	48	10	46	313	45	951	5	18	169	67	41			
52	10	37.0	5	25	242	52	6	10	24	65	169	393	23	16	160	85	54	1066	5	1
53	10	38.8	40	34	178	60	42	10	30	140	123	892	29	15	99	56	38	1067	5	1
54	10	39.0	17	5	225	58	18	10	24	47	152	537	20	6	141	50	30			
55	10	40.4	31	45	196	62	30	10	24	47	296	753	18	8	148	56	33			
56	10	41.5	39	54	179	61	42	10	30	112	89	892	26	19	74	51	38			
57	10	42.5	20	25	220	60	18	10	48	306	331	609	15	16	148	53	29	1085	5	0
58	10	44.1	39	15	180	62	42	10	30	83	54	892	23	23	83	53	43			
59	10	46.1	22	24	216	62	24	10	50	284	116	609	10	4	104	68	50	1100	4	0
60	10	48.8	55	34	152	55	54	10	46	195	285	1065	11	15	92	51	36			
61	10	49.5	9	4	240	56	12	10	48	218	44	466	34	24	181	77	51			
62	10	49.7	22	14	217	63	24	10	50	240	106	609	5	5	138	57	36			
63	10	50.8	17	4	228	61	18	10	48	202	151	537	3	6	66	50	37	1126	4	1
64	10	51.1	55	3	153	55	54	10	46	178	257	1065	9	18	80	50	33			
65	10	51.6	-7	15	259	45	-6	10	48	188	134	250	31	32	98	51	39			
66	10	55.7	1	55	251	53	0	10	48	136	304	322	25	7	111	53	37	1139	3	0
67	10	57.0	-6	25	260	47	-6	10	48	117	179	250	23	27	84	55	45			
68	11	0.3	7	55	245	58	6	10	48	75	304	466	18	31	116	57	41	1149	4	0
69	11	3.8	-14	45	269	41	-12	10	48	29	53	106	13	17	266	81	43			
70	11	5.0	3	15	253	55	6	11	12	332	54	394	11	29	123	57	36			

TABLE 1A—*Continued*

NO	RA 1950.		DEC		L2	B2	PSS FLD			X MM	Y MM	S-W FLD	X	Y	C1	C2	C3	ABELL	D	R
71	11	5.0	44	14	167	63	42	11	0	176	321	953	26	23	190	86	58	1169	5	1
72	11	5.2	16	5	233	63	18	11	12	325	99	538	11	12	99	51	34	1168	5	1
73	11	6.2	41	54	172	65	42	11	0	164	196	893	25	7	130	55	33	1173	5	1
74	11	6.8	21	54	221	66	24	10	50	27	91	610	9	7	95	56	37	1177	4	0
75	11	8.2	29	3	203	68	30	11	16	324	153	755	34	24	239	126	81	1185	2	1
76	11	8.4	8	5	247	59	6	11	12	286	313	466	6	30	127	55	33			
77	11	8.9	41	5	173	65	42	11	0	137	152	893	22	12	190	83	51	1190	5	2
78	11	9.0	39	55	175	66	42	11	0	135	90	893	22	19	79	60	45	1187	3	1
79	11	9.7	-2	55	261	51	0	11	12	269	45	251	34	6	108	59	37	1200	5	1
80	11	9.8	27	54	206	68	30	11	16	306	90	755	32	31	68	63	50			
81	11	10.7	40	35	174	66	42	11	0	118	126	893	20	15	74	57	44	1203	5	1
82	11	11.0	2	45	255	56	6	11	12	252	27	395	32	32	91	83	58	1205	5	1
83	11	11.4	56	55	147	56	60	11	0	131	36	1066	19	7	105	51	36			
84	11	12.3	-3	35	262	51	-6	11	12	233	331	251	30	10	89	54	40			
85	11	12.6	54	45	149	58	54	11	24	302	246	1066	18	20	161	82	60			
86	11	13.5	29	34	201	69	30	11	16	261	179	755	27	21	195	113	77	1213	2	1
87	11	16.6	29	25	202	70	30	11	16	226	170	755	23	22	90	53	41			
88	11	18.3	-5	25	266	51	-6	11	12	153	233	251	21	21	68	57	42			
89	11	19.0	3	5	258	58	6	11	12	145	45	395	20	30	145	87	57			
90	11	19.6	34	25	187	70	36	11	12	146	117	827	19	22	69	65	48			
91	11	19.6	19	55	228	68	18	11	12	140	305	611	19	19	98	57	44	1235	5	2
92	11	19.7	1	5	260	56	0	11	12	135	260	323	19	12	96	59	46			
93	11	21.0	0	25	261	56	0	11	12	117	224	323	17	16	123	55	36			
94	11	21.0	1	25	260	57	0	11	12	118	278	323	17	10	150	66	45	1238	4	1
95	11	21.0	56	24	145	57	54	11	24	234	331	1066	11	10	72	50	38			
96	11	23.7	2	25	260	58	0	11	12	82	331	323	13	4	89	51	36	1260	6	2
97	11	23.7	57	13	144	57	60	11	0	42	57	1066	9	5	63	51	40			
98	11	25.2	17	35	236	68	18	11	12	67	180	539	11	3	118	57	38	1264	5	2
99	11	25.4	21	5	227	70	24	11	16	118	45	611	11	12	98	60	43			
100	11	25.6	27	5	209	71	30	11	16	118	45	683	11	6	103	58	42	1267	3	0
101	11	26.3	54	22	147	59	54	11	24	196	221	1066	6	22	167	67	41	1270	3	0
102	11	27.0	2	15	262	58	0	11	12	37	323	323	8	5	62	50	40			
103	11	27.7	-5	5	269	52	-6	11	12	28	251	251	7	19	154	55	37			
104	11	27.7	-8	35	271	49	-6	11	12	28	63	179	7	10	111	53	34			
105	11	29.0	56	22	144	58	54	11	24	176	329	1067	31	10	113	70	52	1291	3	1
106	11	29.3	-14	24	276	44	-12	11	36	323	72	107	5	15	134	59	36			
107	11	30.0	14	44	244	68	18	11	36	315	28	539	4	20	180	71	42	1307	5	1
108	11	30.3	-3	45	269	54	-6	11	36	314	323	251	3	11	163	71	44	1308	4	0
109	11	32.2	-9	25	274	49	-6	11	36	287	19	180	30	15	70	51	36			
110	11	32.4	49	25	152	64	48	11	20	110	279	1014	22	22	122	77	58	1314	1	0
111	11	32.5	21	24	228	72	24	11	16	29	64	612	29	10	157	72	47			
112	11	32.8	-13	15	276	45	-12	11	36	277	135	108	29	8	182	82	47	1317	5	2
113	11	32.8	42	15	164	69	42	11	30	195	215	894	22	5	109	51	36			
114	11	32.9	55	13	144	59	54	11	24	145	267	1067	28	17	200	105	66	1318	3	1
115	11	33.7	-2	35	269	55	0	11	36	269	63	324	28	34	134	61	38			
116	11	34.0	33	14	189	73	36	11	40	296	56	828	26	29	114	51	34			
117	11	36.3	55	54	143	59	54	11	24	121	305	1067	25	13	147	55	35			
118	11	36.3	-9	5	275	49	-6	11	36	233	37	180	24	13	82	55	39	1332	4	0
119	11	36.4	32	35	190	73	36	11	40	269	20	828	23	33	128	73	53	1336	4	0
120	11	37.6	55	14	143	59	54	11	24	110	269	1067	24	17	122	59	40			
121	11	38.3	10	45	255	66	12	11	36	207	135	468	21	14	165	94	70	1341	6	1
122	11	38.3	6	5	262	63	6	11	36	207	206	396	21	12	194	106	70	1346	5	1
123	11	39.0	-12	5	277	47	-12	11	36	197	198	180	20	31	114	54	34	1348	5	2
124	11	41.0	-1	25	271	57	0	11	36	171	126	324	17	27	206	96	61	1364	4	1
125	11	41.0	7	45	261	65	6	11	36	171	296	468	17	32	145	73	56	1362	4	0
126	11	41.0	-11	15	278	48	-12	11	36	170	242	180	17	26	92	63	44			
127	11	41.1	20	15	234	73	18	11	36	171	323	612	17	17	154	95	73			
128	11	41.7	6	5	263	63	6	11	36	162	207	396	16	12	126	63	41			
129	11	41.8	21	45	230	74	24	11	42	237	82	612	16	8	94	65	46			
130	11	41.9	31	15	194	75	30	11	42	230	269	756	16	11	154	72	45	1365	4	1
131	11	42.5	20	5	235	73	18	11	36	153	314	612	15	18	193	102	80	1367	1	2
132	11	43.0	-2	5	272	57	0	11	36	144	90	324	14	31	101	64	45	1373	5	2
133	11	43.0	5	35	264	63	6	11	36	144	180	396	14	15	136	52	38			
134	11	43.0	10	15	258	67	12	11	36	144	108	468	14	17	125	56	34			
135	11	43.1	15	45	247	71	18	11	36	144	81	540	14	14	149	60	35	1371	5	1
136	11	43.6	33	25	186	75	36	11	40	188	63	828	14	28	119	65	43			
137	11	44.6	56	5	141	59	54	11	24	58	317	1067	18	12	187	105	70	1377	3	1
138	11	44.8	25	45	216	76	24	11	42	198	296	684	12	14	141	55	31	1380	5	1
139	11	45.0	-3	5	274	56	0	11	36	117	37	252	11	7	83	51	40			
140	11	45.7	5	35	266	63	6	11	36	109	180	396	10	15	136	62	44			

TABLE 1A—*Continued*

NO	RA 1950.		DEC		L2	B2	PSS FLD			X MM	Y	S-W FLD	X	Y	C1	C2	C3	ABELL	D	R
141	11	45.7	7	25	263	65	6	11	36	109	278	468	10	34	93	57	40			
142	11	45.7	54	55	141	60	54	11	24	46	255	1067	17	19	114	71	48	1383	4	1
143	11	46.3	-2	15	274	57	0	11	36	99	81	324	9	32	94	52	37			
144	11	47.1	11	25	258	68	12	11	36	91	171	468	8	10	102	59	45			
145	11	47.2	12	35	256	69	12	11	36	91	233	468	8	3	67	56	40			
146	11	47.4	44	12	155	69	42	11	30	54	323	955	32	23	147	56	34			
147	11	47.7	5	55	266	64	6	11	36	82	198	396	7	13	126	52	36			
148	11	47.7	6	55	265	65	6	11	36	82	251	396	7	7	155	70	47			
149	11	48.3	22	24	230	75	24	11	42	156	117	684	7	34	80	53	40			
150	11	48.3	-2	35	275	57	0	11	36	73	64	324	6	34	54	56	43			
151	11	49.0	-2	55	275	56	0	11	36	64	46	252	5	6	122	75	51	1399	4	2
152	11	49.8	8	25	264	66	6	11	36	55	332	468	4	28	115	51	32			
153	11	50.3	6	5	267	65	6	11	36	47	207	397	33	12	85	55	40			
154	11	50.4	4	35	269	63	6	11	36	46	126	396	3	21	74	56	44			
155	11	50.4	20	54	236	75	24	11	42	130	36	613	32	13	102	56	39			
156	11	50.8	13	14	256	70	12	11	36	44	269	541	32	29	181	75	47			
157	11	51.0	-1	25	275	58	0	11	36	37	126	325	32	27	108	51	35	1407	5	1
158	11	52.4	23	24	227	77	24	11	42	106	171	685	29	28	68	51	42	1413	5	3
159	11	53.5	11	5	262	69	12	12	0	322	153	469	28	12	126	53	34	1416	6	1
160	11	54.0	44	14	153	70	42	12	0	278	324	955	25	23	128	54	37			
161	11	54.2	11	45	261	70	12	12	0	313	189	469	27	8	126	63	40			
162	11	55.0	5	25	270	65	6	12	0	305	171	397	26	16	167	69	44	1424	5	1
163	11	57.9	56	32	137	59	60	11	44	107	17	1067	7	9	174	83	59	1436	3	1
164	12	0.3	-6	35	282	54	-6	12	0	233	171	253	18	28	221	72	38	1448	5	1
165	12	0.5	52	5	140	64	54	12	2	224	100	1015	18	6	107	54	34	1452	4	0
166	12	0.9	55	11	137	61	54	12	2	218	266	1067	4	17	127	56	38			
167	12	1.1	20	35	242	77	24	12	8	321	20	613	17	15	50	54	43			
168	12	1.1	28	45	203	79	30	12	8	310	137	757	17	26	116	51	34	1449	5	1
169	12	2.4	10	55	267	70	12	12	0	206	144	469	15	13	136	55	37			
170	12	2.7	51	35	140	64	54	12	2	207	73	1015	16	9	107	59	41	1468	4	1
171	12	5.5	25	35	221	80	24	12	8	261	287	685	11	15	112	59	45			
172	12	7.9	36	53	163	77	36	12	8	225	250	830	33	7	131	51	38			
173	12	9.7	-5	35	285	56	-6	12	0	108	225	253	4	22	119	64	48			
174	12	12.3	-7	45	287	54	-6	12	0	74	108	182	30	5	158	69	39	1502	5	1
175	12	12.3	-6	35	287	55	-6	12	0	74	171	254	30	28	116	75	59			
176	12	12.7	60	13	131	57	60	12	28	303	218	1110	9	17	168	81	53	1507	4	0
177	12	13.3	-18	15	291	44	-18	12	0	65	188	38	28	8	175	66	37			
178	12	15.0	3	55	282	65	6	12	0	37	91	398	26	25	162	100	66			
179	12	15.1	60	19	131	57	60	12	28	287	223	1111	34	16	44	54	47			
180	12	16.3	5	35	282	67	6	12	0	20	180	398	24	15	126	72	57	1516	5	1
181	12	16.3	-4	45	288	57	-6	12	0	20	269	254	24	17	131	60	39	1517	5	0
182	12	16.9	-13	25	291	48	-12	12	24	330	125	110	23	9	126	93	66	1521	5	1
183	12	16.9	-12	55	291	49	-12	12	24	330	152	110	23	6	211	118	75	1520	5	0
184	12	19.7	6	55	283	68	6	12	24	295	252	398	19	7	100	50	34			
185	12	20.3	-14	5	293	48	-12	12	24	284	90	110	18	13	162	64	41			
186	12	23.1	-15	25	294	47	-12	12	24	248	19	110	14	21	219	87	51	1535	5	1
187	12	25.1	9	5	285	71	12	12	24	223	45	470	11	24	149	74	52	1541	4	1
188	12	25.8	12	25	282	74	12	12	24	212	224	542	10	34	86	59	47			
189	12	27.4	-19	34	296	43	-18	12	24	192	118	38	8	16	89	52	35			
190	12	27.8	11	55	284	74	12	12	24	186	197	470	7	7	93	67	51	1552	5	1
191	12	28.2	29	13	190	85	30	12	34	296	161	759	34	23	110	59	40			
192	12	28.5	10	55	286	73	12	12	24	177	143	470	6	13	103	50	32	1553	6	2
193	12	28.6	-13	14	295	49	-12	12	24	178	135	110	6	8	53	59	40	1555	5	1
194	12	32.8	27	54	204	86	30	12	34	242	90	759	28	31	137	54	34			
195	12	33.0	2	5	294	64	0	12	24	117	314	327	29	6	118	55	32	1564	5	0
196	12	33.4	16	55	283	79	18	12	24	114	144	543	28	7	95	69	54	1569	5	0
197	12	35.0	-4	15	296	58	-6	12	24	91	296	255	26	14	68	53	37			
198	12	38.3	-4	45	298	58	-6	12	24	46	269	255	21	17	72	52	45			
199	12	38.9	18	55	287	81	18	12	24	44	252	615	20	25	132	69	45	1589	5	0
200	12	39.0	-12	25	299	50	-12	12	24	41	179	111	20	3	172	60	32			
201	12	42.3	1	15	299	64	0	12	48	314	269	327	15	11	65	64	52			
202	12	43.7	0	45	300	63	0	12	48	296	242	327	13	14	98	55	43			
203	12	44.4	7	45	300	70	6	12	48	285	296	471	12	32	118	54	37			
204	12	46.3	-1	25	302	61	0	12	48	261	126	327	9	27	86	71	56	1620	5	0
205	12	48.3	-22	14	303	40	-24	12	34	58	295	39	7	32	118	58	42			
206	12	48.6	-14	4	303	49	-12	12	48	230	90	111	6	13	114	64	44			
207	12	49.0	-21	54	303	41	-24	12	34	49	313	39	6	30	123	52	37			
208	12	49.8	-9	14	303	53	-6	12	48	215	28	183	4	14	90	51	39			
209	12	50.0	-15	4	303	48	-12	12	48	211	37	111	4	19	178	143	104	1631	3	0
210	12	50.4	45	15	122	72	48	13	2	323	58	957	16	17	131	60	35			

TABLE 1A—*Continued*

NO	RA 1950.		DEC		L2	B2	PSS FLD			X MM	Y MM	S-W FLD	X	Y	C1	C2	C3	ABELL	D	R
211	12	50.8	-11	44	304	51	-12	12	48	201	215	184	32	29	177	66	42			
212	12	51.9	19	14	308	82	18	12	48	183	268	616	30	23	132	62	40	1638	4	0
213	12	52.8	-12	25	304	50	-12	12	48	174	180	184	29	33	95	64	53			
214	12	54.8	-17	25	305	45	-18	12	48	150	233	40	26	3	162	104	76			
215	12	54.8	-17	5	305	45	-18	12	48	150	251	112	26	31	128	108	88	1644	4	1
216	12	54.9	-13	15	305	49	-12	12	48	148	135	112	26	8	50	78	62			
217	12	55.1	27	35	41	89	30	13	0	285	72	688	25	3	39	51	54			
218	12	55.6	-9	35	306	53	-12	12	48	138	331	184	25	16	115	51	30			
219	12	56.3	-1	25	307	61	0	12	48	126	125	328	24	27	97	81	53	1650	5	2
220	12	56.9	-13	15	306	49	-12	12	48	121	134	112	23	8	189	77	51	1652	6	1
221	12	57.0	-3	55	307	59	-6	12	48	118	313	256	23	12	200	81	49	1651	4	1
222	12	57.4	28	15	58	88	30	13	0	258	108	760	22	29	224	154	110	1656	1	2
223	12	59.4	40	2	114	77	42	13	0	224	97	898	33	18	74	61	43			
224	12	59.7	-2	15	308	60	0	12	48	82	81	328	19	32	155	87	59	1663	5	1
225	13	0.0	50	13	118	67	48	13	2	226	321	1018	30	17	125	50	30			
226	13	0.7	51	33	119	66	54	12	40	36	74	1018	29	9	134	50	30			
227	13	1.0	-2	45	309	60	0	12	48	64	54	256	17	5	77	58	41			
228	13	1.0	-16	35	307	46	-18	12	48	69	277	112	17	28	119	63	49			
229	13	1.8	19	35	324	82	18	12	48	58	287	616	16	21	99	59	41	1668	5	1
230	13	2.3	43	43	115	73	42	13	0	192	294	958	29	26	58	56	41			
231	13	2.8	40	14	111	77	42	13	0	189	106	898	29	17	74	67	53			
232	13	2.8	55	52	119	61	54	12	40	33	306	1069	6	13	87	52	35			
233	13	3.6	53	51	118	63	54	13	18	317	198	1070	33	25	103	59	40			
234	13	9.0	39	35	105	77	42	13	0	125	72	898	22	21	198	116	76	1691	3	1
235	13	9.7	-0	45	314	61	0	13	12	269	161	328	4	23	106	65	41			
236	13	13.3	41	45	105	75	42	13	0	83	189	898	17	8	64	51	38	1706	5	2
237	13	13.6	7	15	320	69	6	13	12	215	268	401	28	5	120	53	37			
238	13	16.1	-21	5	311	41	-18	13	12	186	35	41	24	25	107	52	33	1709	4	0
239	13	16.1	42	45	105	74	42	13	0	57	243	958	14	32	83	50	37			
240	13	16.3	11	15	326	73	12	13	12	179	160	473	24	11	114	52	33	1711	5	0
241	13	16.3	-0	35	317	61	0	13	12	180	169	329	24	22	70	63	50			
242	13	16.4	47	25	110	69	48	13	2	80	171	1018	14	34	151	68	34			
243	13	18.0	33	25	79	81	36	13	4	66	63	833	21	28	98	52	37			
244	13	18.3	-16	45	313	45	-18	13	12	157	268	113	21	29	52	62	50			
245	13	18.3	11	45	328	73	12	13	12	152	187	473	21	8	105	51	33			
246	13	21.7	14	5	334	75	12	13	12	107	312	545	16	24	84	55	43			
247	13	23.7	-12	5	316	50	-12	13	12	84	196	185	13	31	64	53	41			
248	13	23.9	57	53	114	59	60	13	12	115	88	1112	9	31	99	66	44	1738	5	2
249	13	27.1	37	54	88	77	36	13	32	269	303	899	29	31	265	103	62	1749	4	1
250	13	27.1	11	55	335	72	12	13	12	36	196	473	8	7	112	69	54			
251	13	29.4	-12	54	318	49	-12	13	36	325	151	114	34	6	124	57	35			
252	13	29.5	-11	24	319	50	-12	13	36	325	231	186	34	27	114	62	42	1754	5	1
253	13	29.7	-1	25	323	60	0	13	36	323	124	330	34	27	189	80	58	1750	4	0
254	13	30.0	-14	14	318	47	-12	13	36	317	79	113	4	14	105	61	42			
255	13	30.1	32	54	67	80	36	13	32	243	34	834	31	31	45	50	39			
256	13	30.7	25	54	26	81	24	13	26	170	302	690	31	13	90	53	37			
257	13	31.2	60	21	114	56	60	13	12	70	222	1113	31	16	161	51	30	1764	5	0
258	13	32.2	-11	45	319	49	-12	13	36	289	213	186	30	29	80	57	41			
259	13	34.3	59	22	112	57	60	13	12	46	171	1113	29	22	114	56	37	1767	4	1
260	13	34.6	36	54	81	76	36	13	32	190	249	834	25	7	62	53	37			
261	13	34.7	39	25	88	75	42	13	30	167	61	899	20	22	98	51	32			
262	13	38.3	44	35	96	70	48	13	36	189	16	959	16	21	117	52	30			
263	13	39.6	26	35	32	79	30	13	26	63	17	690	19	9	170	110	78	1775	4	2
264	13	39.7	2	25	331	62	0	13	36	188	329	402	19	34	187	81	52	1773	3	1
265	13	40.4	30	5	49	78	30	13	26	57	205	762	18	18	128	59	43			
266	13	41.0	-10	55	323	50	-12	13	36	173	258	186	17	24	91	68	51	1778	5	0
267	13	41.9	55	53	108	60	54	13	56	304	305	1071	27	13	203	86	53	1783	4	0
268	13	42.3	3	5	333	63	6	13	36	152	43	402	15	30	88	51	34	1780	5	1
269	13	43.4	26	35	32	78	30	13	26	18	18	690	14	9	62	54	40			
270	13	45.9	32	35	59	77	36	13	32	64	17	834	11	33	210	69	37	1793	4	1
271	13	46.3	25	54	30	77	24	13	52	294	303	690	10	13	175	75	46			
272	13	46.3	26	44	33	77	30	13	52	293	26	690	10	8	296	123	25	1795	4	2
273	13	47.2	28	14	40	77	30	13	52	281	106	762	9	29	118	62	43	1800	3	0
274	13	47.6	38	53	80	73	42	13	30	33	34	899	5	25	150	64	42			
275	13	48.5	25	14	27	77	24	13	52	269	266	690	7	17	96	75	59	1797	5	1
276	13	48.5	-12	45	325	47	-12	13	36	75	159	114	6	5	137	58	38			
277	13	48.8	29	34	46	77	30	13	52	260	177	762	7	21	35	50	42			
278	13	49.7	2	25	336	61	0	13	36	54	329	330	4	4	76	60	47			
279	13	49.8	46	33	95	67	48	13	36	82	123	960	29	9	109	74	51			
280	13	50.4	5	25	339	64	6	13	36	45	168	402	3	16	233	105	60	1809	4	1

TABLE 1A—*Continued*

NO	RA		DEC		L2	B2	PSS		X	Y	S-W	X	Y	C1	C2	C3	ABELL		
	1950.						FLD		MM		FLD							D	R
281	13	50.7	15	14	356	71	18	13 36	43	52	547	32	17	84	51	40	1814	5	1
282	13	50.7	14	54	355	71	18	13 36	42	34	547	32	19	76	57	44			
283	13	51.1	37	54	76	73	36	14 0	309	303	900	29	31	185	89	55	1812	5	0
284	13	51.4	25	13	28	76	24	13 52	233	265	690	3	17	111	51	41			
285	13	51.6	33	33	61	75	36	14 0	313	70	834	4	27	129	63	45			
286	13	52.0	28	24	41	76	30	13 52	223	114	763	29	28	90	51	34			
287	13	53.0	25	24	29	76	24	13 52	214	275	691	28	16	118	70	52			
288	13	56.1	20	55	14	73	24	13 52	178	33	619	24	13	83	54	37	1825	4	0
289	13	56.4	49	45	98	64	48	13 36	29	296	1020	22	20	129	62	41	1834	5	1
290	13	56.6	28	15	40	75	30	13 52	169	105	763	23	29	255	135	86	1831	3	1
291	13	59.0	-11	15	329	48	-12	14 0	253	239	187	20	26	94	67	54	1836	4	0
292	14	1.0	15	35	1	70	18	14 0	218	69	547	17	15	94	51	38	1849	5	0
293	14	1.0	16	5	3	70	18	14 0	218	96	547	17	12	90	61	45	1852	5	1
294	14	2.3	6	35	346	63	6	14 0	205	230	403	15	9	76	54	41			
295	14	3.7	6	35	347	63	6	14 0	187	230	403	13	9	79	61	46			
296	14	5.1	-8	55	333	49	-6	14 0	172	42	187	11	12	101	64	44			
297	14	7.0	-7	15	334	51	-6	14 0	146	131	259	8	32	114	53	34			
298	14	8.0	55	41	102	58	54	13 56	107	289	1071	5	14	92	58	41			
299	14	8.9	55	1	101	59	54	13 56	100	253	1071	4	18	59	57	45			
300	14	9.0	28	23	41	72	30	13 52	23	114	764	33	28	163	61	34	1873	4	0
301	14	9.1	19	24	14	70	18	14 0	115	273	620	34	22	158	90	54			
302	14	10.3	-7	35	335	50	-6	14 0	103	113	188	33	4	90	58	40			
303	14	11.5	43	52	83	67	42	14 0	98	299	961	32	25	178	62	33	1885	5	1
304	14	11.7	3	15	346	59	6	14 0	81	50	404	31	29	123	61	39			
305	14	11.7	1	55	344	58	0	14 0	81	301	332	31	7	58	52	38			
306	14	11.7	-0	5	342	56	0	14 0	81	193	332	31	19	109	62	43	1882	5	3
307	14	13.8	36	14	65	70	36	14 0	68	212	836	26	11	130	61	39			
308	14	14.9	8	25	354	62	6	14 0	37	328	476	26	28	215	106	62	1890	3	0
309	14	15.0	2	15	346	58	0	14 0	36	318	332	26	5	210	94	63			
310	14	15.9	26	45	36	71	30	14 18	249	23	692	24	8	106	51	34			
311	14	17.6	-16	55	331	41	-18	14 24	323	255	116	22	30	167	50	25			
312	14	17.6	-9	5	337	48	-6	14 24	324	31	188	22	13	216	85	47			
313	14	18.8	44	45	83	65	48	14 10	124	23	961	24	20	156	64	40			
314	14	18.9	18	45	15	68	18	14 24	293	238	620	20	26	210	79	47			
315	14	18.9	17	55	13	67	18	14 24	294	194	620	20	31	101	54	39	1899	4	0
316	14	20.5	48	45	90	62	48	14 10	112	238	1021	22	26	183	94	61	1904	3	2
317	14	21.7	17	45	14	67	18	14 24	258	184	620	16	32	167	73	48	1906	5	0
318	14	21.9	26	35	36	69	30	14 18	177	14	692	16	9	106	55	44	1908	5	1
319	14	22.4	-14	45	334	42	-12	14 24	261	49	116	15	17	127	51	28			
320	14	22.6	26	55	37	69	30	14 18	168	31	692	15	7	84	54	39	1912	5	1
321	14	24.5	16	55	13	66	18	14 24	223	139	548	12	7	292	151	46	1913	4	1
322	14	25.9	17	35	14	66	18	14 24	205	174	548	10	3	34	55	45			
323	14	27.0	0	35	348	54	0	14 24	198	228	332	8	15	96	54	38			
324	14	28.3	-1	35	347	52	0	14 24	180	112	332	6	28	66	57	40			
325	14	28.5	25	53	35	68	24	14 18	97	298	693	34	13	109	56	40	1927	4	1
326	14	30.4	4	5	354	56	6	14 24	152	93	404	3	24	122	52	38			
327	14	31.7	3	55	354	56	6	14 24	134	84	405	31	25	131	68	47			
328	14	32.0	17	34	16	64	18	14 24	128	173	549	30	3	109	61	39			
329	14	33.8	24	55	33	66	24	14 18	33	246	693	27	19	129	53	35			
330	14	35.2	45	22	80	62	48	14 44	288	57	962	32	16	106	59	38			
331	14	38.3	14	25	12	61	12	14 24	46	326	549	21	22	107	53	37			
332	14	38.3	3	45	356	55	6	14 24	45	75	405	21	26	139	72	51			
333	14	43.7	-8	35	345	45	-6	14 48	297	57	189	13	10	150	80	49	1964	5	0
334	14	47.1	11	25	9	58	12	14 48	244	164	477	8	10	69	63	47			
335	14	47.8	9	45	6	57	12	14 48	237	74	477	7	20	97	53	37			
336	14	49.5	30	53	48	64	30	14 44	156	243	766	32	13	115	53	37	1982	5	0
337	14	49.9	17	24	20	60	18	14 48	205	163	622	33	34	73	54	44			
338	14	50.5	18	24	22	61	18	14 48	196	216	622	32	28	123	59	41			
339	14	50.6	16	54	19	60	18	14 48	196	136	550	32	7	201	104	75	1983	3	1
340	14	51.7	22	14	29	62	24	14 44	130	100	622	30	5	127	51	35	1986	5	1
341	14	52.6	18	54	23	60	18	14 48	170	243	622	29	25	186	100	66	1991	3	1
342	14	53.6	9	35	8	56	12	14 48	160	65	478	28	21	66	57	41			
343	14	58.8	32	25	51	62	30	14 44	50	326	838	20	34	207	73	40			
344	14	59.3	47	33	80	58	48	14 44	64	172	1022	7	33	104	57	37	2018	5	1
345	15	1.0	8	5	7	53	6	14 48	62	306	478	17	30	105	67	46	2020	4	0
346	15	2.6	26	15	39	60	24	15 10	311	316	694	15	11	119	62	41			
347	15	2.7	28	45	44	61	30	15 10	306	128	766	15	26	118	85	60	2022	3	1
348	15	2.9	36	5	59	60	36	14 56	139	198	838	15	12	135	77	56			
349	15	5.0	8	5	8	52	6	15 12	327	306	478	11	30	55	52	42			
350	15	6.2	36	14	59	60	36	14 56	103	207	838	11	11	103	51	38			

TABLE 1A—*Continued*

NO	RA		DEC		L2	B2	PSS			X	Y	S-W	X	Y	C1	C2	C3	ABELL		
	1950.						FLD			MM		FLD							D	R
351	15	6.4	27	24	41	60	30	15	10	264	55	694	10	4	99	52	39			
352	15	7.7	3	15	3	49	6	15	12	295	46	406	7	29	61	50	38			
353	15	7.7	7	55	9	52	6	15	12	291	296	478	7	31	116	71	51	2028	4	1
354	15	8.4	5	55	6	51	6	15	12	284	189	406	6	13	284	133	36	2029	4	2
355	15	9.0	4	45	5	50	6	15	12	276	126	406	5	20	113	64	53			
356	15	9.0	5	25	6	50	6	15	12	275	162	406	5	16	125	63	46			
357	15	9.1	18	14	25	57	18	15	12	265	206	623	34	29	137	58	41	2036	4	0
358	15	9.6	6	25	7	51	6	15	12	267	215	407	34	10	64	55	49	2033	4	0
359	15	9.6	5	45	7	50	6	15	12	267	180	407	34	14	67	52	59			
360	15	10.2	8	15	10	52	6	15	12	258	314	479	33	29	85	51	36			
361	15	10.4	7	35	9	51	6	15	12	256	278	478	3	33	145	85	59	2040	4	1
362	15	10.9	18	24	25	56	18	15	12	242	215	622	3	28	116	54	40			
363	15	11.0	4	55	6	49	6	15	12	250	135	407	32	19	80	89	68			
364	15	11.2	18	4	25	56	18	15	12	238	197	623	31	30	95	60	48			
365	15	13.0	4	35	6	49	6	15	12	223	117	407	29	21	289	116	25	2048	4	1
366	15	15.0	7	25	10	50	6	15	12	195	269	407	26	4	120	94	65	2052	3	0
367	15	15.7	4	55	7	49	6	15	12	187	135	407	25	19	135	97	74			
368	15	15.9	27	5	41	57	30	15	10	151	36	695	24	6	145	60	36			
369	15	16.3	6	25	9	49	6	15	12	178	215	407	24	10	93	64	42	2055	4	0
370	15	16.4	33	25	53	58	36	15	24	300	56	839	23	28	86	50	38			
371	15	17.0	4	35	7	48	6	15	12	169	117	407	23	21	191	123	94			
372	15	17.7	5	15	8	48	6	15	12	160	152	407	22	17	113	75	54			
373	15	18.1	29	5	45	57	30	15	10	125	143	767	21	24	122	57	38	2059	5	1
374	15	19.0	7	55	11	50	6	15	12	142	295	479	20	31	209	85	55			
375	15	19.0	2	35	5	46	0	15	12	143	331	407	20	33	82	54	38			
376	15	19.6	32	15	51	57	30	15	10	108	313	767	19	5	172	78	49	2062	5	1
377	15	19.6	30	55	48	57	30	15	10	107	242	767	19	13	201	114	79	2061	4	1
378	15	20.3	8	45	13	50	12	15	12	123	18	479	18	26	156	102	70	2063	3	1
379	15	20.4	27	35	42	57	30	15	10	97	63	695	18	3	26	60	64			
380	15	20.4	27	55	43	57	30	15	10	98	81	767	18	31	443	184	58	2065	3	2
381	15	20.4	28	45	44	57	30	15	10	98	126	767	18	26	94	60	46			
382	15	21.2	31	15	49	57	30	15	10	89	260	767	17	11	216	100	66	2067	4	1
383	15	22.7	30	5	47	56	30	15	10	71	197	767	15	18	163	91	71	2069	5	2
384	15	25.0	4	5	8	46	6	15	12	62	89	407	11	24	150	77	53			
385	15	25.7	29	5	45	56	30	15	10	35	144	767	11	24	131	87	63	2079	3	1
386	15	26.6	30	44	48	56	30	15	10	27	233	767	10	14	98	67	51	2083	5	1
387	15	27.1	7	45	13	48	6	15	12	34	286	479	8	32	161	64	39			
388	15	28.2	29	13	46	55	30	15	36	310	151	768	34	23	93	59	47			
389	15	29.7	4	55	10	46	6	15	36	320	133	407	4	19	112	65	43			
390	15	31.0	28	13	44	54	30	15	36	279	97	767	4	29	108	60	40	2089	4	1
391	15	31.3	31	23	49	55	30	15	36	270	266	767	4	10	163	83	53	2092	4	1
392	15	37.5	21	55	34	52	24	15	36	206	79	624	22	7	160	75	46	2107	4	1
393	15	42.9	36	15	58	52	36	15	52	310	205	840	15	11	193	87	51	2122	5	1
394	15	50.9	27	43	44	50	30	15	36	43	69	768	4	32	72	78	62			
395	15	52.1	27	34	44	50	30	15	36	28	61	769	29	33	147	56	39			
396	15	53.3	41	44	66	50	42	16	0	272	176	905	26	8	112	52	34			
397	15	54.7	20	15	34	47	18	16	0	293	310	625	26	17	121	63	41			
398	15	55.5	16	25	29	46	18	16	0	286	104	553	25	10	109	51	31			
399	15	55.8	28	55	47	49	30	16	2	290	132	769	24	25	98	51	33			
400	15	55.9	27	25	44	49	30	16	2	292	51	769	24	34	96	69	55	2142	4	2
401	15	56.1	18	15	31	46	18	16	0	276	203	625	24	29	118	62	44			
402	15	59.7	16	5	29	45	18	16	0	233	86	553	19	12	160	79	62	2147	1	1
403	16	0.6	54	5	84	46	54	15	50	108	193	1075	18	24	172	71	42	2149	4	0
404	16	1.0	16	15	29	44	18	16	0	215	94	553	17	11	93	85	77			
405	16	2.4	17	35	31	45	18	16	0	196	165	553	15	3	53	66	71			
406	16	3.1	16	35	30	44	18	16	0	188	112	553	14	9	154	97	75	2152	1	1
407	16	3.1	17	55	32	45	18	16	0	187	183	625	14	31	285	145	50	2151	1	2
408	16	3.8	15	45	29	44	18	16	0	180	67	553	13	14	144	98	66			
409	16	10.4	29	44	48	46	30	16	2	119	173	770	31	20	77	61	47	2162	1	0
410	16	11.3	31	3	50	46	30	16	2	109	244	769	4	12	130	68	43			
411	16	15.5	35	5	56	46	36	16	20	260	138	842	24	18	113	81	58			
412	16	16.2	50	31	78	45	48	16	26	277	323	1025	3	15	102	66	48			
413	16	17.4	53	30	82	44	54	16	28	275	162	1075	3	27	105	51	36			
414	16	20.1	57	44	88	43	60	16	8	100	66	1117	12	32	68	56	42			
415	16	26.2	41	5	65	44	42	16	30	243	137	906	16	12	69	58	48			
416	16	27.0	39	45	63	44	42	16	30	237	65	906	15	20	166	91	65	2199	1	2
417	16	28.0	40	45	64	44	42	16	30	226	118	906	14	14	78	60	49			
418	16	31.9	50	34	78	42	48	16	26	144	323	1026	11	15	191	69	40			
419	16	33.7	26	34	46	40	24	16	28	151	323	699	27	9	74	55	43			
420	16	35.4	44	22	69	42	42	16	30	149	312	967	32	22	124	53	33			

TABLE 1B

Shane-Wirtanen Clusters of Galaxies: South Galactic Cap

NO	RA 1950.		DEC		L2	B2	PSS FLD			X MM	Y	S-W FLD	X	Y	C1	C2	C3	ABELL	D	R
426	21	37.5	-22	35	28	-47	-24	21	40	271	226	66	22	34	100	61	45			
427	21	38.3	-16	55	36	-45	-18	21	36	211	209	138	21	30	100	53	34			
428	21	39.7	-8	35	47	-42	-12	21	36	191	334	210	19	10	117	59	44			
429	21	40.3	-7	5	48	-41	-6	21	36	182	93	282	18	31	173	79	50	2366	4	0
430	21	41.7	-7	25	48	-41	-6	21	36	164	75	210	16	3	94	51	39			
431	21	42.5	-20	15	32	-47	-18	21	36	158	30	66	15	20	144	66	39	2372	5	0
432	21	43.7	-10	25	45	-43	-12	21	36	138	235	210	13	21	111	114	86	2377	5	2
433	21	48.4	-7	25	49	-43	-6	21	36	75	74	210	6	3	76	64	45			
434	21	49.3	-15	54	39	-47	-18	21	36	69	262	139	34	24	193	99	61	2382	4	1
435	21	49.6	-19	44	34	-48	-18	21	36	69	56	66	5	17	228	85	43	2384	4	1
436	21	49.7	-7	15	50	-43	-6	21	36	57	83	282	4	32	32	51	44			
437	21	52.8	-12	15	44	-46	-12	21	36	19	136	211	29	32	49	53	41			
438	21	52.9	-9	45	47	-45	-12	21	36	16	270	211	29	17	76	60	50			
439	21	55.0	-8	5	50	-45	-6	22	0	307	38	211	26	7	263	143	96	2399	3	1
440	21	56.1	-20	15	34	-50	-18	22	0	288	28	67	24	20	163	86	54	2401	5	1
441	21	59.7	-10	5	48	-47	-12	22	0	244	252	211	19	19	131	78	59	2410	4	1
442	22	0.3	-6	45	52	-45	-6	22	0	235	109	283	18	29	133	50	28			
443	22	3.0	-5	45	54	-45	-6	22	0	199	163	283	14	23	148	67	39	2415	4	0
444	22	7.2	-13	5	46	-50	-12	22	0	146	91	139	8	7	117	68	43			
445	22	7.8	-12	25	47	-49	-12	22	0	137	127	139	7	3	145	73	47	2420	5	2
446	22	9.1	-19	14	37	-53	-18	22	0	124	83	68	34	14	130	54	34			
447	22	12.2	-10	35	50	-50	-12	22	0	79	225	212	30	22	207	90	58	2426	5	2
448	22	13.6	-10	15	51	-50	-12	22	0	60	242	212	28	20	76	65	50			
449	22	18.3	-12	35	48	-52	-12	22	24	314	116	212	21	34	98	54	37			
450	22	23.0	-2	25	62	-47	0	22	24	252	18	356	14	33	87	53	36			
451	22	24.4	-12	5	50	-53	-12	22	24	233	144	212	12	31	96	50	36			
452	22	29.1	-8	45	56	-52	-12	22	24	171	323	212	5	11	106	54	31	2448	4	0
453	22	33.0	1	15	69	-47	0	22	24	117	215	357	29	11	115	72	48	2457	4	1
454	22	34.1	-16	5	46	-57	-18	22	24	108	250	141	27	25	193	89	58	2459	4	0
455	22	37.6	-17	35	44	-58	-18	22	24	65	169	69	22	4	151	64	36			
456	22	43.7	-5	35	64	-53	-6	22	48	296	169	285	13	22	112	54	38			
457	22	44.5	-17	55	45	-60	-18	22	48	282	151	69	12	6	117	52	33			
458	22	48.1	-18	54	44	-61	-18	22	48	236	98	69	7	12	73	51	36			
459	22	49.0	-20	34	40	-62	-24	22	32	24	330	70	34	22	92	55	40			
460	22	49.1	-18	34	44	-61	-18	22	48	223	116	70	34	10	169	69	38			
461	22	51.3	-17	54	46	-61	-18	22	48	196	152	70	31	6	171	58	31			
462	22	59.0	6	45	81	-47	6	22	48	90	187	430	20	8	55	64	48			
463	22	59.7	-8	45	64	-58	-12	22	48	84	321	214	19	11	92	53	37			
464	23	3.8	-13	45	57	-62	-12	22	48	33	52	142	13	11	112	60	37	2529	5	2
465	23	6.0	-20	15	44	-65	-18	23	12	311	25	70	10	20	135	66	50	2538	5	1
466	23	6.5	-11	45	61	-61	-12	23	12	311	159	214	9	29	123	55	34			
467	23	7.7	7	15	84	-48	6	23	12	294	213	430	7	5	179	106	67			
468	23	7.8	-11	5	63	-61	-12	23	12	293	195	214	7	25	162	58	34	2544	5	0
469	23	8.2	-20	44	44	-66	-24	22	58	109	321	70	7	23	94	52	39	2548	5	1
470	23	9.7	-21	54	41	-67	-24	22	58	91	258	70	5	30	84	72	50	2554	5	3
471	23	13.2	-20	44	45	-67	-24	22	58	45	320	71	28	23	109	54	35	2566	5	1
472	23	13.7	-2	45	76	-56	-6	23	12	216	320	287	28	5	111	70	50			
473	23	14.3	9	35	88	-46	12	23	12	206	16	503	27	21	133	58	39			
474	23	14.6	-22	35	40	-68	-24	22	58	30	221	71	26	34	79	52	36	2568	5	0
475	23	14.9	-13	5	61	-64	-12	23	12	200	88	143	26	7	99	53	33	2569	5	1
476	23	16.3	-2	35	77	-57	-6	23	12	180	329	359	24	34	88	59	42	2571	6	1
477	23	18.9	-21	35	44	-69	-24	23	24	298	275	71	20	28	95	51	34	2579	5	1
478	23	21.7	14	25	93	-43	12	23	12	108	276	575	16	22	122	67	49	2593	3	0
479	23	21.7	17	45	95	-40	18	23	12	109	133	647	16	32	87	52	37	2592	5	0
480	23	21.8	-22	25	42	-70	-24	23	24	262	230	71	16	33	104	50	35			
481	23	24.4	-12	35	66	-65	-12	23	12	75	114	215	12	34	107	52	31			
482	23	26.3	-2	25	81	-58	0	23	12	46	16	287	9	3	108	59	42			
483	23	30.3	-1	35	84	-58	0	23	36	314	61	360	33	28	117	57	39			
484	23	36.8	-22	35	45	-73	-24	23	24	77	221	72	23	34	126	68	51			
485	23	36.9	-15	35	65	-70	-18	23	36	225	275	144	23	22	139	60	38			
486	23	42.4	8	55	97	-50	6	23	36	153	302	504	15	25	108	59	40	2657	3	1
487	23	45.0	-2	45	88	-61	-6	23	36	117	320	288	11	5	77	56	39			
488	23	46.7	-20	15	56	-74	-18	23	36	100	25	72	9	20	64	64	43			
489	23	48.4	5	55	97	-54	6	23	36	72	141	432	6	13	76	51	36	2665	4	0
490	23	49.6	-20	54	55	-75	-24	23	50	239	312	72	5	24	126	64	40			
491	23	51.5	-10	45	81	-69	-12	23	36	33	212	145	31	23	196	118	71	2670	4	3
492	23	53.0	-1	45	93	-61	0	0	0	332	51	289	29	29	98	67	47			
493	23	53.3	-18	25	65	-74	-18	0	0	320	122	1	28	9	152	52	33			
494	23	55.4	-19	45	62	-76	-18	0	0	292	51	1	25	17	130	66	46			
495	23	55.7	1	5	97	-59	0	0	0	296	204	289	25	12	112	52	31			

TABLE 1B—*Continued*

NO	RA	1950.	DEC		L2	B2	PSS FLD			X	Y MM	S-W FLD	X	Y	C1	C2	C3	ABELL	D	R
496	23	56.8	-21	5	58	-77	-24	0	0	274	301	1	23	25	169	73	46	2686	5	1
497	0	1.0	1	55	100	-58	0	0	0	225	248	289	17	7	115	51	29	2700	4	1
498	0	1.8	-18	55	69	-76	-18	0	0	212	96	1	16	12	178	77	45			
499	0	2.3	0	15	99	-60	0	0	0	207	159	289	15	17	105	62	39			
500	0	11.1	-19	44	72	-78	-18	0	0	93	52	2	31	17	326	124	19	0013	5	2
501	0	11.7	-0	15	103	-61	0	0	0	82	132	290	31	20	83	51	36			
502	0	14.3	6	35	108	-55	6	0	0	47	177	362	27	9	169	81	50	0016	5	2
503	0	14.3	-0	45	104	-62	0	0	0	46	105	290	27	23	199	81	50			
504	0	15.7	1	25	106	-60	0	0	0	28	221	290	25	10	110	55	44			
505	0	15.7	-1	45	104	-63	0	0	0	28	51	290	25	29	62	57	43			
506	0	16.9	-17	25	85	-78	-18	0	24	326	176	2	23	3	139	60	34			
507	0	17.7	4	35	108	-57	6	0	24	323	70	362	22	21	147	51	27			
508	0	19.0	-1	15	106	-63	0	0	24	305	78	290	20	26	123	87	59	0023	5	0
509	0	21.0	-1	5	108	-63	0	0	24	278	87	290	17	25	122	70	54			
510	0	21.0	-1	55	107	-64	0	0	24	278	43	290	17	30	93	74	52			
511	0	22.5	-21	5	78	-81	-24	0	26	276	301	2	15	25	144	70	49	0027	5	0
512	0	27.0	-0	25	111	-63	0	0	24	198	123	290	8	21	262	111	69			
513	0	27.1	11	35	115	-51	12	0	24	196	123	434	8	9	120	77	51	0044	5	1
514	0	29.0	2	15	113	-60	0	0	24	171	266	290	5	5	116	70	46			
515	0	29.6	-5	25	110	-68	-6	0	24	162	177	219	34	21	181	56	33			
516	0	29.7	1	5	113	-61	0	0	24	162	204	291	34	12	110	60	40			
517	0	30.9	-6	55	110	-69	-6	0	24	145	97	219	32	30	131	54	36			
518	0	31.7	-2	25	113	-65	0	0	24	135	16	219	31	3	395	169	51			
519	0	32.3	-3	5	113	-65	-6	0	24	126	302	219	30	7	100	57	46			
520	0	33.0	1	25	115	-61	0	0	24	117	222	291	29	10	137	60	43			
521	0	33.7	-2	25	114	-65	0	0	24	108	16	219	28	3	78	53	45			
522	0	35.0	-7	45	113	-70	-6	0	24	91	52	147	26	5	153	60	36			
523	0	36.8	-22	35	92	-84	-24	0	26	99	222	3	23	34	206	98	60	0074	4	0
524	0	37.7	6	35	118	-56	6	0	24	56	177	363	22	9	126	68	48	0076	3	0
525	0	38.9	21	5	120	-41	18	0	24	48	312	579	20	12	101	56	37	0084	5	1
526	0	39.7	-9	45	115	-72	-12	0	24	29	266	147	19	17	97	93	73	0085	4	1
527	0	40.4	-22	5	102	-84	-24	0	26	53	248	3	18	31	187	73	44	0086	4	0
528	0	41.1	-22	35	102	-85	-24	0	26	45	221	3	17	34	82	64	43			
529	0	41.7	0	45	119	-62	0	0	48	323	186	291	16	14	88	59	38			
530	0	41.8	-18	55	112	-81	-18	0	48	312	96	3	16	12	85	53	41	0093	5	0
531	0	43.2	-18	35	114	-81	-18	0	48	294	114	3	14	10	130	56	37			
532	0	43.7	-0	15	120	-63	0	0	48	296	132	291	13	20	107	53	33			
533	0	43.7	-1	15	120	-64	0	0	48	296	79	291	13	26	101	54	41	0095	5	1
534	0	43.9	20	15	121	-42	18	0	48	288	267	579	13	17	168	86	53	0098	5	3
535	0	45.3	-19	45	117	-82	-18	0	48	266	52	3	11	17	70	53	43			
536	0	45.7	1	5	121	-62	0	0	48	269	204	291	10	12	117	62	42	0102	3	0
537	0	46.1	-21	35	116	-84	-24	0	52	305	275	3	10	28	154	63	39			
538	0	46.7	-19	35	119	-82	-18	0	48	248	61	3	9	16	130	64	44			
539	0	47.0	-4	25	122	-67	-6	0	48	250	231	219	8	15	119	58	42			
540	0	47.5	-21	54	119	-84	-24	0	52	286	257	3	8	30	90	60	48			
541	0	49.1	-8	45	123	-71	-12	0	48	222	321	147	5	11	117	54	37			
542	0	50.8	-13	24	125	-76	-12	0	48	199	71	76	32	9	130	59	38			
543	0	51.0	-22	4	128	-85	-24	0	52	243	249	4	31	31	145	88	62	0114	4	0
544	0	51.7	-3	45	125	-66	-6	0	48	189	267	220	31	11	123	72	60			
545	0	51.9	-19	44	128	-82	-18	0	48	183	53	4	30	17	84	50	41			
546	0	52.6	-19	24	129	-82	-18	0	48	174	71	4	29	15	104	57	43			
547	0	52.9	-11	15	126	-74	-12	0	48	172	187	148	29	26	98	53	41			
548	0	53.0	0	25	125	-62	0	0	48	171	168	292	29	16	157	73	47	0116	4	0
549	0	53.6	-10	15	127	-73	-12	0	48	162	240	148	28	20	227	114	81	0117	4	0
550	0	53.7	-1	35	126	-64	0	0	48	162	61	292	28	28	259	163	116	0119	3	1
551	0	54.3	-3	5	126	-66	-6	0	48	153	303	220	27	7	108	62	46			
552	0	54.8	-16	45	130	-79	-18	0	48	146	213	76	26	29	134	56	37	0120	5	1
553	0	55.0	7	45	126	-55	6	0	48	146	240	436	26	32	120	58	37			
554	0	55.0	-0	45	126	-63	0	0	48	144	106	292	26	23	137	60	41			
555	0	55.6	-6	15	128	-69	-6	0	48	135	133	220	25	26	66	59	43			
556	0	56.2	12	35	126	-50	12	0	48	130	177	436	24	3	73	72	49			
557	0	56.9	-14	35	132	-77	-18	0	48	119	330	76	23	16	82	53	40	0126	5	1
558	0	57.6	-15	25	133	-78	-18	0	48	110	285	76	22	21	129	52	35			
559	0	58.3	-12	35	132	-75	-12	0	48	100	115	76	21	4	102	57	41			
560	0	58.3	-12	5	132	-75	-12	0	48	100	142	148	21	31	201	64	35			
561	0	58.3	-3	15	129	-66	-6	0	48	99	294	220	21	8	166	102	74			
562	0	58.3	-2	25	129	-65	0	0	48	99	16	220	21	3	154	68	45			
563	0	58.9	-19	45	140	-82	-18	0	48	94	52	4	20	17	176	63	35			
564	1	0.4	-22	5	149	-84	-24	0	52	127	249	4	18	31	201	92	59	0133	4	0
565	1	1.0	-1	55	130	-64	0	0	48	63	43	292	17	30	82	60	43			

TABLE 1B—*Continued*

NO	RA	1950.	DEC		L2	B2	PSS FLD			X MM	Y	S-W FLD	X	Y	C1	C2	C3	ABELL	D	R
566	1	1.0	-2	35	130	-65	-6	0	48	63	330	292	17	34	64	57	46	0134	4	0
567	1	2.3	-1	5	130	-63	0	0	48	46	88	292	15	25	56	62	48			
568	1	2.4	-12	35	136	-75	-12	0	48	47	114	76	15	4	130	62	45			
569	1	5.7	1	55	131	-60	0	1	12	323	249	292	10	7	155	95	64	0147	3	0
570	1	6.5	12	55	130	-49	12	1	12	310	196	508	9	31	180	74	44	0150	5	1
571	1	6.6	-15	45	143	-78	-18	1	12	303	267	76	9	23	322	200	86	0151	3	1
572	1	8.7	17	24	130	-45	18	1	12	280	115	508	6	4	145	79	53	0154	3	1
573	1	9.2	-17	24	149	-79	-18	1	12	268	178	77	34	33	49	64	50			
574	1	9.2	16	34	130	-46	18	1	12	274	70	509	34	9	152	64	48	0158	4	0
575	1	9.9	16	4	130	-46	18	1	12	264	43	509	33	12	108	70	53			
576	1	10.0	15	14	130	-47	12	1	12	264	321	508	4	17	110	77	53	0160	4	0
577	1	10.2	-19	14	155	-80	-18	1	12	254	80	4	4	14	154	60	33			
578	1	10.3	-0	35	135	-63	0	1	12	260	115	293	33	22	103	58	43			
579	1	10.8	-16	44	149	-78	-18	1	12	248	214	76	3	29	99	54	45			
580	1	11.4	-13	24	145	-75	-12	1	12	241	71	77	31	9	112	62	44			
581	1	13.0	-0	5	136	-62	0	1	12	225	142	293	29	19	175	116	86	0168	3	2
582	1	13.4	16	5	131	-46	18	1	12	220	44	509	28	12	91	62	47	0171	4	0
583	1	14.1	-16	15	152	-77	-18	1	12	206	241	77	27	26	133	73	49			
584	1	14.8	-13	55	148	-75	-12	1	12	197	44	77	26	12	89	52	40			
585	1	16.9	14	35	133	-47	12	1	12	175	285	509	23	21	126	60	37	0175	5	2
586	1	17.0	-0	25	138	-62	0	1	12	171	125	293	23	21	70	62	50			
587	1	18.3	-14	5	152	-75	-12	1	12	152	35	77	21	13	149	78	55			
588	1	19.7	-2	55	141	-64	-6	1	12	135	312	221	19	6	162	68	39			
589	1	21.0	1	15	139	-60	0	1	12	118	214	293	17	11	132	65	47	0189	4	1
590	1	22.4	8	25	137	-53	6	1	12	101	277	437	15	28	211	89	52	0193	4	1
591	1	23.0	1	35	140	-60	0	1	12	91	232	293	14	9	114	65	52			
592	1	23.0	-1	35	142	-63	0	1	12	90	62	293	14	28	148	82	56	0194	1	0
593	1	23.0	-8	15	147	-69	-6	1	12	90	26	149	14	8	110	56	40			
594	1	23.8	-13	45	155	-74	-12	1	12	81	53	77	13	11	163	75	52			
595	1	27.2	-12	25	156	-73	-12	1	12	36	125	77	8	3	97	60	41			
596	1	29.3	-15	14	163	-75	-18	1	36	319	295	78	34	20	196	69	44			
597	1	30.7	-14	24	162	-74	-12	1	36	302	18	78	32	15	96	66	49			
598	1	32.3	-0	55	146	-62	0	1	36	287	98	294	30	24	155	62	41			
599	1	32.8	-12	35	160	-72	-12	1	36	275	116	150	29	34	75	63	47			
600	1	34.2	-14	5	164	-73	-12	1	36	257	36	78	27	13	120	74	51			
601	1	34.9	-9	25	156	-69	-12	1	36	249	286	150	26	15	100	67	48			
602	1	35.0	-0	35	147	-61	0	1	36	251	116	294	26	22	100	51	34			
603	1	37.0	-5	25	153	-65	-6	1	36	223	179	222	23	21	80	57	44			
604	1	38.3	-7	35	156	-67	-6	1	36	205	63	150	21	4	128	53	35			
605	1	39.7	7	25	144	-53	6	1	36	190	224	438	19	34	149	64	39	0240	3	0
606	1	43.7	-0	55	152	-60	0	1	36	135	99	294	13	24	90	51	33			
607	1	44.5	-15	25	173	-72	-18	1	36	123	287	78	12	21	53	51	40			
608	1	45.0	-4	5	155	-63	-6	1	36	116	251	222	11	13	98	53	36	0256	5	1
609	1	46.5	13	45	144	-47	12	1	36	102	242	510	9	26	100	58	44	0257	5	1
610	1	49.6	-8	44	163	-66	-12	1	36	56	323	151	34	11	74	51	33			
611	1	50.4	-7	35	162	-65	-6	1	36	44	64	150	3	4	124	55	39			
612	1	52.3	-6	35	162	-64	-6	1	36	19	117	223	30	28	195	86	50	0274	4	3
613	1	52.9	-7	35	163	-65	-6	2	0	329	63	223	29	34	142	85	61	0277	3	1
614	1	54.3	-6	5	162	-64	-6	2	0	312	144	223	27	25	121	58	37	0281	5	0
615	1	57.6	-15	55	181	-70	-18	2	0	263	260	79	22	24	130	61	40			
616	1	59.7	-1	25	159	-59	0	2	0	242	73	295	19	27	69	52	40	0295	5	1
617	2	2.4	-13	5	177	-68	-12	2	0	202	91	79	15	7	129	54	38			
618	2	3.8	-13	35	178	-68	-12	2	0	184	64	79	13	10	152	78	50			
619	2	5.8	-13	15	179	-67	-12	2	0	157	83	79	10	8	143	54	35			
620	2	8.4	-6	45	169	-62	-6	2	0	124	110	223	6	29	142	61	38			
621	2	9.7	-2	35	164	-59	-6	2	0	108	333	296	34	34	72	55	36			
622	2	23.0	-8	55	178	-61	-12	2	24	247	316	152	14	12	219	83	45			
623	2	23.8	-16	35	192	-66	-18	2	24	233	227	80	13	28	121	57	43			
624	2	26.6	-15	55	191	-65	-18	2	24	198	263	80	9	24	153	60	37			
625	2	29.0	1	5	167	-53	0	2	24	171	209	296	5	12	91	61	45			
626	2	30.3	0	55	168	-53	0	2	24	153	200	296	3	13	70	53	45			
627	2	34.0	-19	35	201	-65	-18	2	24	102	67	9	27	16	224	85	47	0367	5	1
628	2	35.7	1	45	169	-51	0	2	24	82	245	297	25	8	100	56	39			
629	2	39.0	-3	15	175	-54	-6	2	24	36	299	225	20	8	54	54	41			
630	2	43.7	-0	45	174	-52	0	2	48	296	112	297	13	23	80	59	41			
631	2	44.4	5	25	168	-47	6	2	48	288	121	369	12	16	149	52	28			
632	2	53.5	-14	25	195	-58	-12	2	48	160	24	82	28	15	195	65	38			
633	2	55.0	5	45	170	-45	6	2	48	146	140	370	26	14	136	73	50	0400	1	1
634	2	56.3	3	15	173	-47	0	2	48	127	328	370	24	29	117	51	35	0403	6	2
635	2	58.3	-11	5	191	-56	-12	2	48	97	202	154	21	25	102	56	38			

TABLE 1B—*Continued*

NO	RA 1950.		DEC		L2	B2	PSS FLD			X MM	Y	S-W FLD	X	Y	C1	C2	C3	ABELL	D	R
636	3	1.0	-12	15	193	-56	-12	2	48	62	140	154	17	32	72	62	43			
637	3	1.7	-13	35	196	-56	-12	2	48	53	68	82	16	10	105	54	35			
638	3	3.7	-9	55	191	-54	-12	2	48	26	265	154	13	18	61	59	45			
639	3	4.4	-12	15	194	-55	-12	2	48	17	140	154	12	32	106	77	52	0415	4	1
640	3	7.0	-2	35	182	-49	0	3	12	304	15	226	8	4	157	66	44			
641	3	7.1	-11	45	194	-54	-12	3	12	296	167	154	8	29	134	60	39	0420	5	1
642	3	8.5	-12	14	195	-54	-12	3	12	278	141	154	6	32	96	52	36	0423	5	2
643	3	9.0	-2	35	183	-48	0	3	12	277	16	298	5	34	98	57	39			
644	3	12.3	2	25	178	-44	0	3	12	234	284	371	30	34	93	56	38			
645	3	24.3	-2	55	186	-46	-6	3	12	71	321	227	12	6	155	54	32	0437	5	0
646	3	34.3	-7	55	194	-46	-6	3	36	257	54	156	27	6	148	69	39			
647	3	38.3	-2	45	189	-43	-6	3	36	206	331	228	21	5	96	56	37			
648	3	43.0	-7	35	196	-44	-6	3	36	141	73	156	14	4	140	57	31			
649	3	51.6	-8	45	198	-43	-12	3	36	27	333	157	31	11	100	56	34			
650	3	55.0	-5	35	195	-41	-6	4	0	302	181	229	26	22	119	53	33			
651	4	12.8	-13	25	207	-41	-12	4	0	63	85	86	29	9	44	51	38			

greater than the smoothed count in any of the eight surrounding bins. Only clusters at galactic latitude $|b| > 40°$ are included in the catalog. Repeat entries caused by overlap in the Lick survey fields have been removed. The clusters have been numbered sequentially, but there are no clusters numbered 421–425.

The table lists the right ascension and declination for each cluster and the galactic longitude and latitude. Millimeter coordinates on the Palomar Observatory Sky Survey, measured from the southeast corner of the plates, are given for each cluster. The Lick survey field number and the X and Y coordinate of the counting cell for each cluster are also given. The values C1, C2, and C3 are, respectively, the unsmoothed Shane-Wirtanen count value at the position of each cluster, the smoothed count value, and the average of the smoothed count in the eight surrounding bins, in each case multiplied by 10.

Finally, Table 1 lists the corresponding Abell cluster, in the case of a positional coincidence within 20′ (Rood and Sastry 1971). Forty percent of the Shane-Wirtanen clusters are members of the Abell catalog.

Figure 2 shows the positions of the Shane-Wirtanen clusters on equal-area projections of the north and south galactic polar caps. The $-22°.5$ southern declination limit of the survey is responsible for the partial coverage of the south galactic cap.

No clusters are found in the north at declination greater than $57°.5$. Groth and Peebles (1977) discuss large-scale gradients in the Shane-Wirtanen counts. In this region of the sky the average count is ~ 20% lower than the mean for the entire catalog (Groth 1984). It is not clear whether the lack of clusters in this area of the sky is due to a real feature of the galaxy distribution, patchiness of the galactic extinction, or systematic effects in the plate material.

The distribution of clusters in Figure 2 exhibits conspicuous clumps, for example, at the position of the Corona Borealis supercluster (Bahcall and Soneira 1982*a*). The nearby Coma/Abell 1367 supercluster (Gregory and Thompson 1978) is not conspicuous; apparently it is too close to be strongly represented in the distribution of Shane-Wirtanen clusters.

The large void in the distribution of Abell clusters, reported by Bahcall and Soneira (1982*b*), overlaps the edge of the map for the north galactic cap, between latitudes 40° and 50° and running from longitudes $140° < l < 240°$. Fourteen clusters are observed in this region. The expected number is 32, based on the density of clusters in the same interval of galactic latitude but at longitudes $-120° < l < 140°$.

III. VELOCITY DISTRIBUTION

Radial velocities of galaxies in a sample of Shane-Wirtanen clusters have been obtained at the Palomar Observatory 5 m telescope using the Reticon spectrometer (Shectman 1981) on the Cassegrain double spectrograph (Oke and Gunn 1982). In general, a single galaxy in each Shane-Wirtanen cluster is selected on a finding chart made from the Palomar Sky Survey, using an overlay showing the positions of the peak counting cell and several bright stars. Typically a brighter galaxy is chosen within 10′ of the center of the peak counting cell.

The radial velocity sample is complete for Shane-Wirtanen clusters in the south galactic cap, north of declination $-8°.5$. The radial velocities are measured using a cross-correlation technique similar to the one described by Shectman, Stefanik, and Latham (1983). The typical standard deviation of a radial velocity observation should be ~ 50 km s^{-1}. Accurate positions for the measured galaxies, together with a larger sample of radial velocities, will appear in a subsequent publication.

Table 2 lists 97 geocentric velocities in the complete sample area. Velocities for an additional 15 Shane-Wirtanen clusters in the complete sample are available in the data of Hoessel, Gunn, and Thuan (1980). The HGT sample includes Abell clusters of richness class $R \geq 1$ and distance class $D \leq 4$, plus a few Abell clusters of $R = 0$, $D \leq 3$. The $R = 0$ clusters are excluded from the analysis of Bahcall and Soneira (1983).

Figure 3 shows the distribution of radial velocities for the 97 galaxies in Table 2. The median velocity is 17,300 km s^{-1}. Figure 3 also shows the radial velocity distribution of the 19 clusters in the HGT sample within the complete sample area

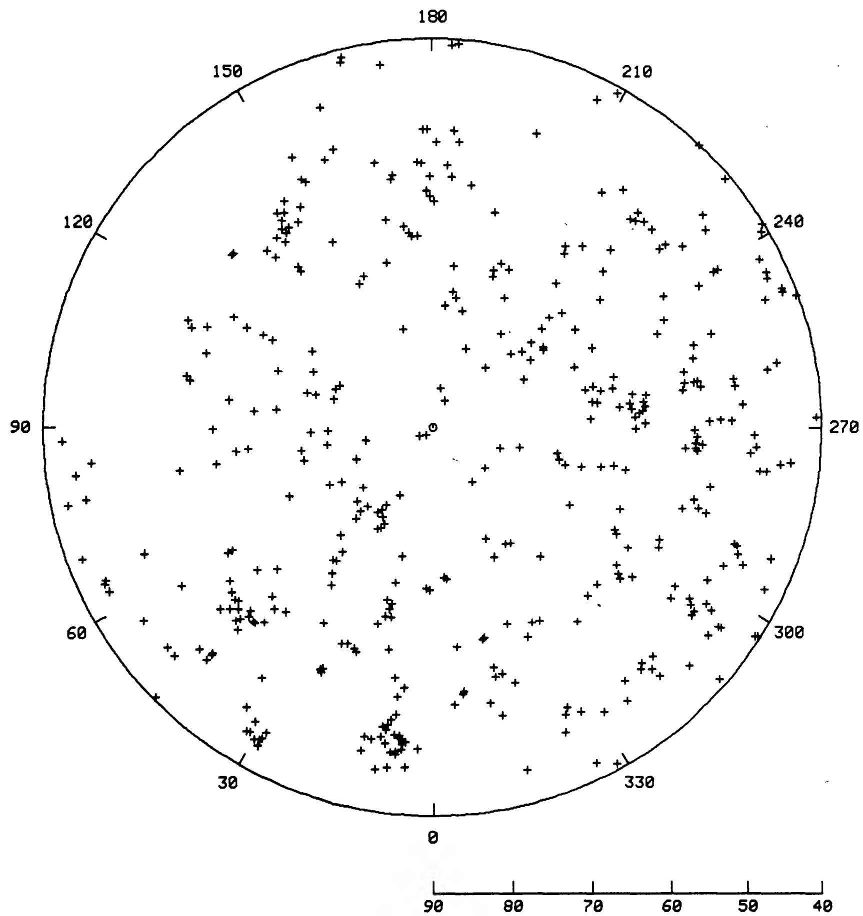

FIG. 2*a*

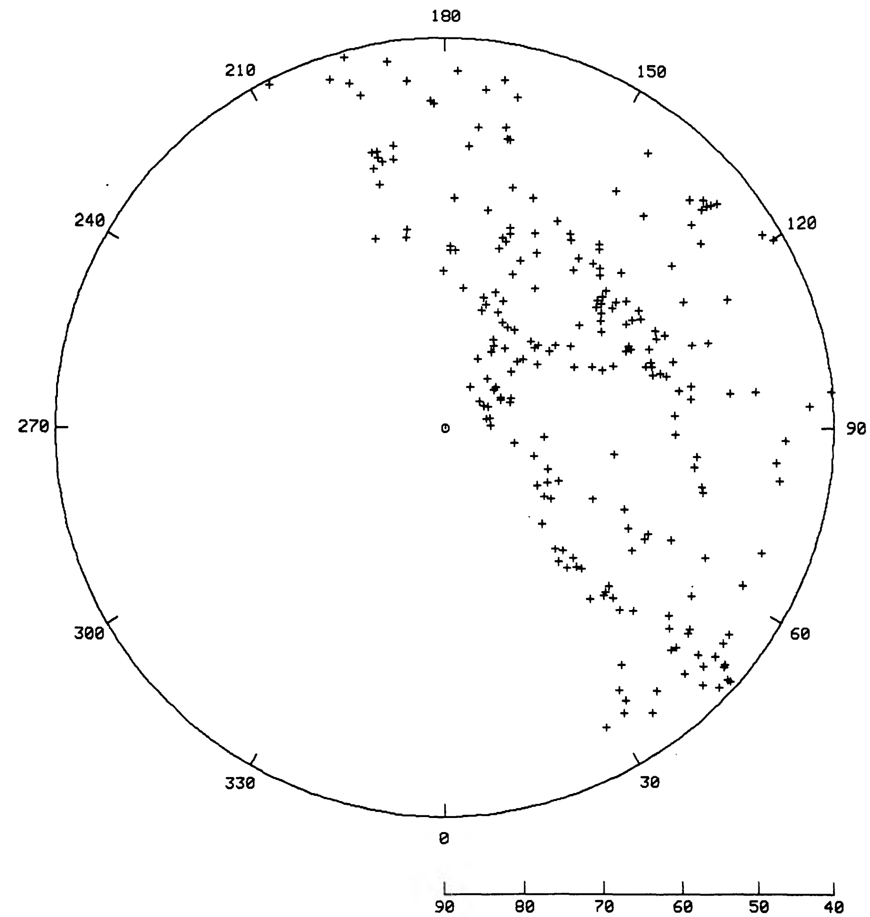

FIG. 2*b*

FIG. 2.—(*a*) Positions of Shane-Wirtanen clusters in the north galactic cap. North galactic pole is marked at the center of the equal-area projection. Galactic longitude is marked around the perimeter of the map. Scale at bottom is for north galactic latitude. (*b*) Positions of Shane-Wirtanen clusters in the south galactic cap. South galactic pole is marked at the center of the equal-area projection. Galactic longitude is marked around the perimeter of the map. Scale at bottom for south galactic latitude.

TABLE 2
RADIAL VELOCITIES[a]

SWC	cz	SWC	cz	SWC	cz
433	27085	516	18026	585-2	38617
436	21072	517	16646	586	5195
442	17043	518	24643	588	16246
443	18156	519	5867	591	9293
450	17384	520	23906	593	20720
456	27237	521	17253	598	25231
462	12268	522	42030	602	16868
467	11822	525	31286	603	14452
472	7517	532	16423	604	22302
473	11898	533	33454	605	16983
476	32336	534	30935	606	23630
478	12540	536	19021	608	12742
479	13875	539	16143	609	21171
482	18104	544	12973	611	17808
483	2568	548	20186	614	26405
487	6996	551	5668	616	12837
489	16865	553	11465	620	12699
492	11385	554	13205	621	11607
495	16312	555	14623	625	6639
499	25593	556	12092	626	6316
501	19604	561	21587	628	6586
502	25128	562	20671	629	20257
503	19381	565	14540	630	13092
504	25499	566	21334	631	20303
505	19400	567	5174	634-1	3157
507	25355	570	17777	634-2	29884
508	31549	574	17367	640	8180
509	19084	575	18404	643	8864
510	19241	576	13214	644	11269
512	17988	578	5253	647	11811
513	16757	582	21703	648	10495
514	24044	585-1	4275	650	19212
515	7585				

[a] In kilometers per second.

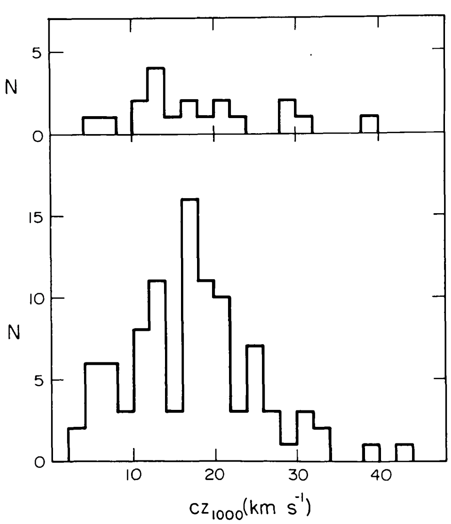

FIG. 3.—Histograms of radial velocities of clusters of galaxies, in a completely sampled region of the south galactic cap. *Top*: radial velocities of Abell clusters in the sample of Hoessel, Gunn, and Thuan (1980). *Bottom*: radial velocities of clusters chosen from the Shane-Wirtanen counts.

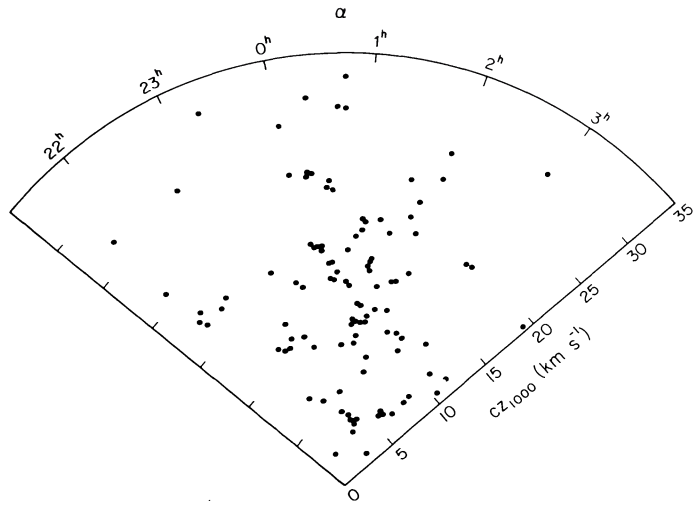

FIG. 4.—Positions of Shane-Wirtanen clusters in right ascension and radial velocity, in a completely sampled region of the south galactic cap.

(four HGT clusters are not Shane-Wirtanen clusters). The median velocity is 17,000 km s^{-1}. The velocity distribution of Shane-Wirtanen clusters is not significantly different than the velocity distribution of Abell clusters in the HGT sample. The space density of Shane-Wirtanen clusters is ~ 6 times greater than the space density of Abell clusters in the HGT sample.

Figure 4 is a pie-diagram in right ascension and radial velocity of the 112 Shane-Wirtanen clusters in the complete sample area. The boundaries of the sample area in galactic latitude and declination cause the distribution of right ascensions to concentrate toward the middle of the range. A casual inspection of Figure 4 indicates that, along some lines of sight, clusters are present at several different distances. Conceivably, the superposition of clouds of galaxies at very different distances along the line of sight can enhance the likelihood of detecting clusters in the Shane-Wirtanen counts. Preliminary analysis indicates that the background count rises by at most 1.0 galaxy per counting cell, along the lines of sight in the complete sample area which are most densely populated with Shane-Wirtanen clusters. Lucey (1983) discusses similar effects in the Abell catalog.

IV. ANGULAR CORRELATION

Figure 5 shows the latitude distribution of Shane-Wirtanen clusters in the north galactic cap. The surface density of clusters appears to be roughly constant north of galactic latitude 50°, but there are fewer clusters between latitudes $40° < b < 50°$. Some of the deficit may be attributable to features in the large-scale distribution of clusters, but most of the deficit is likely to be due to the changing sensitivity of the Shane-Wirtanen counts at low galactic latitude. The analysis of the angular correlation function is restricted to the 488 Shane-Wirtanen clusters in the north and south galactic caps at latitudes $|b| > 50°$.

The clusters are divided into three nearly equal samples: the north galactic cap at longitudes $0° < l < 180°$, the north galactic cap at longitudes $180° < l < 360°$, and the south

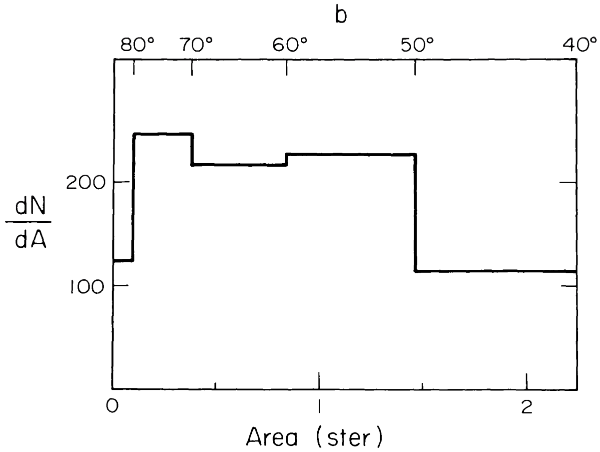

FIG. 5.—Latitude distribution of Shane-Wirtanen clusters in the north galactic cap. Area is measured from the north galactic pole.

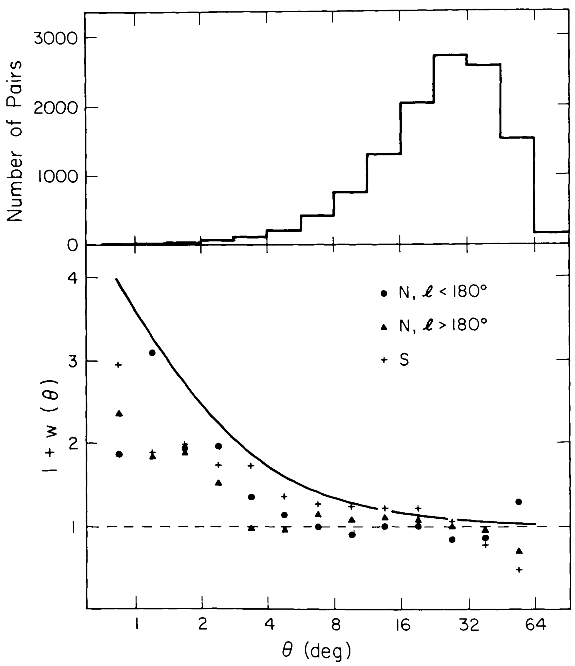

FIG. 6.—Angular correlation function for Shane-Wirtanen clusters. *Top*: typical distribution of random pair separations. *Bottom*: angular correlation for three samples of Shane-Wirtanen clusters. Solid line is the angular correlation function derived by Bahcall and Soneira (1983) for Abell clusters of distance class 4.

galactic cap. A Monte Carlo calculation is used to generate the expected distribution of random pair separations in each sample, normalized to the total number of possible pairs in each sample, $n(n-1)/2$. If $w(\theta)$ is the two-point angular correlation function, the quantity $1+w(\theta)$ is the ratio of the actual number of pairs at each separation to the random value.

Figure 6 shows the quantity $1+w(\theta)$ for each of the three areas, along with a typical distribution function for the separations of random pairs. The solid line is the relation given by Bahcall and Soneira (1983), based upon their determination of the angular correlation function for $D \leq 4$ Abell clusters. At angular separations less than 4°, the correlation of Shane-Wirtanen clusters is clearly detected, at about one-half the amplitude for $w(\theta)$ given by Bahcall and Soneira. At separations greater than 4°, which correspond to clustering scales $\geq 20h^{-1}$ Mpc, the scatter of the points for the three sample areas is large enough that the angular correlation is essentially unconstrained.

The spatial correlation function for Shane-Wirtanen clusters, required to account for the observed angular correlation, is roughly $\xi(r)=180(rh)^{-1.8}$ (adopting the canonical slope). At a given separation, the cluster correlation function is larger by a factor of 9 than the correlation function for galaxies (Davis and Peebles 1983). Considering that the space density of Shane-Wirtanen clusters is ~ 6 times higher than the density of Abell clusters in the Bahcall and Soneira sample, the results for the Shane-Wirtanen clusters and Abell clusters seem to be in substantial agreement.

V. CONCLUSIONS

A catalog of clusters of galaxies selected from the Shane-Wirtanen counts contains 646 entries at galactic latitude $|b| > 40°$ and declination $\delta > -22.5°$. The catalog includes 70% of the Abell clusters at distance class $D = 4$. Only 40% of Shane-Wirtanen clusters are members of the Abell catalog.

The radial velocity distribution of Shane-Wirtanen clusters is similar to the radial velocity distribution of Abell clusters of distance class $D \leq 4$. The space density of Shane-Wirtanen clusters is ~ 6 times higher than the space density of a sample of Abell clusters of $D \leq 4$ and richness $R \geq 1$.

The two-point angular correlation of Shane-Wirtanen clusters is detected at separations up to 4°, corresponding to a spatial scale of $\sim 20h^{-1}$ Mpc. The strength of the correlation is an order of magnitude greater than expected from the galaxy-galaxy correlation function, but a factor of 2 weaker than the correlation of Abell clusters of $D \leq 4$, $R \geq 1$.

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