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Radio surveys and source counts at 408 MHz and 1420 MHz towards the Abell 1314 cluster of galaxies

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Summary. — The cluster of galaxies Abell 1314 has been observed with the Penticton synthesis telescope simultaneously at 408 MHz (73.5 cm wavelength) with a sensitivity (7 rms) near 70 mJy and at 1420 MHz (21.1 cm wavelength) with a sensitivity (5 rms) near 4.3 mJy. In addition to the 3 cluster sources detected, a further 64 background radio sources have been detected at 1420 MHz (the 20P radio survey), and 169 background sources at 408 MHz (the 21P radio survey). The surveys extend to a radius of 3.7 degrees at 408 MHz, and to 1.0 degree at 1420 MHz, from the map center at RA = 11h31.5m, Dec = + 49d20′. The differential source count for the background radio sources, derived at 408 MHz in the flux density range 90 mJy to 3.0 Jy, shows consistency with the Cambridge 5C5 survey at 408 MHz in a direction away from clusters of galaxies. Also, the differential count derived at 1420 MHz in the flux density range 10 mJy to 330 mJy is consistent with the Westerbork LBDS survey at a nearby frequency away from clusters of galaxies. We find no candidate for very steep spectrum « relic » sources in this cluster of galaxies, nor for very flat spectrum « blue » background radio galaxies behind the cluster.

Key words : radio surveys — radio sources — source counts — cosmology — clusters of galaxies.

1. Introduction.

In a previous paper (Vallée and Roger, 1987), we reported on the radio source members of the cluster of galaxies, Abell 1314, at 408 MHz and at 1420 MHz. In this paper, we provide the complete list of background radio sources observed at these two frequencies in the direction of this cluster. These surveys complement the survey at 610 MHz towards the same cluster by Wilson and Vallée (1982).

The radio observations and their reduction are explained in section 2, with the survey lists given in section 3. The background source counts are detailed in section 4, followed by a discussion and comparisons in section 5.

2. Observations and reduction.

Simultaneous radio observations were made at 408 MHz and at 1420 MHz with the Penticton synthesis radio telescope at the Dominion Radio Astrophysical Observatory. At the time of the observations, the instrument consisted of four 9-m paraboloids on a 600-m east-west baseline (Roger *et al.*, 1973). Table I lists the pertinent instrumental parameters at each frequency.

Maps of the total brightness distribution in total continuum intensity were made in the usual way by Fourier transformation, and were cleaned and restored with standard techniques. Sources above the detection threshold (Tab. I) were measured and their flux densities corrected for the attenuation due to the primary beam of the individual paraboloids. As usual, the flux density errors take account of the noise in the map, the calibration, and the zero level, following the derivation of Wilson and Vallée (1982).

3. Survey lists at 408 MHz and at 1420 MHz.

Lists were compiled of all sources within radii of 3.7 deg, at 408 MHz, and 1.07 deg at 1420 MHz. The nomenclature follows the « *nPxxx* » scheme of Higgs (1986) in which *n* is the list serial number, P refers to Penticton, and *xxx* is the source serial number. Table II contains the 21P source list for 408 MHz, while table III contains the 20P source list at 1420 MHz in the same format.

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For 1420 MHz, we omitted from table III the two extended cluster sources IC708 and IC711 near the center of the field as in the map of Vallée and Roger (1987, their Fig. 1) ; one additional cluster source, IC712, is listed as 20P39, and the compact background source « G » (Vallée and Roger, 1987) is listed as 20P33. For 408 MHz, we have omitted from table II the three cluster sources IC708, IC711, and IC712, plus source « G », since their radio emission merged together within 5′ of the field center, as seen in the map of Vallée and Roger (1987, their Fig. 3). This angular distance of 5′ corresponds to a linear distance of 300 kpc for the Abell 1314 cluster at a redshift of 0.0338 (Coleman *et al.*, 1976) and for a Hubble constant of 50 km.s^{-1}.Mpc^{-1}.

Table IV lists the sizes of the background sources that are observed to be extended at 408 MHz. The sizes of the cluster sources have been detailed in Vallée and Roger (1987).

Table V contains the radio spectral indices of the background sources listed in both table II (408 MHz) and table III (1420 MHz). For these 14 sources, the mean spectral index is $\alpha = 0.88 \pm 0.08$, in the notation $S \sim \nu^{-\alpha}$. The seven brightest sources ($S > 120$ mJy at 408 MHz) have a mean spectral index $\alpha = 0.93 \pm 0.06$, while the seven weakest sources ($S < 120$ mJy at 408 MHz) have a mean spectral index $\alpha = 0.82 \pm 0.12$. Thus there is no significant difference in spectral index between the stronger and the weaker background sources at 408 MHz.

4. Background source counts.

The radio sources corresponding to the known cluster members (IC708, IC711 and IC712) are not included in the source counts described here. For each of the other sources we have calculated the maximum angular radius from the field center at which the source could have been detected, considering the attenuation of the power pattern P of the primary antennae and the flux density cutoff S_{cut}. Thus :

$$P = e^{-4 \ln 2 (\theta / \text{HPBW})^2} \tag{1}$$

$$S_{408} \cdot P_{\text{max. rad.}} = 7 \text{ rms} \quad \text{(at 408 MHz)} \tag{2}$$

$$\theta^2_{\text{max. rad.}} = \text{HPBW}^2 \, (4 \ln 2)^{-1} (\ln (S_{408}) - \ln (7 \text{ rms})) \tag{3}$$

where HPBW denotes the half power beam width.

If the $\theta_{\text{max. rad.}}$ thus computed exceeded the survey radial extent, then $\theta_{\text{max. rad.}}$ was replaced by the survey radial extent as given in table I. For each source, the inverse of the corresponding sky area (in sterad.) was computed, i.e. $(3.1416\ \theta^2_{\text{max. rad.}})^{-1}$. These inverses were later summed for all sources in the flux density ranges 10 to 15.5 mJy, 15.5 to 24.0 mJy, ..., where the lowest flux density of the ith range is given by

$$S_i = 10.0 \text{ mJy } (1.55)^{i-4}, \quad i = 1, 2, 3, \ldots \tag{4}$$

Finally, the sums dN thus obtained were divided by their respective range dS, to give dN/dS in sources/sterad./Jy. This procedure was performed independently for the 408 MHz and the 1420 MHz survey lists, using their respective P, S_{cut}, HPBW, and survey radial extent.

Table VI shows the results obtained for the source counts dN/dS, along with the number N of sources observed at Penticton in each range. The dN/dS values in table VI have been decreased slightly for a small effect known as the Murdoch correction by means of an extrapolation of the correction factors given in table II of Murdoch *et al.* (1973) to an integral count slope of 0.8.

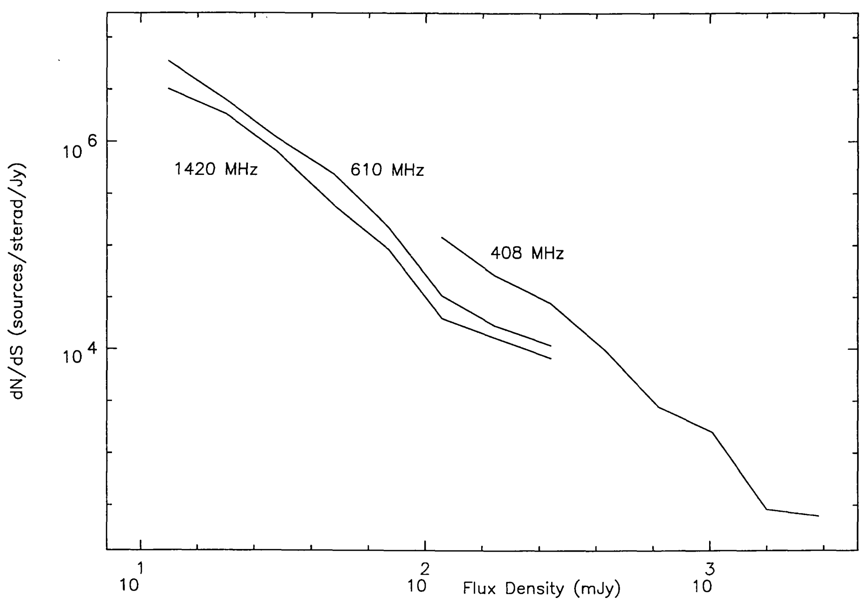

FIGURE 1. — The background differential source counts dN/dS (sources/sterad/Jy) toward the cluster Abell 1314, as a function of the source flux density (mJy), plotted on a log-log scale. The data for 1420 MHz and for 408 MHz are from this paper (Tab. VI), while the data for 610 MHz are from Wilson and Vallée (1982, their Tab. 6).

At 408 MHz, the largest decrease needed for this effect was only 1.9 %. At 1420 MHz, the largest decrease needed was only 1.2 %.

Figure 1 shows the source counts thus obtained, i.e. the differential counts dN/dS toward A1314, as a function of source flux density, plotted on a log-log scale. The differential source counts shown are those at 408 MHz and at 1420 MHz as computed above, and those at 610 MHz computed in an identical way by Wilson and Vallée (1982).

5. Discussion.

(a) Comparison of the source counts at 408 MHz — Penticton and Cambridge 5C5.

The power law :

$$dN/dS = (2200 \pm 400)\, S_{\mathrm{Jy}}^{-1.9 \pm 0.1}\ \mathrm{sterad}^{-1}\ \mathrm{Jy}^{-1} \quad (5)$$

was derived by a least squares fitting technique over the range 90 mJy to 516 mJy. Over the same flux density range, the Cambridge 5C5 survey at 408 MHz of Pearson (1975, his Tab. 3a) gives a power law $dN/dS = (2600 \pm 2000)\, S_{\mathrm{Jy}}^{-1.6 \pm 0.5}$ sterad^{-1} Jy^{-1}, not significantly different to ours. There is agreement between the 21P list and the 5C5 list, the individual values of dN/dS differing by < 4 % (2 σ) when $n > 12$ in both lists. The agreement suggests that at the 1-σ level there are less than 3 radio sources associated with the cluster A1314 which are identifiable with faint galaxies or have no optical emission on the PSS.

(b) Comparison of the source counts at 1420 MHz — Penticton and Westerbork LBDS.

The power law :

$$dN/dS = (410 \pm 200)\, S_{\mathrm{Jy}}^{-2.1 \pm 0.1}\ \mathrm{sterad}^{-1}\ \mathrm{Jy}^{-1} \quad (6)$$

was derived by a least squares fit over the range 10 mJy to 58 mJy. Over the same flux density range, the Westerbork LBDS survey at 1412 MHz of Windhorst *et al.* (1984, their Tab. 10b) gives a power law $dN/dS = (341)\, S_{\mathrm{Jy}}^{-2.2 \pm 0.2}$ sterad^{-1} Jy^{-1}, againt not significantly different to ours. There is agreement between the 20P list and the LBDS list, with individual values of dN/dS differing by < 3 % (2 σ) except in the lowest flux density bin. This agreement suggests that at the 2-sigma level there are less than 2 radio sources associated with the cluster A1314 which are identifiable with faint galaxies or have no optical emission on the PSS.

(c) Proposed new source populations.

The new « relic » cluster source population of Andernach *et al.* (1988) and Reynolds (1987) is based on some statistical evidence for very steep ($\alpha > 1.2$) radio spectrum sources without any optical emission (0.3 such source in a cluster). This relic cluster population could be radio remnants swept away from the parent galaxy, the parent galaxy having turned radio quiet since. Our values in table V for the spectral index and in table VI for source counts, omitting the cluster sources with optical identification, give no candidate for such a relic cluster source in our sample (at 408 MHz, our 1 σ upper limit for all sources turns into 0.4 relic steep spectrum source, not contradicting the expected 0.3 relic steep spectrum source).

The new « blue » background source population of Oort *et al.* (1988) is based on some statistical evidence for very flat radio spectrum sources at low flux densities. They derived such a « blue » population with $\alpha = 0$ for $S_{21\,\mathrm{cm}} < 1$ mJy, whereas the standard population has $\alpha = 0.8$ for $S_{21\,\mathrm{cm}} > 100$ mJy. The flattening of the spectra is assumed to start at 100 mJy at 21 cm, so the spectral index changes roughly linearly from $\alpha = 0$ to $\alpha = 0.8$ between 1 mJy and 100 mJy. Our spectral data in table V show a value $\alpha = 0.8 \pm 0.1$ (as opposed to the expected value of 0.7) for six sources with $S_{21\,\mathrm{cm}} > 70$ mJy, and $\alpha = 0.9 \pm 0.1$ (as opposed to the expected value of 0.3) for eight sources with 19 mJy $< S_{21\,\mathrm{cm}} < 50$ mJy. Our values of α indicate no change in spectral index in our sample. There is a bias against flat spectrum sources due to the flux density cutoff at 74 cm here (thus not in contradiction with their deeper sample below 19 mJy).

In an earlier paper, Wilson and Vallée (1982) attempted to identify the radio sources in the 610 MHz survey (with 4″ accuracy) with optical objects to the limit of the Palomar Sky Observatory prints (with 1″ accuracy). Because of the relatively low accuracy of the radio positions, the number of possible identifications was close to the expected number of coincidences by chance. The situation would be similar with the Penticton lists, since position errors in our 21P survey (with 12″ accuracy) and 20P survey (with 4″ accuracy) are similar to those in the 610 MHz survey.

6. Conclusions.

We have presented complete 408 MHz and 1420 MHz survey lists and have derived background source counts for fields centered on the position of Abell 1314. There is agreement between these counts and those of non-cluster fields (Cambridge 5C5 at 408 MHz, Westerbork LBDS at 1412 MHz). We find no candidate in our samples for very steep spectrum relic cluster sources, nor for very flat spectrum blue background sources.

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TABLE I. — *Instrumental parameters at 408 MHz and 1420 MHz.*

Wavelength	73.5cm	21.1cm
Obs. Period	Dec.'85-June'86	Dec.'85-June'86
Observing time	35 half-days	35 half-days
Field center, RA(1950)	11h 31m 30.0s	11h 31m 30.0s
Field Center, Dec(1950)	+49d 20' 00"	+49d 20' 00"
Single dish HPBW	318'	103'
Synthesised HPBW, RAxDec	3.5' x 4.6'	1.0' x 1.3'
r.m.s. noise	10.0 mJy/beam area	0.86 mJy/beam area
Survey detection cutoff	7 r.m.s.	5 r.m.s.
Survey radial extent	223'	64'

TABLE II. — *Source List at 408 MHz, corrected for a primary beam with Gaussian function of HPBW of 318 arcmin.*

Source Name	R.A.(1950) h	m	s	& sd s	Dec.(1950) o	'	"	& sd "	Flux Density mJy	& sd mJy	Other Name(*)
21P01	11	10	23.9	1.1	+47	35	11	14	414	43	
21P02	11	12	23.9	1.3	+50	25	26	16	242	46	
21P03	11	12	33.9	1.1	+47	31	36	13	548	43	
21P04	11	12	36.3	1.1	+50	12	58	13	1193	70	
21P05	11	14	57.8	1.1	+49	17	25	13	374	27	
21P06	11	14	59.2	1.1	+50	24	03	13	378	27	
21P07	11	15	00.7	1.1	+50	07	12	14	264	27	
21P08	11	15	40.3	1.2	+49	48	40	15	211	29	
21P09	11	16	07.6	1.1	+47	54	42	13	276	25	
21P10	11	16	25.3	1.1	+50	21	34	13	468	35	
21P11	11	17	33.2	1.2	+50	46	05	14	232	24	
21P12	11	17	45.0	1.3	+51	49	24	14	274	36	
21P13	11	18	05.0	1.1	+48	01	49	13	250	19	
21P14	11	18	33.4	1.1	+46	34	48	13	329	29	
21P15	11	18	59.1	1.2	+50	42	06	17	352	40	
21P16	11	19	01.3	1.2	+51	39	32	15	188	26	
21P17	11	19	04.9	1.1	+49	25	05	13	268	18	
21P18	11	19	08.6	1.5	+49	49	07	17	164	29	
21P19	11	19	10.2	1.1	+50	27	27	13	447	32	
21P20	11	19	32.7	1.2	+47	29	34	14	166	20	
21P21	11	19	52.5	1.1	+48	10	56	13	419	30	
21P22	11	19	55.8	1.1	+50	26	45	13	525	35	
21P23	11	20	15.8	1.1	+47	32	45	13	280	25	
21P24	11	20	26.5	1.2	+52	11	37	14	303	34	
21P25	11	20	33.1	1.2	+48	14	23	14	167	22	
21P26	11	20	49.8	1.5	+51	01	51	16	197	35	
21P27	11	21	06.6	1.1	+51	58	17	13	587	44	
21P28	11	21	32.1	1.3	+49	06	25	15	87	13	
21P29	11	21	57.0	1.1	+50	50	47	13	269	22	
21P30	11	21	59.6	1.1	+48	02	59	13	286	21	
21P31	11	22	11.9	1.5	+49	20	50	15	203	32	
21P32	11	22	34.7	1.2	+51	34	21	14	216	24	
21P33	11	22	50.2	1.3	+50	16	58	14	163	24	
21P34	11	22	57.2	1.2	+48	44	14	13	180	17	
21P35	11	23	07.4	1.2	+49	09	46	14	97	11	
21P36	11	23	09.4	1.1	+49	30	48	13	627	40	
21P37	11	23	17.3	1.3	+46	57	01	17	173	28	
21P38	11	23	19.8	1.1	+50	39	25	13	990	55	
21P39	11	23	33.0	1.1	+51	10	32	13	205	17	
21P40	11	23	39.2	1.1	+48	07	13	13	201	15	
21P41	11	23	53.2	1.8	+49	45	43	21	84	25	
21P42	11	24	08.7	1.1	+48	49	47	13	921	56	
21P43	11	24	24.2	1.1	+49	54	01	12	1793	93	
21P44	11	24	40.9	1.3	+49	17	38	15	77	11	
21P45	11	24	57.4	1.3	+50	22	52	17	91	16	
21P46	11	25	21.1	1.1	+48	39	39	13	253	23	
21P47	11	25	37.5	1.4	+47	47	14	16	120	22	
21P48	11	25	57.1	1.2	+49	27	22	15	96	12	1125+49W1
21P49	11	26	13.4	1.4	+48	47	58	16	93	19	
21P50	11	26	20.8	1.1	+51	39	48	13	606	38	
21P51	11	26	26.5	1.1	+50	40	21	13	967	56	
21P52	11	26	35.6	1.1	+48	17	47	13	403	23	
21P53	11	26	49.9	1.1	+46	00	20	13	900	52	
21P54	11	27	03.2	1.1	+50	42	27	12	3065	156	

TABLE II *(Continued)*.

21P55	11	27	32.9	1.2	+49	27	53	14	115	14	1127+49W1
21P56	11	27	37.0	1.3	+48	56	00	14	128	16	1127+48W1
21P57	11	28	06.8	1.1	+51	24	33	13	330	26	
21P58	11	28	19.2	1.3	+49	12	31	16	77	14	1128+49W1
21P59	11	28	27.6	1.1	+48	45	14	14	101	11	1128+48W1
21P60	11	28	31.6	1.1	+52	03	29	13	297	23	
21P61	11	28	59.1	1.1	+47	17	00	13	245	18	
21P62	11	29	44.2	1.1	+52	44	23	13	430	38	
21P63	11	29	52.7	1.5	+50	26	42	17	213	38	
21P64	11	30	06.4	1.1	+51	16	53	13	445	29	
21P65	11	30	16.7	1.2	+47	57	01	14	123	13	
21P66	11	30	27.6	1.2	+46	55	09	14	215	22	
21P67	11	30	29.9	1.1	+50	25	17	12	2412	126	1130+50W1
21P68	11	30	32.5	1.1	+51	30	19	13	169	16	
21P69	11	30	34.5	1.5	+50	52	38	20	92	20	
21P70	11	30	37.7	1.2	+45	47	33	14	420	43	
21P71	11	30	39.3	1.1	+48	20	28	13	171	15	1130+48W2
21P72	11	30	40.3	1.2	+47	18	57	14	179	18	
21P73	11	31	09.1	1.3	+47	43	18	14	93	13	
21P74	11	31	20.1	1.3	+47	19	08	14	98	14	
21P75	11	31	30.2	1.1	+47	25	55	14	156	17	
21P76	11	31	39.8	1.2	+50	47	25	14	399	36	
21P77	11	32	22.6	1.1	+50	08	25	13	508	31	1132+50W1
21P78	11	32	29.9	1.1	+51	23	11	13	376	27	
21P79	11	32	35.4	1.1	+50	47	02	13	320	26	
21P80	11	33	09.8	2.1	+51	02	44	16	96	20	
21P81	11	33	11.1	1.5	+48	26	00	16	84	16	1133+48W1
21P82	11	33	13.9	1.2	+52	05	11	15	219	25	
21P83	11	33	20.1	1.1	+52	42	58	13	397	35	
21P84	11	33	45.1	1.2	+48	19	49	14	173	17	1133+48W2
21P85	11	33	48.6	1.7	+50	30	11	17	120	34	
21P86	11	34	30.0	1.2	+48	42	15	14	107	12	1134+48W1
21P87	11	35	14.2	1.2	+46	36	53	14	361	43	
21P88	11	35	16.0	1.1	+46	28	24	13	904	57	
21P89	11	35	28.6	1.6	+50	11	40	38	95	24	
21P90	11	35	36.1	1.2	+50	06	32	16	198	24	1135+50W1
21P91	11	35	36.6	1.1	+48	21	04	13	239	17	1135+48W1
21P92	11	35	40.8	1.1	+48	01	55	13	525	33	
21P93	11	35	44.4	1.1	+49	45	06	13	203	17	1135+49W2
21P94	11	35	44.4	1.1	+51	22	40	13	310	22	
21P95	11	35	45.2	1.1	+46	24	57	13	1213	71	
21P96	11	35	48.7	1.1	+45	57	07	14	325	36	
21P97	11	35	49.0	1.1	+52	12	17	13	240	21	
21P98	11	36	10.8	1.1	+50	32	42	12	2201	117	
21P99	11	36	15.6	1.1	+47	32	14	13	372	25	
21P100	11	36	25.2	1.2	+46	49	22	14	153	17	
21P101	11	36	34.8	1.1	+50	16	48	13	417	33	1136+50W1
21P102	11	36	39.1	1.1	+49	15	35	13	335	24	1136+49W2
21P103	11	37	16.1	1.1	+49	19	10	13	777	43	1137+49W1
21P104	11	37	17.1	1.2	+51	02	24	14	196	19	
21P105	11	37	17.5	1.2	+51	25	27	14	131	13	
21P106	11	37	32.5	4.1	+47	15	46	27	334	66	
21P107	11	37	33.7	1.1	+50	27	02	13	570	37	
21P108	11	37	44.8	1.1	+47	06	32	14	205	27	
21P109	11	37	50.0	1.1	+47	14	08	14	299	31	
21P110	11	37	59.9	1.2	+47	49	42	14	164	18	
21P111	11	38	27.4	1.2	+50	13	39	19	153	25	
21P112	11	38	35.0	1.2	+47	58	38	14	167	18	
21P113	11	38	44.6	1.1	+46	11	57	13	282	26	
21P114	11	39	14.6	1.1	+50	01	44	13	328	24	
21P115	11	39	16.8	1.6	+50	19	07	22	151	30	
21P116	11	39	17.1	1.1	+49	52	36	13	219	21	
21P117	11	39	17.4	1.3	+49	35	37	16	110	20	
21P118	11	39	21.5	1.1	+50	34	11	14	177	18	
21P119	11	39	39.9	1.3	+51	37	17	14	220	27	
21P120	11	39	48.7	1.1	+51	02	14	13	515	34	
21P121	11	39	55.5	1.2	+48	51	20	14	184	21	
21P122	11	40	11.9	1.3	+51	37	59	14	222	28	
21P123	11	40	15.9	1.2	+50	07	25	14	312	30	
21P124	11	40	17.0	1.9	+48	16	11	17	99	21	
21P125	11	40	19.1	1.1	+49	08	01	12	3171	164	
21P126	11	40	26.3	1.3	+48	38	33	15	65	12	
21P127	11	40	50.2	1.4	+51	19	30	14	252	30	
21P128	11	41	00.6	1.1	+46	38	00	13	2841	156	
21P129	11	41	05.3	2.4	+48	15	39	41	123	30	
21P130	11	41	10.0	1.1	+47	34	55	13	481	31	
21P131	11	41	26.8	1.3	+46	50	06	15	174	32	
21P132	11	41	35.4	1.1	+51	32	36	13	1241	68	
21P133	11	41	43.5	1.5	+49	32	38	16	90	17	
21P134	11	41	53.9	1.2	+48	32	42	15	118	17	
21P135	11	42	02.9	1.1	+51	40	25	13	531	44	
21P136	11	42	21.1	1.2	+52	14	21	14	411	38	
21P137	11	42	55.7	1.1	+48	25	41	13	225	20	
21P138	11	43	04.7	1.1	+50	02	51	12	6252	319	
21P139	11	43	25.5	1.4	+48	41	43	16	164	27	
21P140	11	43	52.0	1.2	+51	02	43	14	267	29	
21P141	11	44	26.4	1.2	+49	53	40	16	300	41	
21P142	11	44	27.7	1.1	+46	25	52	13	1057	60	
21P143	11	44	31.0	1.1	+50	47	18	14	294	27	
21P144	11	44	31.3	1.1	+51	02	20	13	472	39	
21P145	11	44	50.2	1.1	+49	45	50	13	812	59	
21P146	11	45	00.6	1.1	+49	22	47	14	151	18	
21P147	11	45	14.4	1.1	+48	35	33	12	1904	99	
21P148	11	45	30.2	1.1	+47	27	08	13	352	34	
21P149	11	45	34.5	1.1	+51	08	04	13	388	31	
21P150	11	45	58.7	1.3	+47	24	51	19	260	41	
21P151	11	46	00.8	1.1	+48	59	16	13	368	29	
21P152	11	46	07.4	1.4	+47	20	12	20	215	37	
21P153	11	46	29.3	1.1	+46	55	30	13	840	51	
21P154	11	46	33.9	1.1	+48	17	33	13	208	20	
21P155	11	46	34.6	1.1	+50	47	51	13	631	48	
21P156	11	46	58.7	1.3	+50	23	41	16	283	33	
21P157	11	48	11.1	1.1	+49	40	23	13	340	31	
21P158	11	48	32.7	1.1	+47	45	38	12	2530	133	
21P159	11	49	22.7	1.1	+50	07	32	13	592	44	
21P160	11	49	52.8	2.0	+49	57	13	20	245	50	
21P161	11	49	59.0	1.3	+48	44	13	15	197	28	
21P162	11	50	08.5	2.0	+50	03	28	20	221	50	
21P163	11	50	32.9	1.3	+48	52	33	15	204	30	
21P164	11	50	48.6	1.1	+49	47	56	13	4072	216	
21P165	11	51	06.3	1.2	+48	08	13	14	277	32	
21P166	11	51	09.5	1.1	+47	43	29.	13	1183	75	
21P167	11	51	32.9	1.1	+50	28	47	13	432	37	
21P168	11	51	44.4	1.2	+48	51	47	14	243	31	
21P169	11	53	35.5	1.2	+48	59	19	14	520	53	

(*) In the 610 MHz survey of A1314 by Wilson and Vallee (1982, their table 3).

TABLE III. — *Source List at 1420 MHz, corrected for a primary beam of Gaussian function of HPBW of 103 arcmin.*

Source Name	R.A. (1950) h	m	s	& sd s	Dec. (1950) °	′	″	& sd ″	Flux Density mJy	& sd mJy	Other Name (*)
20P01	11	25	45.5	0.4	+48	55	09	4	37	3	
20P02	11	25	56.0	0.4	+49	27	52	4	49	4	1125+49W1
20P03	11	25	59.7	0.5	+49	50	39	5	14	3	
20P04	11	26	13.9	0.4	+48	47	50	4	43	5	
20P05	11	26	45.5	0.6	+48	43	21	5	23	4	
20P06	11	27	14.7	0.4	+48	42	51	4	21	3	
20P07	11	27	33.8	0.4	+48	56	08	4	45	3	1127+48W1
20P08	11	27	33.8	0.4	+49	27	50	4	20	2	1127+49W1
20P09	11	27	48.5	0.4	+49	17	36	4	18	2	1127+49W2
20P10	11	27	51.5	0.4	+49	35	15	5	11	2	
20P11	11	27	55.3	0.4	+48	32	55	4	32	4	
20P12	11	28	00.2	0.4	+49	40	20	4	13	2	1127+49W3
20P13	11	28	09.9	0.5	+49	26	58	5	9	2	
20P14	11	28	18.4	0.4	+49	12	39	3	47	3	1128+49W1
20P15	11	28	28.9	0.4	+48	45	02	3	27	2	1128+48W1
20P16	11	29	05.7	0.4	+49	11	10	4	9	2	
20P17	11	29	19.0	0.6	+50	02	24	5	15	3	
20P18	11	29	27.4	0.4	+50	04	24	4	24	3	1129+50W1
20P19	11	29	55.4	0.3	+49	57	40	4	23	2	
20P20	11	30	22.1	0.3	+48	50	10	4	13	2	1130+48W1
20P21	11	30	23.0	0.4	+49	29	24	5	13	2	1130+49W3
20P22	11	30	30.7	0.3	+49	33	53	3	15	2	1130+49W4
20P23	11	30	33.6	0.3	+49	31	50	3	19	2	1130+49W5
20P24	11	30	38.7	0.3	+48	20	32	3	71	4	1130+48W2
20P25	11	30	40.2	0.3	+49	18	50	3	29	2	1130+49W7
20P26	11	30	42.2	0.4	+49	42	14	4	13	2	1130+49W8
20P27	11	30	44.7	0.3	+49	47	02	4	15	2	1130+49W9
20P28	11	30	48.9	0.3	+48	58	53	3	14	2	1130+48W3
20P29	11	31	05.3	0.3	+49	15	35	4	33	3	1131+49W1
20P30	11	31	06.3	0.4	+48	31	13	4	15	2	
20P31	11	31	13.0	0.3	+48	34	56	3	24	2	
20P32	11	31	16.3	0.4	+49	59	44	4	11	2	
20P33	11	31	34.0	0.3	+49	25	38	3	21	2	
20P34	11	31	48.5	0.4	+48	38	01	4	9	2	
20P35	11	31	56.2	0.4	+50	01	55	4	16	3	1131+50W1
20P36	11	31	58.4	0.4	+49	31	01	5	16	2	1131+49W6
20P37	11	32	03.4	0.3	+49	47	29	3	27	2	1132+49W1
20P38	11	32	04.8	0.4	+50	03	59	5	9	2	
20P39	11	32	06.6	0.3	+49	21	17	3	32	2	1132+49W3
20P40	11	32	11.9	0.3	+49	55	27	3	18	2	1132+49W4
20P41	11	32	18.9	0.4	+49	28	08	4	9	2	1132+49W6
20P42	11	32	20.4	0.5	+48	42	03	4	16	3	
20P43	11	32	22.0	0.3	+50	08	21	3	149	5	1132+50W1
20P44	11	32	29.0	0.5	+48	43	15	4	19	3	
20P45	11	32	30.0	0.3	+49	14	42	3	14	2	1132+49W8
20P46	11	32	34.3	0.4	+49	31	38	4	10	2	1132+49W9
20P47	11	33	11.3	0.3	+48	26	02	4	19	3	1133+48W1
20P48	11	33	21.3	0.4	+49	20	36	5	19	3	
20P49	11	33	45.8	0.3	+48	49	57	4	9	2	
20P50	11	33	47.3	0.4	+49	37	17	4	13	2	
20P51	11	34	04.2	0.3	+49	08	10	3	26	2	1134+49W1
20P52	11	34	27.2	0.3	+48	42	11	3	75	4	1134+48W1
20P53	11	34	28.6	0.4	+49	58	55	4	15	3	
20P54	11	34	39.3	0.4	+49	41	28	4	10	2	1134+49W2
20P55	11	34	44.4	0.3	+49	07	25	4	15	2	1134+49W3
20P56	11	34	51.2	0.3	+49	34	43	4	16	2	1134+49W4
20P57	11	35	05.8	0.4	+49	07	52	4	12	2	
20P58	11	35	20.4	0.3	+49	15	35	3	33	2	1135+49W1
20P59	11	35	35.0	0.3	+50	07	00	3	81	5	1135+50W1
20P60	11	35	44.1	0.3	+49	45	13	3	43	4	1135+49W2
20P61	11	36	12.7	0.4	+49	07	38	4	14	3	1136+49W1
20P62	11	36	14.2	0.4	+48	47	51	5	10	3	
20P63	11	36	16.5	0.7	+49	55	03	11	25	9	
20P64	11	36	37.7	0.3	+49	15	31	3	90	4	1136+49W2
20P65	11	37	15.8	0.3	+49	19	07	3	229	8	1137+49W1

(*) In the 610 MHz survey of A1314 by Wilson and Vallee (1982, their table 3).

TABLE IV. — *Size of extended sources at 408 MHz.*

Source Name	Major Axis Size ′	Minor Axis Size ′	PA Major Axis °
21P15	6.4	1.0	165
21P135	2.4	1.0	114
21P136	2.3	1.0	055
21P156	4.4	1.9	142

TABLE V. — *Comparison table for sources in both lists (408 and 1420 MHz).*

Name 1420 MHz	Right Ascension (1950)	Declination (1950)	Flux Densities 21cm	Flux Densities 74cm	Spec'l Index	Name 408 MHz
20P02	11H 25M 56.0S	49D 27′ 52″	49mJy	96mJy	0.84	21P48
20P04	11H 26M 13.9S	48D 47′ 50″	43mJy	93mJy	0.62	21P49
20P07	11H 27M 33.8S	48D 56′ 8″	45mJy	128mJy	0.84	21P56
20P08	11H 27M 33.8S	49D 27′ 50″	20mJy	115mJy	1.39	21P55
20P14	11H 28M 18.4S	49D 12′ 39″	47mJy	77mJy	0.39	21P58
20P15	11H 28M 28.9S	48D 45′ 2″	27mJy	101mJy	1.05	21P59
20P24	11H 30M 38.7S	48D 20′ 32″	71mJy	171mJy	0.70	21P71
20P43	11H 32M 22.0S	50D 8′ 21″	149mJy	508mJy	0.98	21P77
20P47	11H 33M 11.3S	48D 26′ 2″	19mJy	84mJy	1.19	21P81
20P52	11H 34M 27.2S	48D 42′ 11″	75mJy	107mJy	0.28	21P86
20P59	11H 35M 35.0S	50D 7′ 0″	81mJy	198mJy	0.72	21P90
20P60	11H 35M 44.1S	49D 45′ 13″	43mJy	203mJy	1.25	21P93
20P64	11H 36M 37.7S	49D 15′ 31″	90mJy	335mJy	1.06	21P102
20P65	11H 37M 15.8S	49D 19′ 7″	229mJy	777mJy	0.98	21P103

TABLE VI. — *Source counts at three frequencies toward the Abell 1314 area.*

S (Jy)	408 MHz N	408 MHz dN/dS (sterad^{-1} Jy^{-1})	610 MHz N	610 MHz dN/dS (sterad^{-1} Jy^{-1})	1420 MHz N	1420 MHz dN/dS (sterad^{-1} Jy^{-1})
0.010 - 0.015	-	-	14	5.9×10^{6}	18	3.2×10^{6}
0.015 - 0.024	-	-	19	2.5×10^{6}	16	1.8×10^{6}
0.024 - 0.037	-	-	21	1.1×10^{6}	10	7.4×10^{5}
0.037 - 0.058	-	-	21	4.8×10^{5}	5	2.4×10^{5}
0.058 - 0.089	-	-	12	1.5×10^{5}	3	9.2×10^{4}
0.089 - 0.139	22	1.2×10^{5}	5	3.3×10^{4}	1	2.0×10^{4}
0.139 - 0.215	36	5.2×10^{4}	4	1.7×10^{4}	1	1.3×10^{4}
0.215 - 0.333	42	2.8×10^{4}	4	1.1×10^{4}	1	8.3×10^{3}
0.333 - 0.516	28	1.2×10^{4}	5	9.0×10^{3}	-	-
0.516 - 0.800	12	3.2×10^{3}	-	-	-	-
0.800 - 1.241	11	1.9×10^{3}	-	-	-	-
1.241 - 1.923	3	3.3×10^{2}	-	-	-	-
1.923 - 2.980	4	2.9×10^{2}	-	-	-	-