

The velocity field of the outer Galaxy in the Southern Hemisphere.

I. Catalogue of nebulous objects

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Summary.— We outline a multifrequency program to measure the velocity field of the outer Galaxy in the Southern Hemisphere ($230^\circ \leq l \leq 305^\circ$). This paper, the first in a series, presents a catalogue of HII regions and reflection nebulae used as a basis for the study. Most of the entries are previously uncatalogued ; the emphasis is on small objects likely to be very distant from the sun.

Key words : HII regions — reflection nebulae — galactic structure — rotation curve.

1. Introduction.

In the past decade there has been considerable interest in the velocity structure of the outer Galaxy. A number of studies using HII regions have shown that the mean rotation curve of the outer Galaxy rises out to at least 18 kpc from the Galactic Center (Jackson *et al.*, 1979 ; Blitz, 1979 ; Blitz *et al.*, 1982 ; Chini and Wink, 1984). Studies of the outer Galaxy using planetary nebulae (Schneider and Terzian, 1983) confirm the rise determined from the HII regions. Most of the data are, however, from Northern Hemisphere observations, and it is not yet known to what degree the rise is truly global. Furthermore, all outer Galaxy rotation curves are derived under the assumption of an azimuthally symmetric velocity field, yet the HI distribution beyond the solar circle shows a remarkable lack of bilateral symmetry. The extent of the HI disk in the south is much larger than in the north, while the warp is more pronounced in the north (see e.g. Henderson *et al.*, 1982). This lopsidedness, also observed in a number of external galaxies (Baldwin *et al.*, 1980), may be the result of a true asymmetry in the spatial distribution, a reflection of velocity asymmetries, or a combination of both. To determine the nature of the asymmetry requires an independent measurement of the Southern Hemisphere velocity field in the outer Galaxy which does not presently exist.

This is the first paper in a series in which we seek to make an independent determination of the outer Galaxy rotation curve in the Southern Hemisphere, and to

obtain a velocity field which can determine the nature of the galactic HI asymmetry. The work is a comprehensive survey of the tracers of the velocity structure of the Milky Way in the longitude range $230^\circ \leq l \leq 305^\circ$. We use as tracers molecular clouds and their associated optical nebulae for which we obtain independent distances and velocities. In this paper, we present a catalogue of the optical nebulae which form the basis of the present study, since no suitable catalogue exists for our purposes. Although most of the brighter entries have been previously catalogued, the majority of the objects here are new. The other papers will deal with the measurement of CO velocities (paper II) and the derivation of optically determined distances (papers III and IV) for the objects in the catalogue. In paper V we will discuss the results of our kinematic analyses and their implications. First results, based on a small part of the available data, have been presented by Brand *et al.* (1985).

2. The catalogue.

2.1 OBJECT SELECTION.— A rotation curve is derived by independently determining the distances and velocities to a suitably chosen set of objects. The most useful objects in this respect are HII regions and their associated molecular material (see Blitz, 1979). Reflection nebulae can however also be used. The nebula guides one to the stars associated with it, the distances of which can be determined photometrically or spectroscopically ; the velocity is that of the molecular material, as measured by the CO emission line. Previous studies have usually limited themselves to HII regions taken from existing catalogues (e.g. Sharpless, 1959 and Rodgers *et al.*, 1960). These catalogues are incomplete in listing small HII regions (diameter ≤ 10 arcmin), whereas the smaller

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regions are potentially the most distant (see e.g. Fich and Blitz, 1984). For this project we therefore searched preferentially for very small, nebulous regions on the ESO/SRC and Palomar Observatory Sky Survey prints and a new catalogue was compiled. The region of the Galaxy selected for this study has galactic longitude l between 230° and 305° , and galactic latitude $|b| \leq 10^\circ$. The lower limit in longitude allows for a small overlap with other investigations. The upper limit is the highest longitude for which objects at large galactocentric distance are likely to be identified due to the large amount of obscuration in the inner Galaxy. The latitude limits are set to allow for warping and widening of the galactic disk at large distances from the Galactic Center. In practice, the latitude extent was increased to $\pm 15^\circ$ rather than $\pm 10^\circ$ at some longitudes.

The nebula search was carried out on 76 ESO/SRC and Palomar Observatory Sky Survey prints that cover this section of the Galaxy ; the area covered by these prints is shown in figure 1. At the time this search was undertaken, R-prints ($\lambda\lambda 6300-7000 \text{ \AA}$) were not available for each field, so for the sake of consistency the J-prints ($\lambda\lambda 3959-5400 \text{ \AA}$) were used as the basis of the catalogue. Where possible, images on R- (or SR-) and B-prints (optimum $\lambda 4800 \text{ \AA}$) were compared to those on the J-prints, in order to get an impression of the colour of the nebulosity (and thus of its nature). An attempt was made to collect as unbiased a sample as possible, but a few of the largest diffuse nebulous regions are not included. Many of these are clouds lit-up by the general interstellar radiation field rather than being excited by a (group of) individual star(s). They are therefore not of great importance for the present work. Only easily distinguishable discrete complexes of this type were included and then only when enhancement near a star was seen.

On the other side of the size spectrum (diameters 1 to 3 arcmin) making a distinction between possibly interesting nebulous regions and planetary nebulae or galaxies is sometimes very difficult, especially at higher latitudes. For example, galaxies with bright nuclei seen through foreground extinction sometimes look like small galactic nebulae excited by a single star. A check was made against catalogues of planetary nebulae (Perek and Kohoutek, 1967) and galaxies (Lauberts, 1982). Positive identifications were rejected from our list. Nevertheless, many doubtful cases remained. Those objects which we

are most confident are truly HII regions or reflection nebulae and are listed in table I. The distribution of these objects on the sky is presented in figure 2 which shows a clear concentration towards the galactic plane. The distribution of the remaining objects is presented in figure 3 which demonstrates an avoidance for the galactic plane, which is evidence for their probable extragalactic nature. A listing of these objects will be published at a later date (Brand, 1986 ; in preparation).

Many of the nebulae in table I have been catalogued by others. Our listing was cross-checked with the catalogue of Dixon and Sonneborn (1980) which in itself is a compilation of catalogues. The comparison also serves as a test for the completeness of the catalogue. In all, only one reflection nebula and 14 HII regions were not in our catalogue, most of which were only marginally identifiable or unidentifiable on the prints we examined.

2.2 DESCRIPTION OF THE CATALOGUE. — Table 1 contains our catalogue of nebulous regions in the section of the Galaxy between longitudes 230° and 305° and latitudes $\pm 10^\circ$ and contains 400 objects.

Some entries in the catalogue are divided into subentries on the basis of an apparent visual association between them on the Sky Survey prints. This could either be a connecting luminous part, or a common obscuring part. Obviously this is a somewhat subjective procedure and not necessarily one with physical implications. Later an objective selection and regrouping will be made on the basis of kinematic and photometric data.

In table I, the first column contains a running number ; columns 2 through 5 respectively give the galactic and equatorial coordinates of the center of the nebula. Column 6 lists the approximate, maximum size in arcminutes, column 7 indicates whether any obvious obscuration seems to be associated with the nebula, and column 8 is reserved for remarks and previous identifications for a given nebula (and its associated stars).

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Notes to table I. — *Object identifications are by commonly used designations :*

ACK	Acker (1975 ; see Dixon and Sonnenborn, 1980), Acker <i>et al.</i> (1981)	Planetary nebulae
Be	Bernes (1977)	Bright nebulosities in dust clouds
BRABCMS	van den Bergh <i>et al.</i> (1973)	Planetary nebulae
CED	Cederblad (1946)	Diffuse galactic nebulae
CG	Zealey <i>et al.</i> (1983)	Cometary globules
Cr	Collinder (see Ruprecht <i>et al.</i> , 1981)	Star clusters
GGD	Gyulbudagyan <i>et al.</i> (1978)	Herbig-Haro type objects
HH	Herbig (1974)	Herbig-Haro objects
HOFF	Hoffleit (1953)	Dark Holes
Ko	Kohoutek (1971)	Planetary nebulae
L	Lauberts (1982)	Various types of objects
LBN	Lynds (1965)	Bright nebulae
LDN	Lynds (1962)	Dark nebulae
MIL	Milne (1970)	Supernova remnants
MRSL	Marsalkova (1973)	HII regions
Mü	Münch (1955)	Emission nebulae
OCL	Ruprecht <i>et al.</i> (1981)	Open clusters
Pis	Pismis (1959)	Star clusters
PK	Perek and Kohoutek (1967)	Planetary nebulae
Rp	Reipurth (1981)	Small nebulae and HH objects in dark clouds
RCW	Rodgers <i>et al.</i> (1960)	H α emission regions
S	Sharpless (1959)	HII regions
Sa	Sandqvist (1977)	Dark dust clouds
St	Stock (see Ruprecht <i>et al.</i> , 1981)	Star clusters
VBH	van den Bergh and Herbst (1975)	Reflection nebulae
VDB	van den Bergh (1966)	Reflection nebulae
VHA	van den Bergh and Hagen (1975)	Star clusters
Wat	Moffat <i>et al.</i> (1979)	Study of stars in HII regions
Wray	Wray (1966 ; see Dixon and Sonnenborn, 1980)	H α emission objects

TABLE I. — Catalogue of galactic emission and reflection nebulae.

Object	1	b	(1950)			max	size Obsc.	Identification, remarks	(1950)			max	size Obsc.	Identification, remarks		
			(degrees)	h m s	DEC ° ' "				(degrees)	h m s	DEC ° ' "					
1	233.18	-9.63	65058.5	-221609	<1	N			23	239.54	-4.85	72209.3	-254402	67	Y	
2	234.76	-10.08	65208.1	-235152	34	N	S308, RCW11								Diff. em. around dark cloud	
3	233.40	-9.42	65212.5	-222200	84	N	S303								LDN 1667. In W. part of emission	
4	228.97	-4.65	70157.3	-161836	2	Y									there are various locations where stars interact with cloud.	
5	242.88	-10.80	70448.5	-312249	10x16	N	Lit-up cloud								CED99	
6	231.57	-4.47	70735.7	-183130	<1	N			24	231.34	-0.32	72229.0	-162231	<1	Y	
7A	231.49	-4.41	70741.9	-182525	9	Y	S301, RCW6. Incl. ft. em. to W.:			25	262.99	-16.07	72313.8	-512000	7	N
					18 arcmin					26	255.78	-12.62	72415.6	-433310	13	N
B	231.31	-4.76	70601.4	-182544	6x1	N	R-print only			27	257.79	-13.23	72603.4	-453509	2	Y
C	231.50	-4.37	70757.5	-182405	<1	Y			28	236.27	-2.00	72617.8	-213028	<1	N	
D	231.52	-4.30	70808.6	-182423	<1	Y			29	236.60	-2.17	72620.5	-215229	3	Y	
8	237.94	-6.15	71208.0	-252026	40	Y			30	251.44	-9.80	72728.6	-382845	<1	N	
9	258.23	-16.05	71208.7	-470806	6	Y			31	237.67	-2.39	72743.9	-225510	9	N	
10	259.65	-16.57	71226.0	-483550	<1	Y			32	233.75	-0.20	72751.0	-182554	5	Y	
11	259.56	-16.18	71246.8	-482837	18	Y	CG13, Be136			33A	235.69	-1.25	72754.7	-203803	<1	N
12	259.56	-16.36	71323.9	-482549	<1	N			B	235.69	-1.25	72755.7	-203840	<1	N	
13	232.41	-2.91	71504.0	-183242	1	N			34	259.23	-13.51	72801.8	-465754	51x39	Y	
14	232.48	-2.91	71512.5	-183604	11x2	N								There is com. glob. head to E., outside main body of cloud (CG4)		
15	239.83	-6.52	71608.6	-264550	3	Y			35	259.21	-13.51	72801.9	-465645	<1	N	
16	235.54	-4.06	71659.0	-215042	30	N	RCW14, LBN1054			36	233.84	-0.18	72804.0	-182937	<1	N
17A	237.34	-4.97	71709.6	-235059	<1	Y				37	230.97	1.47	72819.0	-151138	1	N
B	237.45	-4.93	71731.5	-235552	10	Y	VDB96; CSD96, LBN1058			38	247.53	-7.49	72842.1	-335905	5	N
18	256.14	-14.06	71756.4	-442934	5	Y	CG1, Be135			39	234.41	-0.29	72850.0	-190254	36	N
19	240.88	-6.52	71821.3	-274138	2	Y	* in RN? (L)			40	231.14	1.53	72852.0	-151828	4	N
20	230.36	-0.61	71931.0	-153854	2	N				41	232.56	0.86	72917.0	-165245	18	Y
21	255.29	-13.11	72039.4	-431952	9	N				42A	234.74	-0.27	72936.0	-191939	10	Y
22A	238.56	-4.42	72147.1	-2414007	<1	Y	Subentries are individual knots, all located within LDN1664			B	234.76	-0.28	72936.9	-192105	<1	Y
B	238.25	-4.22	72155.3	-241812	<1	Y				43	237.51	-1.75	72949.0	-222813	1	N
C	238.48	-4.29	72209.0	-213220	2	Y				44	237.26	-1.28	73103.0	-220112	<1	N
D	238.56	-4.26	72225.8	-243543	<1	Y				45	237.32	-1.28	73110.8	-220425	<1	N
E	238.47	-4.17	72233.9	-242831	2	Y	GCD20			46	238.95	-2.09	73133.2	-235335	12	N
F	238.42	-4.11	72241.1	-242409	<1	Y	GCD21			47	237.23	-1.07	73148.7	-215341	<1	Y
G	238.59	-4.20	72242.1	-24525	<1	Y				48	257.72	-12.12	73210.9	-452933	10	N
H	238.43	-4.08	72248.4	-242334	<1	Y	GCD22			49	237.74	-0.96	73317.8	-221717	2	Y
I	238.46	-3.98	72316.1	-242231	<1	Y	GCD23									

TABLE I (*continued*).

Object	l	b	(1950)			max			Object	1	b	(1950)			size Obsc.	Identification, remarks
			(degrees)	RA h m s	DEC ° ' "	size Obsc.	RA h m s	DEC ° ' "				RA h m s	DEC ° ' "	RA h m s	DEC ° ' "	
50	234.58	0.83	73320.0	-183853	20	Y	S307		80A	243.16	0.35	75014.9	-261842	17	Y	S311, NGC2467
51A	239.04	-1.67	73321.5	-234544	1	Y			B	243.11	0.63	75110.1	-260714	23	Y	Fainter, associated emission
B	239.04	-1.64	73328.7	-234523	1	Y			81	256.62	-7.26	75203.5	-414417	1	N	
52	261.00	-13.34	73328.0	-482539	17	N			82	244.67	0.06	75237.8	-274459	2	N	
53A	260.64	-13.04	73409.2	-475845	1	N			83	245.29	-0.31	75240.3	-282829	<1	N	
B	260.68	-13.02	73421.0	-480019	1	Y	VDB98		84	242.56	1.45	75301.0	-251340	2	N	Wat 3
54	240.13	-2.17	73427.0	-251312	14	Y			85	246.12	-0.55	75341.3	-291832	2	N	
55	262.42	-13.76	73456.6	-495125	<1	N			86	245.21	0.13	75410.6	-281019	<1	N	* with faint neb.
56	255.83	-10.44	73501.3	-423630	180	Y			87A	268.39	-13.35	75457.1	-344845	<1	Y	
57	262.52	-13.73	73519.8	-495544	2	N			B	268.38	-13.32	75504.1	-544708	<1	Y	
58	247.14	-5.58	73549.9	-324339	<1	Y			C	268.42	-13.32	75514.4	-544856	<1	Y	
59	260.81	-12.76	73604.0	-480005	2	Y			88	253.88	-4.93	75511.1	-381153	6	N	
60	263.05	-13.76	73628.8	-502413	<1	N			89	251.01	-2.82	75639.5	-313939	<1	Y	
61	248.01	-5.46	73821.1	-332534	4	N	Em neb + ** (L)		90A	247.64	-0.56	75720.4	-303606	<1	Y	
62	254.85	-8.94	73941.0	-410247	6	N			B	247.64	-0.54	75725.7	-303538	<1	Y	
63	247.58	-4.72	74026.2	-324118	9	Y			91	252.21	-3.15	75823.1	-355112	17	Y	Enhanced part of larger complex
64	244.40	-2.71	74111.4	-285545	8	N			92	248.01	-0.41	75851.7	-305027	3	Y	
65	243.68	-2.19	74136.4	-280305	11x3	N			93	260.38	-7.99	75910.4	-451846	1	Y	VBH1
66A	241.52	-0.60	74253.0	-252322	<1	Y	Mu13, OCL651		94	255.52	-5.01	75913.7	-393813	1	N	
B	241.52	-0.56	74301.0	-252416	2	Y			95	255.40	-4.82	75944.7	-392552	5	Y	
67A	237.53	1.85	74318.0	-204225	2	N			96	245.93	1.16	75952.4	-281435	1	Y	
B	237.57	1.85	74323.1	-204427	1	Y			97	246.09	1.21	80027.2	-282051	2	Y	
68	247.64	-4.03	74323.1	-322338	<1	Y			98	246.01	1.26	80027.4	-281534	3	Y	
69	261.44	-11.61	74552.1	-480124	<1	Y			99	251.19	-1.97	80037.5	-342149	<1	Y	* + neb env.; PN? (L)
70A	263.13	-12.16	74541.0	-494355	<1	N			100	250.43	-1.33	80116.9	-332227	<1	Y	
B	263.11	-12.15	74542.9	-494257	<1	N			101	248.90	-0.01	80239.6	-312223	3	Y	VBH2
C	263.11	-12.14	74545.5	-494218	<1	N	Rp1		102A	255.42	-4.12	80251.0	-390446	1	Y	VBH3A
71	235.96	3.50	74600.3	-183045	2	N			B	255.44	-4.10	80301.6	-390513	1	Y	3B
72	251.09	-5.39	74601.4	-360313	18	Y			C	255.42	-4.07	80303.7	-390323	1	Y	3C
73	263.06	-12.04	74609.7	-493639	11	N	Part of v. large lit-up cloud		103	255.45	-3.97	80334.5	-390131	<1	Y	
74	247.97	-3.44	74623.8	-322435	1	Y			104A	252.01	-1.51	80437.9	-344814	11	Y	
75	241.87	0.44	74736.9	-250919	<1	Y			B	252.39	-1.40	80606.6	-350353	9	Y	
76	248.71	-3.37	74840.4	-325843	<1	Y			105	245.85	2.67	80526.0	-272139	2	N	
77	249.27	-3.65	74854.0	-333625	<1	Y			106	252.93	-1.90	80529.2	-354720	1	Y	VBH5
78	255.84	-7.47	74901.1	-411033	6	N			107	254.27	-2.73	80540.9	-372137	2	N	
79	250.14	-4.13	74902.8	-343525	4	Y			108	248.01	1.44	80602.1	-295005	<1	Y	

TABLE I (*continued*).

Object	1	b	(1950)			size Obsc.	Identification, remarks	(1950)			max size Obsc.	Identification, remarks	
			RA (degrees)	h m s	DEC ° ' "			RA (degrees)	h m s	DEC ° ' "			
109	255.42	-3.04	80730.0	-382953	<1	Y	*	268.16	-8.94	81928.9 -521898	6	Y	
110	247.47	2.19	80737.3	-285854	<1	N	in em. neb.; gal? (L)	141A	259.61	-2.99	81959.4 -415556	1	Y
111	253.29	-1.61	80739.9	-355602	<1	Y	Rp2 in CG30	B	259.59	-2.97	82000.2 -415420	<1	Y
112	255.62	-3.13	80740.4	-384236	3	Y	VBH4	C	259.64	-3.00	82001.4 -415804	2	Y
113	267.18	-10.42	80754.2	-521821	<1	Y	*	D	259.64	-2.97	82010.2 -415709	<1	Y
114	251.88	-0.47	80831.3	-340732	<1	Y	* + neb. env.; PN? (L)	E	258.87	-2.31	82043.1 -415640	<1	Y
115	264.45	-8.53	80857.1	-490106	22	N	OCL753, NGC2517; Extended red em. around cluster	F	259.71	-2.82	82103.1 -415522	2	Y
						G		259.79	-2.86	82107.6 -420037	3	Y	
116	261.18	-6.43	80905.8	-450900	3	N	H	259.75	-2.83	82108.2 -415719	<1	Y	
117	242.08	6.36	81003.3	-221154	2	N	I	259.78	-2.84	82111.4 -415924	<1	Y	
118	267.47	-10.16	81021.8	-522411	<1	Y	J	259.77	-2.78	82124.7 -415656	3	Y	
119	255.83	-2.60	81032.3	-383554	<1	Y	K	259.85	-2.73	82153.5 -415901	<1	Y	
120	252.43	-0.19	81090.0	-342537	3	N	VBH6; * = RS Pup = HD68860	L	261.60	-4.33	82012.8 -442006	2	Y
121	255.68	-2.27	81133.0	-381710	20	Y	VBH7	M	258.31	-1.96	82031.4 -401639	1	Y
122A	253.82	-0.91	81159.6	-355906	1	Y	VBH8	N	258.31	-1.90	82046.2 -401416	1	Y
B	253.79	-0.88	81203.2	-355656	<1	Y		O	256.11	-0.15	82136.1 -372620	6	Y
123	260.56	-5.21	81253.8	-435756	<1	Y	VBH9A	P	264.18	-5.42	82331.8 -470700	3	Y
124A	253.75	-0.63	81256.9	-354610	<1	N	VBH9B	Q	264.17	-5.33	82356.0 -470030	6	Y
B	253.74	-0.60	81303.8	-354503	<1	N		R	253.58	2.23	82355.2 -335935	<1	Y
125A	254.03	-0.58	81356.5	-355834	1	Y		S	258.48	-1.27	82358.6 -400108	2	Y
B	254.06	-0.56	81407.2	-355911	<1	Y		T	258.50	-1.32	82359.2 -400533	2	Y
126	253.93	-0.49	81402.8	-355044	<1	Y		U	267.36	-7.49	82417.3 -505032	<1	Y
127	253.67	-0.23	81422.7	-352840	29	Y	RCW19	V	260.49	-2.54	82443.2 -422337	<1	Y
128	257.64	-2.78	81457.5	-401143	<1	Y		W	252.91	3.11	82529.1 -325618	11x6	N
129	259.25	-3.76	81527.6	-420433	1	Y	VBH10A,B	X	267.67	-7.34	82611.6 -505950	<1	Y
130	268.06	-9.47	81614.7	-523106	<1	Y		Y	243.84	9.76	82624.4 -214506	16x5	N
131	268.03	-9.45	81615.5	-522923	<1	Y		Z	268.22	-7.61	82647.7 -513611	5	Y
132	259.23	-3.56	81619.2	-415708	3	Y	VBH11A,B,C,H	A	253.26	3.35	82724.7 -330456	84	Y
133	254.44	-0.11	81659.4	-360247	177	Y	RCW20	B	256.14	1.53	82830.1 -362902	10	N
134	257.89	-2.44	81712.0	-401229	<1	Y		C	257.53	0.63	82902.7 -380805	1	Y
135A	251.52	2.00	81722.7	-322702	1	Y		D	266.00	-5.47	82939.6 -483317	<1	Y
B	251.55	2.01	81730.3	-322754	<1	Y		E	260.97	-1.65	83008.0 -421527	3	Y
136	268.06	-9.13	81804.8	-322020	<1	Y		F	262.86	-2.41	83259.2 -441319	6	Y
137	266.07	-7.80	81809.1	-455741	<1	Y	VBH12B	G	259.97	-0.06	83342.8 -403008	2	Y
138	254.68	0.22	81859.1	-360322	3	N	VBH13A,B,C	H	259.15	0.94	83516.2 -391443	1	Y
139	266.32	-7.78	81907.1	-500916	2	Y	VBH12A	I	266.07	-4.30	83529.6 -475521	2	Y

TABLE I (*continued*).

Object	1	b	(1950)			size Obsc.	Identification, remarks	(1950)			max size Obsc.	Identification, remarks
			RA (degrees)	h m s	DEC ° ' "			RA (degrees)	h m s	DEC ° ' "		
163	260.15	0.25	83553.2	-402735	<1	Y		193A	268.21	-3.18	84845.2	-485348 <1 Y
164	265.37	-3.74	83537.1	-470125	3	N	VBH19	B	268.27	-3.15	84907.3	-485516 5 Y
165	259.34	0.92	83547.0	-392429	3	Y	OCL735	194	268.38	-3.06	84958.8	-485644 <1 Y
166	259.97	0.56	83618.0	-400718	90	Y	RCW27	195A	268.16	-2.70	85046.8	-483258 2 Y
167	255.92	3.99	83734.1	-341945	<1	N	* in neb.; PN? (L)	B	268.22	-2.69	85104.0	-483534 7x3 Y
168	260.22	0.70	83740.6	-401401	<1	Y		196A	261.69	0.23	85051.6	-440051 1 Y
169	260.27	0.67	83741.7	-401740	1	Y	VBH20	B	264.73	0.26	85109.6	-440130 <1 Y
170	259.28	1.50	83757.0	-390009	2	N		C	264.72	0.28	85110.5	-435952 <1 Y
171	254.98	4.96	83828.6	-332926	<1	N		197	261.97	0.27	85202.4	-441218 1 Y
172	260.76	0.66	83916.3	-404059	<1	Y		198	268.42	-2.65	85203.3	-484258 <1 N
173	261.47	0.32	84010.1	-412730	1x6	Y		199	272.40	-5.97	85210.1	-535336 2 N
174	260.79	0.92	84026.5	-403323	<1	Y		200	269.78	-3.80	85215.2	-502938 2 N
175	266.60	-3.61	84039.0	-475507	10	Y	VHA47; CED106M	201	266.98	-1.27	85248.1	-464342 1 Y
176	261.38	0.84	84203.0	-410345	19	Y	RCW32	202	271.09	-4.73	85250.2	-520517 3 Y
177	262.18	0.36	84244.5	-415915	<1	Y		203	268.06	-2.16	85251.8	-480737 134 Y
178	258.28	3.53	84256.4	-365755	8	N		204	264.42	1.05	85320.7	-431630 3 Y
179	276.27	-10.59	84316.7	-594601	40	Y		205	263.86	1.55	85327.5	-423142 <1 Y
180	258.81	3.24	84327.7	-373312	15	N		206A	261.28	1.43	85426.6	-425509 <1 Y
181	263.61	-0.52	84352.4	-433916	2	Y	Wray19.13	B	261.29	1.17	85439.4	-125419 2 Y
182	263.52	-0.35	84418.0	-432838	1	Y	VBH21A	C	264.39	1.43	85449.9	-430032 2 Y
183	263.75	-0.40	84451.8	-434112	<1	Y		D	261.49	1.45	85515.4	-430410 8 Y
184	262.09	1.17	84515.4	-412422	<1	Y		207	264.98	0.98	85506.2	-434449 2 Y
185	263.74	-0.16	84550.4	-433143	<1	Y	VBH21B	208	261.50	4.10	85534.1	-390429 <1 N
186	263.23	0.50	84651.2	-421245	3	Y	MU23; ACK263+00.1, Ko263+0.1	209	253.58	10.78	85538.6	-284559 2 Y
187A	266.46	-2.03	84726.2	-461907	<1	Y		210A	261.13	1.88	85547.1	-423047 4 Y
B	266.47	-2.02	84730.8	-464901	<1	Y		B	264.27	1.86	85610.0	-423800 <1 Y
188	269.67	-4.62	84738.5	-505611	5	N		C	264.17	1.95	85610.4	-422916 1 Y
189	260.34	3.14	84757.2	-384850	<1	N		211	265.87	0.48	85612.6	-444446 <1 Y
190	252.27	9.73	84814.7	-282949	10	N	Very clear on R-print	212	267.98	-1.36	85613.3	-473236 12 Y
191	254.02	8.35	84815.2	-303848	14	N		213A	268.06	-0.95	85622.4	-471106 <1 Y
192A	262.90	1.31	84832.3	-411938	67	Y	RCW33	B	267.93	-0.98	85741.4	-471536 6 Y
B	263.16	1.43	85029.6	-420352	<1	Y		C	269.86	-0.84	85802.7	-470636 9 Y
C	263.12	1.53	85046.1	-415806	<1	Y		D	268.06	-0.98	85814.0	-472117 7 Y
D	263.11	1.61	85103.1	-415454	<1	Y		214	265.42	0.94	85630.0	-440605 2 Y
E	263.22	1.57	85118.4	-420129	1	Y		215	264.78	1.52	85637.6	-431429 2 Y
F	263.53	1.52	85211.3	-421742	9	Y		216	273.38	-5.86	85702.9	-543342 3 N

TABLE I (*continued*).

Object	1	b	(1950)			DEC ° ' "	size Obsc.	Identification, remarks	(1950)			RA h m s	b ° ' "	DEC h m s	size Obsc.	Identification, remarks
			(degrees)	RA h m s	DEC ° ' "				(degrees)	RA h m s	DEC ° ' "					
217	265.07	1.41	85712.6	-433227	16	Y	RCW36		251	269.33	2.37	91731.4	-455902	4	Y	
218	271.76	-4.24	85807.9	-521700	3	N			252	271.26	0.56	91759.9	-483741	3	Y	
219	271.87	-4.12	85912.0	-521653	4	N			253	271.79	0.21	91847.8	-491540	1	Y	
220	268.26	-0.80	85946.3	-472304	2	Y			254	265.82	6.22	91854.4	-404734	<1	N	
221	266.46	-2.03	90002.3	-443226	<1	Y			255	271.23	0.36	91933.6	-481938	2	Y	
222	268.42	-0.86	90009.5	-473228	<1	Y			256	267.83	4.41	91940.6	-432928	5	Y	
223	268.48	-0.87	90020.2	-475258	1	Y			257	260.03	12.13	91956.3	-323424	<1	N	
224	269.19	-1.43	90040.8	-480001	8	Y	RCW40, Wray19.17		258	273.89	-1.59	92013.7	-520023	1	Y	
225	268.62	-0.74	90127.9	-475651	2	Y			259A	271.01	1.39	92027.1	-475208	<1	Y	VBH31A
226	269.10	-1.13	90140.2	-481351	2	Y	RCW39, Wray19.18		B	271.01	1.41	92030.8	-475051	<1	Y	31B
227	268.59	-0.61	90153.4	-473013	1	Y			260	272.87	-0.27	92127.2	-502120	3	N	
228	261.00	6.41	90243.7	-371032	<1	Y			261	273.78	-1.01	92219.1	-513117	15	N	Partly overlaps with OCL775
229	268.97	-0.49	90358.3	-471202	2	Y			262	274.80	-1.96	92246.4	-525501	9	Y	
230	270.11	-1.30	90500.8	-490507	5	Y			263	271.01	-1.13	92250.0	-514609	6	Y	RCW42, MU34
231	272.88	-3.71	90537.8	-521521	4	Y			264A	274.68	-1.48	92425.9	-522845	<1	Y	
232	271.62	-2.29	90550.1	-505229	1	Y			B	274.71	-1.46	92435.9	-522915	<1	Y	
233	272.06	-2.60	90718.6	-512357	1	Y			265	275.57	-2.20	92522.5	-533712	<1	Y	
234	270.05	-0.70	90724.6	-483757	19x3.5	Y	Lit-up cloudlet		266	271.85	1.92	92615.9	-480422	2	Y	RCW44; BRABCHS-2
235	268.86	0.53	90757.2	-465557	1	Y			267	277.72	-3.56	92946.6	-560422	2	Y	
236	270.02	-0.51	90808.2	-482913	<1	Y			268	271.22	4.98	93536.4	-452328	<1	Y	
237A	267.90	1.81	90929.9	-452112	1	Y	VBH29C, Be139		269	273.01	3.61	93808.5	-473618	1	Y	
B	267.93	1.79	90932.2	-452325	1	Y	29B, 140		270	273.20	3.71	93922.1	-473845	1	N	
C	268.02	1.81	91000.0	-452628	<1	Y	VBH29A, Be141		271	276.30	0.22	93946.7	-521837	2	N	
238	281.66	-10.82	91044.4	-633826	<1	N			272	273.34	3.93	94051.1	-473431	1	Y	
239	270.43	-0.27	91053.7	-550654	<1	Y			273	277.16	0.40	94451.0	-324343	5	N	
240	272.83	-2.34	91155.4	-514719	<1	Y			274	273.67	6.19	95047.7	-460239	2	Y	
241	266.95	3.67	91326.1	-433308	2	N			275	280.82	-2.63	95122.6	-465134	<1	N	
242	269.76	0.97	91328.4	-471631	8	Y			276	284.32	-5.86	95726.0	-620505	2	N	
243	268.38	0.86	91352.3	-473049	2	Y			277	281.76	-2.26	95833.9	-514015	<1	N	
244	270.99	0.03	91432.9	-481852	3	Y			278	284.36	-5.61	95859.9	-615443	3	N	Very clear on R-print
245	270.18	0.90	91452.6	-473736	<1	Y			279	280.13	0.17	95940.8	-544450	23	Y	Several cond. in 3 arcmin area
246	270.13	0.85	91513.0	-471511	6	Y	RCW41		280	281.77	-2.00	95947.4	-572813	<1	Y	VBH32B
247	270.82	0.69	91641.4	-481340	<1	Y	VBH30		281A	281.83	-2.07	95952.2	-573332	<1	Y	32A.
248	269.32	2.21	91650.8	-460539	1	Y	Rp7, Rp8		B	281.82	-2.04	95956.0	-573203	<1	Y	
249	267.93	3.62	91657.5	-440653	<1	Y			282	278.24	2.79	9559.3	-513101	<1	Y	
250	271.46	0.19	91716.7	-490156	1	Y			283	282.88	-3.14	100125.7	-590240	<1	Y	VBH33A, D, E, F

TABLE I (*continued*).

Object	1	b	(1950)			max	(1950)			max	(1950)						
			RA (degrees)	h m s	DEC ° ' "		size Obsc.	Identification, remarks	Object		1	b	RA (degrees)				
284	274.90	7.94	100226.2	-452424	12	N			E	286.42	-0.79	103423.8	-585915	1	Y	VBH40B	
285	282.71	-2.48	100322.0	-582445	21	Y	RCW47		F	286.28	-0.52	103430.4	-584135	2	Y	40A	
286	286.28	-6.95	100531.3	-640715	<1	Y	Em. neb. or gal.? (L); ACK286-6.2		310	287.97	-4.42	103035.5	-625447	2	N		
287A	283.74	-3.41	100535.8	-594617	<1	Y			311	287.22	-3.05	103056.1	-612127	2	Y	VBH38	
B	283.78	-3.42	100551.1	-591808	<1	Y			312	290.75	-8.54	103333.4	-675212	7x3	N		
288	282.35	-1.39	100557.6	-571903	<1	N	Part of RCW46		313	285.76	1.65	103856.6	-563246	51	Y	Strands of em., brighter in R; prob. connected to entry 316.	
289	284.72	-4.47	100707.2	-611150	<1	N			314	288.97	-3.84	104042.5	-625341	<1	Y		
290	282.74	-1.43	100806.6	-573436	<1	N			315	284.70	4.28	104109.4	-534333	<1	Y		
291	282.30	-0.77	100816.6	-564710	1	Y			316A	287.61	-0.85	104222.9	-593734	180x135	Y	RCW53, incl. VBH43	
292	280.58	1.81	100843.7	-534113	<1	Y			B	285.73	-0.50	103055.1	-582431	6	Y	VBH37	
293	282.81	-1.34	100857.1	-573227	3	Y			C	285.85	0.08	103354.0	-575726	56x28	Y	OCL816, VHA98, NGC3293, incl. VBH2A,B, RCM51	
294	283.01	-1.56	100917.8	-575012	<1	Y			D	286.21	-0.20	103514.7	-582305	23	Y	Incl. VBH41A,B,C	
295	282.13	-0.10	101000.6	-560754	11x17	Y	Very clear on R-print		E	287.25	0.35	104412.7	-582322	6	Y	RCW52	
296	283.08	-1.48	101001.6	-574846	4	N			317	281.18	5.74	104239.0	-521145	<1	N		
297	283.84	-1.73	101341.6	-582628	4	N			318	285.65	3.78	104519.4	-543633	2	N		
298	284.76	-3.06	101351.3	-600336	2	Y	VBH34		319	285.04	5.24	104608.5	-530207	2	Y	Gal? V. diff. (L)	
299	283.15	-0.61	101405.1	-570730	11	Y	Neb. around SAQ237850		320	289.26	-2.80	104715.1	-620552	3	Y	HOFF L07 (cloud, bright edges)	
300A	283.52	-0.97	101445.7	-574102	23	Y	RCW48		321A	286.35	3.23	104753.9	-552513	<1	Y		
B	284.30	-0.31	102226.7	-575021	6	Y	RCW49; NGC3247		B	286.35	3.24	104757.3	-552420	<1	Y		
C	284.38	0.40	102540.3	-565607	23x11	Y	RCW50		C	286.39	3.25	104812.6	-552502	<1	Y		
							Diffuse em. connects 300A,B,C and 299 with 300. Whole complex is roughly 113x56		322A	285.85	4.38	104824.0	-541010	1	Y		
301	285.32	-3.37	101615.5	-603731	1	Y	VBH35		B	285.89	4.50	104900.5	-540446	1	Y		
302	284.12	-1.51	101624.4	-582435	<1	N			323	289.78	-3.23	104928.4	-624353	<1	Y		
303	285.53	-3.36	101745.0	-604406	1	N			324	286.86	2.89	105004.8	-555659	2	Y	VBH4A-G	
304	284.20	-0.15	102225.3	-571848	1	Y	VBH36		325	287.14	2.39	105019.3	-563130	<1	Y		
305	284.53	-0.59	102245.5	-575135	<1	Y			326	281.79	7.42	105102.3	-505805	<1	N		
306A	279.43	8.12	102437.9	-474654	11x17	N	Enhanced parts of same complex of diffuse emission		327	288.04	0.80	105107.5	-582021	5	Y	Lit-up cloud edge	
B	280.22	7.52	102643.6	-484425	5	N			328A	290.32	-2.99	105435.0	-624443	2	Y	VBH45A-D, RCM55	
307	289.19	-7.60	102456.0	-661554	11x6	N			B	290.36	-2.96	105459.5	-624410	1	Y		
308	277.30	12.47	102731.6	-425858	<1	Y			329	288.49	1.02	105456.1	-582023	1	Y		
309A	285.87	-1.02	102949.1	-585534	1	Y	A-F all in dark		330	284.07	10.47	105517.0	-475449	3	N	Gal or em. neb.? Very diffuse or obscured (L)	
B	286.23	-1.32	103105.4	-592158	1	Y	VBH39	material W. of entry 316A		331	290.36	-2.84	105527.2	-623733	<1	Y	
C	286.09	-0.92	103142.6	-585704	1	Y			332	290.41	-2.91	105534.1	-624244	<1	Y		
D	286.01	-0.76	103146.1	-584553	2	Y	VBH40C										

TABLE I (*continued*).

Object	1	b	(1950)			max size Obsc.	Identification, remarks	(1950)			max size Obsc.	Identification, remarks		
			RA (degrees)	h m s	DEC ° ' "			1	b	RA (degrees)	h m s			
333	289.89	-1.32	105712.8	-610309	28	Y	MRSLL289-1/1; Cr236 (in S. part)	352	287.53	11.43	111617.2	<1	Y	
334A	289.89	-0.80	105859.5	-603450	2	N	ML18	353	291.94	2.06	112225.5	-584007	2	Y
B	289.88	-0.75	105904.3	-603130	2	N	CED109B; ACK289-0.2	354A	293.09	-0.97	112315.6	-615434	1	Y
335	289.50	0.12	105911.7	-593430	3	Y	VBH46; Pis17	B	293.15	-0.96	112346.1	-615525	3	Y
336	290.56	-1.98	110006.1	-615532	<1	Y		C	293.49	-0.92	112637.3	-615922	2	Y
337	289.55	0.53	110050.6	-591306	84x51	Y	RCW54	D	293.59	-0.86	112733.2	-615743	2	Y
338	291.12	-2.57	110227.4	-624131	<1	Y		E	293.56	-0.68	112747.2	-614658	2	Y
339	291.04	-2.08	110332.4	-621342	2	Y		355	291.82	2.88	112337.6	-575125	6x3	N
340	292.30	-4.86	110401.7	-651553	8	N	RCW58	356	292.65	1.24	112539.5	-594054	2	N
341A	297.16	-15.69	110451.3	-770543	4	Y	CED110, Be143	357	291.13	-2.63	112716.8	-634856	5	Y
B	297.37	-15.91	110638.4	-772303	6	Y	CED111, Be144	358A	292.91	1.32	112749.6	-594054	<1	Y
C	297.04	-14.92	110819.9	-762039	5	Y	CED112, Be142	B	292.94	1.32	112800.1	-594120	1	Y
D	297.23	-14.98	111052.1	-762804	<1	Y		359	289.05	13.15	112802.8	-471444	<1	Y
E	297.50	-15.56	111110.1	-770605	<1	Y		360	294.12	-0.04	113352.9	-612018	11	N
342	290.64	0.26	110755.6	-595405	27	Y	MRSLL290+0/3; NGC3572B	361	294.31	-0.11	113513.4	-612742	6x3	Y
343A	290.37	0.96	110803.1	-590850	<1	Y	A-D in same dark cloud	362A	294.85	-1.65	113559.8	-630544	68	Y
B	290.41	0.90	110811.3	-591306	<1	Y		B	293.67	-1.64	112605.9	-624345	18x8	Y
C	290.43	0.99	110834.3	-590829	<1	Y		C	293.61	-1.26	112637.1	-622100	21x16	Y
D	290.63	1.16	111031.9	-590352	<1	Y		D	293.75	-1.70	112639.0	-624849	2	Y
344	291.39	-1.07	110929.8	-612425	2	Y		E	293.94	-2.13	112659.8	-631641	9	Y
345	295.08	-10.10	110938.4	-710953	4	N		F	294.14	-2.34	112808.5	-633228	17	Y
346	288.23	6.84	110945.2	-525334	3	N		G	294.24	-1.92	113010.1	-631020	12x6	Y
347	290.35	1.62	110949.4	-583127	7	Y	St13	363	294.49	-0.39	113605.1	-614659	1	Y
348A	291.29	-0.68	110958.8	-610108	23	Y	RCW57, incl. VBH47A,B,C	364	294.36	0.19	113622.3	-601120	2	Y
B	291.63	-0.53	111259.5	-605955	16	Y	NGC3603	365	294.54	-0.34	113632.2	-614452	1	Y?
C	292.15	-0.15	111809.1	-604923	34x23	Y	Various bright ** (from Tr18, Hogg12, NGC3590) apparently associated with dark cloud N.	366	295.41	-2.70	113812.0	-641528	<1	Y
							of 348A. Large filamentary ring structure to W. of 348A (of size 37 arcmin)	367	294.28	2.67	114105.3	-584544	3	Y
349	288.29	7.07	111039.5	-524215	7	N		368	294.22	3.51	111221.7	-575913	5	Y
350	288.34	7.24	111123.3	-523338	11	Y	To N. there is connected material (length 34 arcmin)	369	291.78	12.92	114248.4	-481357	<1	N
								370	293.28	7.43	114254.6	-535501	<1	N
								371A	296.22	-3.55	111333.1	-651654	1	Y
								B	296.27	-3.59	1114349.7	-652012	<1	Y
								C	296.19	-3.55	111313.1	-651616	<1	Y
								372A	295.48	0.41	114547.8	-611611	<1	Y
351	291.86	-0.68	111421.6	-611327	1	Y		B	295.47	0.52	114558.0	-610913	<1	Y

TABLE I (*continued*).

Object	1	b	(1950)			max size Obsc.	Identification, remarks	Object	1	b	(1950)			max size Obsc.	Identification, remarks
			(degrees)	RA h m s	DEC ° ' "						(degrees)	h m s	° ' "		
C	295.51	0.48	114611.8	-611227	1	Y	VBH54	393	301.67	-4.87	123513.2	-672601	2	Y	
373A	295.69	-0.34	114558.3	-620230	<1	Y	VBH55B	394	301.73	-4.43	123559.2	-665953	5	Y	
B	295.72	-0.34	114616.1	-620253	<1	Y	55A	395	301.86	1.38	123934.1	-611159	<1	Y	
374	296.49	-2.77	114745.7	-613538	5x3	Y	VBH56	396	302.13	0.34	124129.6	-621448	4	Y	
375	296.00	-0.60	114759.6	-622221	4	15	N Filaments. SNR?	397	302.81	1.29	124723.2	-611836	3	Y	
376A	295.95	-0.27	114814.1	-620217	6	N	MRSL295+0/1	398	302.92	-0.43	124818.0	-630153	<1	Y	
B	296.18	-0.16	115024.2	-615849	6	N		399	303.66	-3.51	125530.0	-660604	<1	Y	
C	296.22	-0.01	115102.6	-615039	5	N		400A	304.94	0.56	130529.4	-615838	1	Y	
							Filaments; associated with 375? W. of 376C is obscuration	B	304.94	0.51	130535.1	-620130	1	Y	
								C	304.95	0.47	130536.1	-620357	1	Y	
377	297.02	-1.71	115437.0	-634038	<1	Y									
378	296.39	3.14	115741.0	-584807	1	Y									
379	297.58	-0.87	120100.0	-652800	43x17	N	Part of MRSL297-0/1								
380	297.58	1.14	120406.1	-605839	8	N	OCL871								
381	296.55	10.12	120739.7	-515736	3	N									
382	298.42	0.69	121020.9	-613348	<1	Y	Em neb. or gal? * superimposed? (L)								
383A	298.36	2.23	121144.7	-600208	2	Y									
B	298.73	2.31	121445.7	-600023	50	N									
384	298.94	0.48	121429.1	-615056	1	Y									
385	298.70	2.86	121505.7	-592720	<1	Y									
386A	299.26	-0.35	121619.3	-621227	<1	N	RCW64								
B	299.31	-0.29	121643.9	-6223925	1	Y									
C	299.33	-0.31	121654.2	-6224043	<1	Y									
D	299.35	-0.31	121707.0	-624104	<1	Y									
E	299.35	-0.27	121709.3	-6223829	2	Y	ACK299-0.2								
F	299.37	-0.32	121716.8	-624138	<1	Y									
G	299.39	-0.24	121731.6	-623654	<1	Y									
387	299.46	-1.09	121711.3	-632831	1	Y	* in RN? (L)								
388	299.67	-0.60	121937.3	-630037	2	Y	VBH57								
389	300.67	1.06	122927.1	-612708	6	N	MRSL301+1/1								
390A	300.96	1.22	123200.0	-611901	2	Y	RCW65; ACK301+1.1								
B	300.97	1.16	123206.9	-612224	1	Y									
391A	301.05	1.07	123327.9	-612754	8	N									
B	301.10	1.07	123304.5	-612821	2	Y	RCW66								
392	301.76	-6.76	123442.7	-691912	6x2	Y									

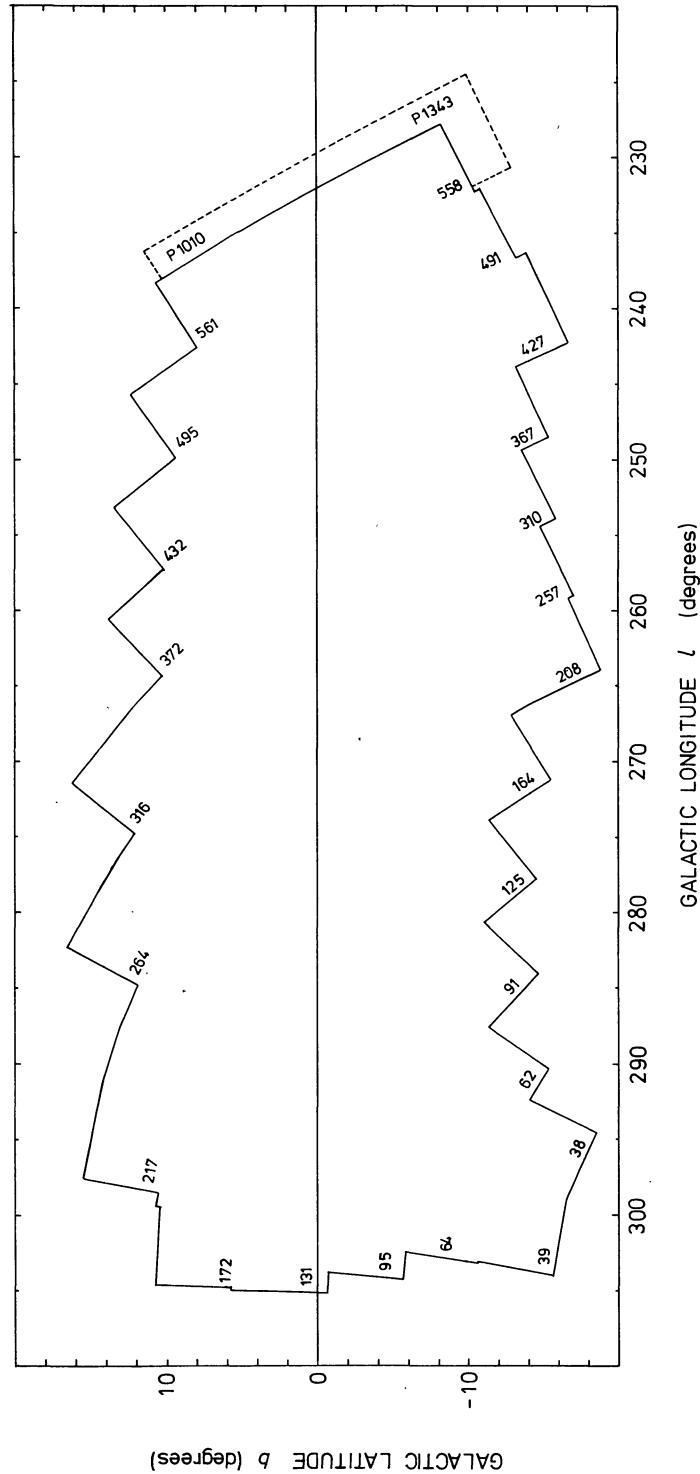


FIGURE 1. — Plot showing the sky coverage of the ESO/SRC and Palomar (POSS) survey prints used in identifying the objects listed in table I. The numbers indicate the first and the last plate used for the object search in a specific declination zone. The region searched only on POSS prints is indicated by the dotted line.

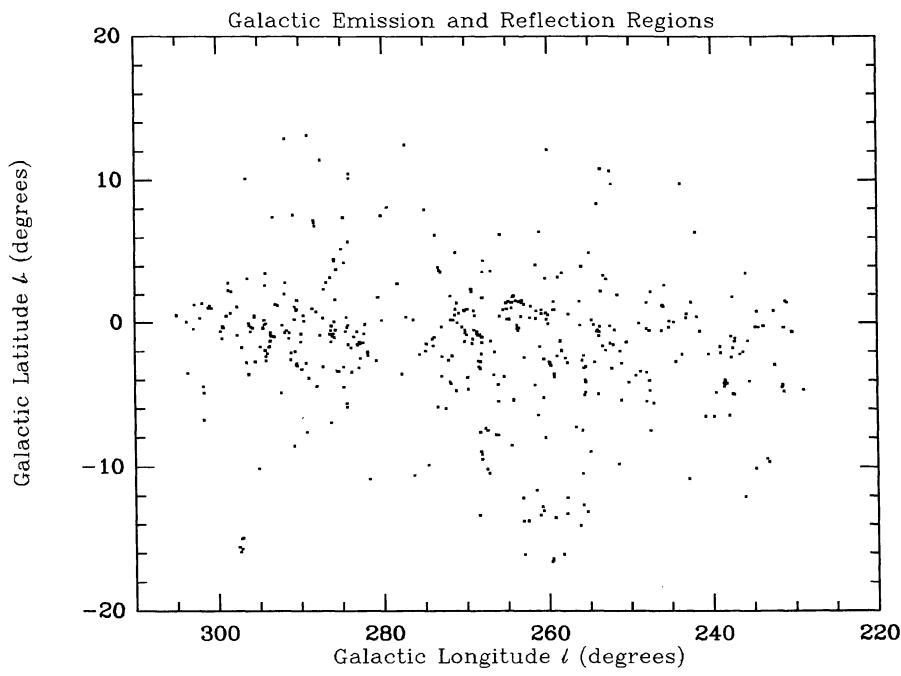


FIGURE 2.— Plot of the positions on the sky for all objects listed in table I. Note the concentration of objects towards the galactic plane.

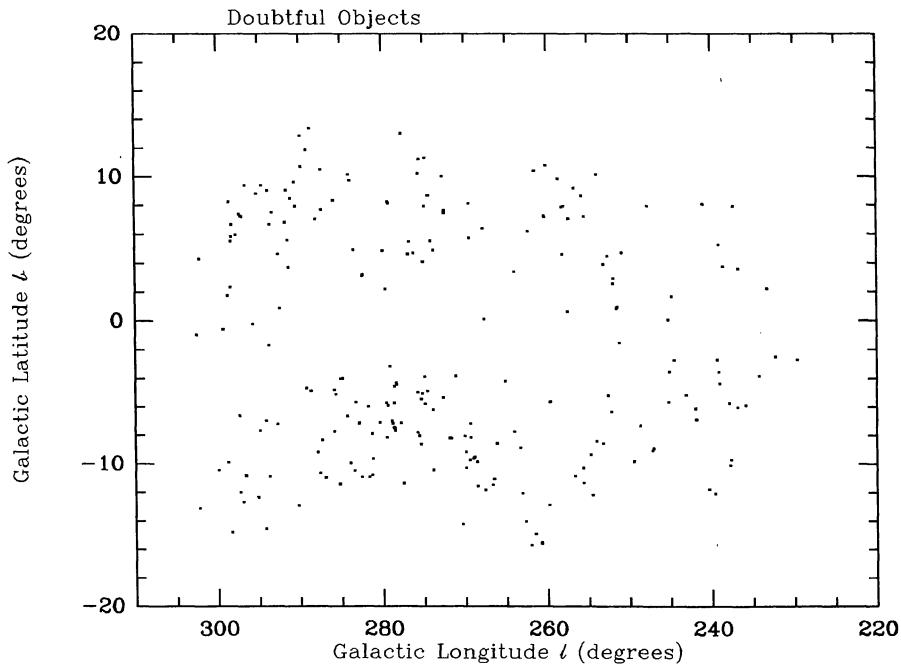


FIGURE 3.— Plot showing doubtful nebulous objects not included in table I. Note the avoidance of these objects for the galactic plane.