

THE PARKES CATALOGUE OF RADIO SOURCES

DECLINATION ZONE $+20^\circ$ TO $+27^\circ$

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Summary

This paper gives details of 397 radio sources between declinations $+20^\circ$ and $+27^\circ$ which were compiled from a finding survey made at 635 MHz with the 210 ft reflector at the Australian National Radio Astronomy Observatory, Parkes, N.S.W.

The survey covers an area of 0.703 steradian but is incomplete in two regions within $\pm 10^\circ$ of the galactic equator. Additional measurements of flux densities and positions were made at 1410 and 2650 MHz. Some discussions on spectra, source counts, and source identifications are included, and a comparison is made between this survey and other published catalogues covering the same region.

I. INTRODUCTION

This paper is the fifth section of a survey for radio sources being made with the 210 ft radio telescope at the Australian National Radio Astronomy Observatory, Parkes, N.S.W. The earlier parts of the survey have already been published and cover the declination zones 0° to $+20^\circ$ (Day *et al.* 1966), 0° to -20° (Shimmings *et al.* 1966), -20° to -60° (Bolton, Gardner, and Mackey 1964), and -60° to -90° (Price and Milne 1965). The present paper covers the remaining declination zone that is visible with the Parkes telescope, $+20^\circ$ to $+27^\circ$, and is complete except for two areas within $\pm 10^\circ$ of the galactic equator. The catalogue contains 397 sources within 0.703 steradian, 341 of these sources being outside the region $\pm 10^\circ$ of the galactic equator (effective area 0.606 steradian). The catalogue is thought to be substantially complete down to a flux density of 1.5 f.u.† at 635 MHz outside the galactic plane region but contains some weaker sources down to 0.8 f.u.

The observations differ from those of the earlier sections of the catalogue in that the finding survey was done at a frequency of 635 MHz. Positions and flux densities were subsequently measured at 1410 and 2650 MHz.

The estimated r.m.s. errors in position and the date of measurement are given for each source in the catalogue. For most of the sources the positions stated have an r.m.s. error of less than $1''.0$ arc in each coordinate. A few of the weaker sources have errors of up to $2''.0$ in each coordinate. Spectra and source counts at the three frequencies are discussed and a comparison is made between the results of this survey and the Cambridge 4C catalogue (Pilkington and Scott 1965) and the California Institute of Technology CTD list (Kellerman and Read 1965) for the regions of overlap. The results of an examination by J. G. Bolton of the source positions on the Palomar Sky Survey prints have been included.

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† 1 flux unit = 10^{-26} W m $^{-2}$ Hz $^{-1}$.

II. OBSERVATIONS AND EQUIPMENT

The observational procedures for this survey were similar to those for the previous surveys; they are given in detail in the first part of the catalogue (Bolton, Gardner, and Mackey 1964). The major difference is that the finding survey was carried out at 635 MHz rather than at 408 MHz. A degenerate parametric receiver with a 10 MHz bandwidth and a system temperature of 215°K was used. With a 2 sec time constant the peak-to-peak noise fluctuation was 0.33 degK, which corresponds to 0.50 f.u. At 635 MHz the telescope has a beamwidth of 30'.6 arc, and the flux limit was set by confusion between adjacent sources and by background irregularities rather than by the system noise.

The observations at 635 MHz consisted of a series of scans at 2.5 deg/min between declinations +20° and +27°. Adjacent scans were made at intervals of 2^m of right ascension. From these records 738 objects were selected down to a flux density of 0.7 f.u. at 635 MHz. Of these, approximately 400 of the strongest objects were subsequently selected for position and flux density measurement at 1410 and 2650 MHz. Most of the sources in this catalogue are stronger than 1 f.u. at 635 MHz.

All strong sources, with flux density greater than 3 f.u. at 635 MHz (or 0.8 f.u. at 2650 MHz), have been accurately positioned at 2650 MHz as part of a separate programme of accurate position measurement (Shimmings 1968). For the weaker sources some were positioned at 2650 MHz and some at 1410 MHz, the particular frequency being indicated in the catalogue (Table 2, column 13).

TABLE 1
DATES OF OBSERVATIONS AND POSITIONAL ERRORS

Reference	Observation Period	Frequency (MHz)	Estimated R.M.S. Error	Remarks
T6	July 29-30, 1965	2650	15"	Near transit
T10	Oct. 8-11, 1966	2650	16"	Near transit
T11A	Feb. 1-2, 1967	2650	16"	Near transit
T11B	Feb. 3-4, 1967	2650	30"	
T12A	June 22-27, 1967	2650	30"	
T20	Feb. 24-26, 1967	1410	1'-2'	
T21	May 15, 1967	1410	1'-2'	
T22	Sept. 14-15, 1967	1410	1'-2'	

III. SOURCE POSITION ERRORS

The position errors depend on the flux density of the source and the frequency at which its position was measured. All the strong sources were measured at 2650 MHz either near transit across the northern meridian, with an average r.m.s. positional error of 16" arc in each coordinate, or off the meridian, in which case the r.m.s. error is 30" arc. The positions of the weakest sources were measured at 1410 MHz and have an r.m.s. error of 1'.0 arc in each coordinate for sources stronger than 0.5 f.u. at 1410 MHz and 2'.0 arc for those few sources weaker than 0.5 f.u. Table 1 shows

the various observing sessions during which positions were measured, and the estimated r.m.s. error for each. For each source in the catalogue, the period of observation is indicated (Table 2, column 13).

IV. NOTES ON THE CATALOGUE

Table 2 contains details of the 397 sources in the declination zone $+20^\circ$ to $+27^\circ$:

Column 1. Parkes catalogue number derived from hours and minutes of right ascension and sign and degrees of declination.

Columns 2 and 3. Mean position for epoch 1950.0. For a discussion of position errors see Section III.

Columns 4 and 5. Annual precession in right ascension (seconds of time) and declination (seconds of arc).

Columns 6, 7, 8, and 9. Flux densities in flux units at frequencies of 178, 635, 1410, and 2650 MHz. The values at 178 MHz are from the 4C catalogue (Pilkington and Scott 1965). Where the flux density errors are thought to be significantly greater than those quoted in Table 3, Section V(b), the flux density has been placed in parentheses. For a discussion on the determination of flux densities, see Section V.

Columns 10 and 11. Values of the mean spectral index, flux density at 400 MHz, and estimated r.m.s. errors. C indicates a departure from a power law spectrum (see Section VI).

Column 12. Identification and remarks. The numerals I-IV refer to the classification of the optical field, on the Palomar Sky Survey prints, within a rectangle $\pm 1'.0$ from the position of the source (see Section VII). Where an optical identification has been made the following abbreviations apply: QSO, quasi-stellar object; QSO?, possible quasi-stellar object; E, elliptical galaxy; D, spherical galaxy with diffuse envelope; N, compact blue galaxy; S, spiral galaxy; DB, dumb-bell galaxy; M, estimated photographic magnitude; GAL, galaxy for which the type has not been determined. Other abbreviations used are: EXT, source appears extended, as indicated by beam broadening at 2650 MHz; CONF, confused, either with the background or with the source stated.

Column 13. Reference to period of observation during which position and flux density were measured (see Table 1).

Columns 14 and 15. New galactic coordinates.

Columns 16 and 17. Catalogue numbers as given by Pilkington and Scott (1965, 4C catalogue), Kellerman and Read (1965, CTD list), and Pauliny-Toth, Wade, and Heeschen (1966, NRAO); NPC = not previously catalogued. Parentheses around a catalogue number indicate that the source has been resolved at higher frequencies or that there is some doubt that the source and the Parkes catalogue source are identical.

TABLE 2
PARKES CATALOGUE OF RADIO SOURCES, DECLINATION ZONE $+20^{\circ}$ TO $+27^{\circ}$

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
SOURCE NUMNER	POSITION (1950)		ANNUAL PRECESSION		FLUX DENSITY				SPECTRUM		REMARKS	DATE	GALACTIC COORDS		OTHER CATALOGUE NUMBERS	
	R.A.	DEC.	+	+	S178	S635	S1410	S2650	INDEX	S400			L2	B2	4C	OTHER
0004+21	00 04 55	+21 47.9	3.08	20.0	4.1	1.6	0.6	0.4	0.9±0.2	2.0±0.6	III	T11B	110 -40		4C21.1	
0010+26	00 10 06	+26 45.5	3.10	20.0		2.0	0.5	0.4	1.0±0.4	2.3±0.8	II	T21	112 -35			CTD 1
0010+20	00 10 42	+20 30.5	3.10	20.0	(5.3)	(3.1)	(0.9)	0.5	-		III CONF WITH 0011+20	T10	111 -41			
0011+20	00 11 19	+20 28.4	3.10	20.0	(5.3)	(3.1)	(0.7)	0.3	-		III CONF WITH 0010+20 Q50? 18M	T10	111 -41		4C20.1	
0015+21	00 15 42	+21 25.2	3.11	20.0	3.6	1.1	0.7	0.5	0.7±0.2	1.8±0.5	III	T11B	113 -41		4C21.2	
0017+25	00 17 00	+25 46.0	3.12	20.0	2.6	1.3	0.7		0.7±0.5	1.7±0.8		T22	114 -36		4C25.1	
0018+24	00 18 44	+24 11.1	3.12	20.0	3.8	1.2	0.9	0.6	0.6±0.2	2.1±0.5	III	T11B	114 -38		4C24.1	CTD 2
0025+21	00 25 48	+21 00.9	3.13	19.9	4.8	2.5	0.9	0.6	0.8±0.2	2.8±0.7	III	T11B	116 -41		4C20.2	
0029+21	00 29 09	+21 36.5	3.14	19.9	3.9	1.8	0.8	0.4	0.9±0.2	2.4±0.7	II	T11B	117 -41		4C21.3	
0033+26	00 33 25	+26 04.4	3.17	19.8	2.8	1.4	(0.4)	0.4	0.8±0.4	1.8±0.8	III	T20	119 -36		4C26.1	
0035+23	00 35 13	+23 50.0	3.16	19.8		1.7	0.9	0.7	0.5±0.4	1.8±0.5	III	T20	119 -39			CTD 5
0038+25	00 38 37	+25 33.2	3.18	19.8	5.0	1.5	0.4	0.2	1.2±0.2	2.1±0.9	III	T11B	120 -37		4C25.2	
0039+21	00 39 00	+21 07.3	3.16	19.8	2.0	(1.6)	0.5	0.3	0.7±0.5	1.3±0.5	II	T21	120 -41		4C21.5	
0043+20	00 43 49	+20 12.0	3.17	19.7	2.4	1.6	0.8	0.3	1.0±0.3	2.5±0.8	II	T21	121 -42		4C20.4	3C21 NRAO 39
0044+23	00 44 06	+23 54.7	3.19	19.7	2.1	1.2	0.4	0.2	1.0±0.4	1.4±0.7		T12B	122 -39		4C23.3	
0053+26	00 53 11	+26 08.5	3.22	19.5	16.3	5.0	1.8	0.6	1.2±0.1	7.6±1.3	II E 17.5M	T10			4C26.2	3C28 CTD 6 NRAO 48
													124 -36			
0055+26	00 55 43	+26 35.9	3.23	19.5	5.1	(4.8)	1.3	1.0	0.6±0.2	2.8±0.6		T12A	125 -36		4C26.3	CTD 7
0100+25	01 00 07	+25 35.9	3.24	19.4	4.8	2.8	0.9	0.6	0.9±0.2	3.0±0.7	II	T11B	126 -37		4C25.3	CTD 8

0108+25	01 08 35	+25 49.5	3.26	19.2	2.7	0.8	0.4	0.3	0.8±0.3	1.2±0.5	III	T20	128 -37	4C25.4	
0117+22	01 17 49	+22 40.1	3.26	18.9		1.5	0.7	0.5	0.7±0.4	1.8±0.5		T128	132 -39		NPC
0121+23	01 21 05	+23 50.4	3.28	18.8	(3.7)	(2.0)	(1.1)	0.4	-		III CONF WITH 0121+24	T118	132 -38		NPC
0121+24	01 21 09	+24 03.0	3.28	18.8	(3.7)	(2.0)	(1.1)	0.2	-		III CONF WITH 0121+23	T118	132 -38	4C23.4	
0123+25	01 23 54	+25 41.5	3.30	18.7	2.5	1.1	0.5		0.8±0.6	1.4±0.9		T22	133 -36	4C25.5	
0124+22	01 24 23	+22 59.0	3.28	18.7	3.2	(1.4)	(0.3)	0.1	1.3±0.4	1.1±0.8	II CONF	T118	133 -39	4C23.5	
0127+23	01 27 15	+23 22.8	3.29	18.6	11.6	6.2	3.0	1.9	0.7±0.1	7.6±1.0	III QSO 19M	T10	134 -38	4C23.6	3C43 NRAO 74
0127+25	01 27 38	+25 52.7	3.32	18.6	3.8	2.8	1.6	1.0	0.6±0.2	3.5±0.6	III	T118	134 -36	4C25.6	CTD 11
0128+25	01 28 33	+25 05.0	3.31	18.6	8.6	3.5	1.3	1.0	0.8±0.1	4.2±0.8	III	T10	134 -37	4C25.7	CTD 12
0130+24	01 30 43	+24 13.4	3.30	18.5	2.8	1.4	0.4	0.3	0.9±0.3	1.5±0.6		T128	135 -37	4C24.2	
0133+20	01 33 40	+20 42.0	3.27	18.4	26.4	8.2	3.5	2.0	1.0±0.1	12.2±1.5	III QSO 18M	T 6	137 -41	4C20.7	3C47 NRAO 78
0135+22	01 35 26	+22 46.3	3.30	18.3	6.0	2.1	0.6	0.4	1.0±0.2	2.7±0.8	III	T10	137 -39	4C22.2	
0147+26	01 47 15	+26 43.7	3.38	17.9	3.3	1.7		0.2	1.2±0.4	2.0±1.2	III CONF	T118	139 -34	4C26.5	CTD 14
0148+20	01 48 01	+20 01.7	3.29	17.9	4.7	1.5	0.8	0.4	0.9±0.2	2.5±0.7	II	T118	141 -40	4C20.8	
0149+21	01 49 28	+21 52.2	3.32	17.8		1.9	1.6	1.0	0.6±0.3	3.5±0.7		T128	141 -39		NPC
0152+24	01 52 12	+24 12.1	3.36	17.7	2.6	1.3	0.4		1.0±0.6	1.5±1.0		T22	141 -36	4C24.3	
0153+20	01 53 47	+20 49.0	3.32	17.6	3.0	0.9	0.4	0.4	0.6±0.3	1.3±0.5	III	T118	143 -39	4C20.9	
0208+21	02 08 23	+21 05.2	3.35	17.0	6.2	3.1	1.4	0.9	0.8±0.2	3.8±0.7	III	T10	147 -38	4C21.9	NRAO 94
0222+26	02 22 25	+26 39.5	3.46	16.3	4.5	1.0	0.6		1.0±0.4	2.0±1.0		T22	148 -31	4C26.8	
0232+22	02 32 33	+22 56.7	3.42	15.8	2.9	1.2	0.8	0.4	0.8±0.3	2.1±0.6	III	T118	152 -34	4C22.4	
0248+21	02 48 06	+21 09.5	3.42	14.9	2.0	1.6	0.7	0.5	0.6±0.3	1.7±0.5		T12A	157 -34	4C21.10	
0251+20	02 51 07	+20 02.3	3.40	14.7	5.0	(1.2)	1.0	0.5	0.9±0.3	2.9±0.8	III-IV	T118	158 -34	4C20.11	3C 74 NRAO 117
0302+25	03 02 01	+25 41.0	3.53	14.0	2.9	(2.2)	0.4	0.3	0.8±0.4	1.3±0.6	III	T118	157 -28	4C25.10	
0308+25	03 08 39	+25 18.8	3.54	13.6	2.4	1.7	0.6	0.5	0.6±0.3	1.6±0.5	III	T20	159 -27	4C25.11	CTD22

TABLE 2 (Continued)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
SOURCE NUMBER	POSITION (1950)		ANNUAL PRECESSION		FLUX DENSITY				SPECTRUM		REMARKS	DATE	GALACTIC COORDS		OTHER CATALOGUE NUMBERS	
	R.A.	DEC.	+	+	S178	S635	S1410	S2650	INDEX	S400			L2	B2	4C	OTHER
0309+24	03 09 41	+24 12.9	3.52	13.6	5.8	2.9	0.8	0.5	1.0±0.2	3.2±0.8	III	T11B			4C24.5	CTD 23 3C83 NRAO 127
													160	-28		
0310+26	03 10 26	+26 13.6	3.56	13.5	2.8	1.3	0.3		1.1±0.6	1.5±1.2	III	T20	158	-26	4C26.11	NRAO129
0310+22	03 10 58	+22 08.6	3.48	13.5	3.1	1.2	0.4	0.2	1.1±0.3	1.6±0.7	III	T20	161	-30	4C22.5	
0322+24	03 22 06	+24 33.7	3.54	12.7	3.2	1.4	0.6	0.4	0.8±0.3	1.8±0.6	III	T20	162	-26	4C24.6	
0322+21	03 22 32	+21 17.7	3.48	12.7	2.7	1.6	0.3		1.2±0.6	1.7±1.3	III	T20	164	-29	4C21.11	
0326+24	03 26 58	+24 07.2	3.54	12.4	3.1	1.0	0.4		1.0±0.5	1.5±1.0		T22	163	-26	4C24.7	
0328+24	03 28 07	+24 48.0	3.56	12.3	3.8	1.9	0.3	0.1	1.4±0.3	2.1±1.2	III	T20	163	-25	4C24.8	
0340+20	03 40 03	+20 51.2	3.49	11.5	2.2	1.7	0.5	0.3	0.9±0.3	1.8±0.7		T12A	168	-26	4C20.12	
0349+26	03 49 02	+26 15.3	3.63	10.8	6.5	3.1	1.1	0.7	0.9±0.2	3.6±0.8	III-IV	T10	166	-21	4C26.12	CTD 25
0349+22	03 49 35	+22 11.7	3.53	10.8	3.1	1.6	0.7	0.3	1.0±0.3	2.2±0.7	III-IV	T11B	169	-24	4C22.6	
0349+21	03 49 44	+21 16.0	3.51	10.8	2.5	1.1	0.6	0.4	0.7±0.3	1.5±0.5	II	T20	170	-25	4C21.13	
0350+23	03 50 02	+23 06.9	3.55	10.8	2.3	1.2	0.3	0.3	0.8±0.3	1.2±0.5		T12A	168	-23	4C23.7	
0352+21	03 52 56	+21 04.5	3.51	10.6	2.9	1.9	0.7	0.4	0.9±0.3	2.2±0.7	III	T11B	170	-24	4C21.14	
0403+20	04 03 24	+20 47.4	3.52	9.8	2.6	2.2	0.7	0.4	0.9±0.3	2.4±0.7	III	T20	172	-23	4C20.13	
0409+22	04 09 44	+22 57.5	3.58	9.3	5.1	3.1	1.3	1.0	0.6±0.2	3.3±0.6	III-IV	T11B			4C22.8	3C 108 NRAO167
													172	-20		
0410+26	04 10 19	+26 40.8	3.67	9.2	3.8	1.5	0.5	0.2	1.1±0.3	2.0±0.8	III-IV	T11B	169	-17	4C26.15	
0417+25	04 17 46	+25 19.1	3.64	8.6	5.5	1.5	1.1	0.5	0.9±0.2	3.1±0.8	III-IV	T10	171	-17	4C25.14	
0418+23	04 18 21	+23 41.2	3.60	8.6	2.9	1.0	0.5		0.9±0.5	1.5±0.9		T22	173	-18	4C23.8	
0421+21	04 21 22	+21 19.5	3.55	8.4	3.7	2.7		0.7	0.8±0.3	3.1±0.9		T12A	175	-19	4C21.16	
0424+26	04 24 44	+26 32.2	3.68	8.1	3.1	2.2		0.3	1.1±0.3	2.5±1.2	IV	T11B	172	-15	4C26.16	

TABLE 2 (Continued)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
SOURCE NUMBER	POSITION (1950)		ANNUAL PRECESSION		FLUX DENSITY				SPECTRUM		REMARKS	DATE	GALACTIC COORDS		OTHER CATALOGUE NUMBERS	
	R.A.	DEC.	+	+	S178	S635	S1410	S2650	INDEX	S400			L2	B2	4C	OTHER
0600+219	05 00 51	+21 59.7	3.61	-0.1	8.4	3.7	2.9	1.9	0.6±0.1	5.6±0.8	III-IV	T11B	188	0	4C22.12	
0600+217	05 00 53	+21 42.4	3.61	-0.1				2.2	-		EXT SIZE 8'	T12A	188	-0		NPC
0601+20	05 01 30	+20 21.3	3.57	-0.1	12.4	5.3	2.1	0.8	1.1±0.1	7.4±1.2	III	T11A	190	-1	4C20.17	3C152 NRA0226
0601+24	05 01 51	+24 29.5	3.68	-0.2	3.8	2.0	0.9	0.7	0.6±0.2	2.2±0.5	III-IV	T10	186	1	4C24.11	CTD 40
0604+26	05 04 38	+26 37.3	3.74	-0.4	5.7		1.0	0.5	0.9±0.2	3.1±0.8	III-IV	T21	184	3	4C26.19	CTD 41
0605+21	05 05 34	+21 36.8	3.60	-0.5		2.0	1.1		0.7±0.6	2.8±0.6		T21	189	1		NRA0227
0606+20	05 06 37	+20 29.9	3.57	-0.6		23.0	11.3		0.9±0.2	34.7±2.6	HII EXT	T21	190	0		NRA0229 3C153,1
0609+22	05 09 46	+22 54.5	3.64	-0.9	3.4	1.4	0.6		0.9±0.5	1.9±0.9	III-IV	T21	188	2	4C22.13	
0610+26	05 10 43	+26 05.4	3.73	-0.9	23.1	9.2	5.0	3.4	0.7±0.1	12.5±1.3	III-IV EXT	T10			4C26.20	3C154 CTD 42 NRA0230
													186	4		
0615+22	05 15 01	+22 40.5	3.63	-1.3	6.3		(14.7)	(8.0)	-		IC443 EXT SIZE 24 MIN	T11A	189	3	4C22.15	3C157
0618+23	05 18 09	+23 23.5	3.65	-1.6	4.3	(3.8)	(1.0)		-		EXT SIZE 25 MIN III-IV	T21	189	4	4C23.16	
0619+26	05 19 33	+26 36.7	3.74	-1.7	2.6		0.4	0.1	1.1±0.5	1.4±0.9	II	T20	186	6	4C26.21	
0619+22	05 19 50	+22 01.8	3.61	-1.7	4.8		1.2	0.8	0.7±0.2	2.8±0.6	III-IV	T11B	190	4	4C22.16	
0623+26	05 23 58	+26 25.4	3.73	-2.1	4.1		1.4	1.0	0.5±0.3	2.8±0.6	II	T20			4C26.22	CTD 44 3C160 NRA0235
													187	7		
0628+25	05 28 20	+25 02.7	3.69	-2.5	5.6		1.2	0.6	0.9±0.2	3.4±0.8	II	T11A			4C25.18	CTD45 3C162 NRA0237
													188	7		
0632+26	05 32 30	+26 19.4	3.73	-2.8	3.8		0.7	0.6	0.6±0.3	1.8±0.5	II EXT SIZE 9'	T20	188	8	4C26.23	CTD 46
0635+20	05 35 37	+20 36.7	3.57	-3.1	3.1		0.3	0.2	1.0±0.4	1.3±0.8	III	T11B	193	7	4C20.19	

0640+23	06 40 06	+23 22.0	3.64	-3.5	13.5	5.3	2.5	1.4	0.9±0.1	7.4±1.0	III	T10	191	9	4C23.17	3C165 NRA0240
0642+21	06 42 26	+21 25.0	3.59	-3.7	14.7	5.1	2.5	1.8	0.8±0.1	7.1±1.0	II GAL 19M	T10	193	8	4C21.21	3C166 NRA0242
0648+22	06 48 15	+22 53.4	3.63	-4.2	3.0	(2.3)	(0.2)	0.1	1.3±0.4	1.1±0.8	III EXT LOWER	DECT20	192	10	4C22.17	NRA0247
0648+26	06 48 36	+26 20.0	3.72	-4.2	2.9	1.3	0.6	0.4	0.7±0.3	1.6±0.5	III	T20	189	12	4C26.25	
0649+22	06 49 45	+22 36.1	3.62	-4.3	6.6	2.9	1.0	0.5	1.0±0.2	3.7±0.9	II GAL 19M	T10	193	10	4C22.18	3C170 NRA0249
0655+22	06 55 42	+22 29.9	3.61	-4.8		1.5	0.3		2.0±1.0	3.8±2.1	III	T21	193	12		NPC
0656+21	06 56 39	+21 22.4	3.58	-4.9	3.1	1.0	0.7	0.3	0.9±0.3	2.0±0.7	II	T118	195	11	4C21.22	
0658+23	06 58 29	+23 17.6	3.63	-5.1	3.6	1.9	1.1	0.7	0.7±0.2	2.5±0.6	II	T118	193	12	4C23.18	
0659+25	06 59 04	+25 18.1	3.68	-5.1	13.7	5.8	3.0	1.7	0.8±0.1	8.1±1.1	III	T10			4C25.19	CTD48 3C172 NRA0254
													191	13		
0706+26	07 06 02	+26 09.3	3.70	-5.7	3.2	2.1	1.0	0.7	0.6±0.2	2.3±0.5	III	T118	191	15	4C26.26	
0715+20	07 15 14	+20 14.0	3.54	-6.5		1.5	0.7		1.0±0.8	2.3±0.7	III	T21	198	15		NPC
0719+25	07 19 45	+25 34.7	3.67	-6.8		0.9	0.4	0.1	1.7±1.0	2.9±1.9	II	T20	193	18		CTD 50
0725+24	07 25 33	+24 25.2	3.64	-7.3		1.2	0.8	0.6	0.5±0.4	1.5±0.4	II CONF WITH 0726+24	T21	195	19		3C182 NRA0267
0726+24	07 26 03	+24 48.2	3.65	-7.3	4.3	0.9	(0.2)	0.1	1.4±0.4	1.5±1.3	III CONF WITH 0725+24	T118	194	19	4C24.15	
0729+25	07 29 54	+25 54.7	3.67	-7.7	(3.3)	(2.2)	0.9	0.7	0.4±0.4	1.5±0.3	III CONF WITH 0730+25	T118	193	20	(4C25.21)	
0730+25	07 30 10	+25 43.8	3.67	-7.7	(3.3)	(2.2)	0.7	0.3	1.3±0.6	3.8±1.0	III CONF WITH 0729+25	T118	194	20	4C25.21	
0736+21	07 36 49	+21 01.5	3.54	-8.2	4.4	2.2	0.6	0.4	1.0±0.2	2.4±0.8	III	T10	199	20	4C21.23	
0740+23	07 40 54	+23 42.1	3.60	-8.5		1.5	0.4		1.7±0.9	3.2±1.5	III	T21	197	22		NPC
0754+22	07 54 11	+22 01.7	3.55	-9.6		1.6	0.3	0.2	1.4±0.6	2.5±1.4	III	T21	200	24		NPC
0802+24	08 02 37	+24 18.4	3.59	-10.2	15.0	8.3	5.0	3.3	0.6±0.1	10.5±1.1	I D 15M	T10			4C24.16	CTD 52 3C192 NRA0280
													198	26		
0802+21	08 02 41	+21 15.1	3.52	-10.2		(2.0)	0.8	1.0	-0.4±0.4	0.5±0.1	II	T21	201	25		NPC

TABLE 2 (Continued)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
SOURCE NUMBER	POSITION (1950)		ANNUAL PRECESSION + +		FLUX DENSITY				SPECTRUM		REMARKS	DATE	GALACTIC COORDS		OTHER CATALOGUE NUMBERS	
	R.A.	DEC.			S178	S635	S1410	S2650	INDEX	S400			L2	B2	4C	OTHER
0806+22	08 06 03	+22 32.3	3.55	-10.5	2.9	1.2	0.5	0.3	0.9±0.3	1.6±0.6	III	T11B	200	27	4C22.19	
0814+22	08 14 39	+22 46.5	3.54	-11.1	4.1	2.6	1.2	0.8	0.7±0.2	3.0±0.6	III	T11B	201	28	4C22.20	3C197 NRA0287
0815+23	08 15 09	+23 48.4	3.56	-11.1	2.0	1.2	0.5	0.2	1.0±0.4	1.7±0.7	III	T21	200	29	4C23.19	
0820+22	08 20 29	+22 32.6	3.53	-11.5	4.5	2.7	2.3	1.0	C		III	T11B	201	30	4C22.21	
0825+24	08 25 46	+24 46.3	3.57	-11.9	2.7	1.2	0.7	0.4	0.8±0.3	1.8±0.6	II	T20	199	32	4C24.17	
0825+23	08 25 53	+23 28.3	3.54	-11.9		(2.1)	0.3		-		III CONF WITH 0827+23	T21	201	31		NPC
0827+23	08 27 23	+23 32.7	3.54	-12.0		(2.1)	1.0	0.7	0.6±0.4	2.0±0.3	III CONF WITH 0825+23	T21	201	32		NPC
0832+26	08 32 07	+26 45.3	3.60	-12.3		2.0	0.4		2.0±0.8	5.1±2.2	III	T20	198	34		CTD 56
0835+25	08 35 53	+25 37.4	3.57	-12.6	4.2	2.0	0.7	0.5	0.8±0.2	2.3±0.6	III	T10	199	34	4C25.22	
0848+22	08 48 49	+22 53.4	3.49	-13.5	(2.0)	1.0	0.3		1.5±1.3	2.0±1.2	III	T21	203	36	(4C23.20)	
0901+22	09 01 57	+22 31.7	3.46	-14.3	5.1	2.1	0.9	0.5	0.9±0.2	2.8±0.7	III	T11B	205	39	4C22.22	
0903+25	09 03 22	+25 49.5	3.52	-14.4	3.0	1.0	0.6	0.4	0.7±0.3	1.6±0.5	III	T11B	201	40	4C25.23	
0905+23	09 05 08	+23 07.1	3.47	-14.5		1.3	0.4	0.2	1.3±0.6	2.1±1.1	III	T21	205	40		NPC
0907+24	09 07 30	+24 31.7	3.49	-14.6	3.2	1.6	0.7	0.5	0.7±0.2	1.9±0.5	III	T11B	203	41	4C24.19	CTD 60
0910+23	09 10 43	+23 49.5	3.47	-14.8	3.1	1.9	0.8	0.6	0.6±0.2	2.0±0.5	III	T11B	204	41	4C23.21	
0912+25	09 12 48	+25 22.0	3.50	-14.9	2.1	1.1	0.4	0.2	1.0±0.4	1.4±0.7	III	T21	202	42	4C25.24	
0914+23	09 14 50	+23 18.9	3.45	-15.1	2.9	1.3	0.4	0.2	1.1±0.3	1.6±0.8	III	T20	205	42	4C23.22	
0915+22	09 15 38	+22 45.0	3.44	-15.1	6.1	2.5	0.8	0.4	1.1±0.2	3.2±0.9	III	T10	206	42	4C22.23	
0919+21	09 19 54	+21 47.9	3.42	-15.3	2.6	1.5	0.4		1.0±0.6	1.7±1.1	III	T20	208	42	4C21.25	
0926+25	09 26 09	+25 25.7	3.47	-15.7	2.4	1.7	0.3	0.1	1.4±0.4	1.9±1.2	III EXT IN RA	T21	203	45	4C25.25	
0932+25	09 32 42	+25 23.2	3.45	-16.0	3.0	1.6	0.7	0.4	0.8±0.3	2.0±0.6	III	T11B	204	46	4C25.26	

0934+25	09 34 16	+25 34.4	3.45 -16.1	2.5	1.1	0.4	0.2	1.0±0.3	1.4±0.7	II	T20	204	47	4C25.27
0935+26	09 35 58	+26 12.9	3.46 -16.2	3.5	2.6	0.7	0.4	1.0±0.2	2.8±0.8	III	T11B	203	47	4C26.28
0939+26	09 39 38	+26 39.9	3.46 -16.4	4.1	1.4	0.6	0.4	0.8±0.2	2.0±0.6	III	T11B	203	48	4C26.29
0943+25	09 43 28	+25 45.5	3.44 -16.6	2.2	1.1	0.5	0.3	0.8±0.3	1.4±0.5	III	T21	204	49	4C25.28
0949+24	09 49 11	+24 36.5	3.40 -16.9	6.5	3.3	1.9	1.2	0.7±0.1	4.3±0.7	II DR 18M	T10			4C24.22 CTD 62 3C 229 NRA0338
												206	50	
0950+25	09 50 48	+25 30.5	3.41 -16.9	5.7	2.1	0.9	0.5	0.9±0.2	2.9±0.7	II	T11B	205	50	4C25.29
0951+21	09 51 20	+21 36.8	3.36 -17.0	3.3	2.0	0.8	0.6	0.7±0.2	2.1±0.5	III	T20	211	49	4C21.26
0957+22	09 57 36	+22 47.5	3.36 -17.3	3.7	2.1	1.1	0.7	0.7±0.2	2.6±0.6	III	T11B	210	51	4C22.25
0958+25	09 58 40	+25 40.0	3.40 -17.3	3.8	1.2	0.4	0.3	0.9±0.3	1.7±0.7	III	T11B	206	52	4C25.30
1000+20	10 00 13	+20 06.2	3.32 -17.4	5.1	1.9	0.9	0.7	0.7±0.2	2.5±0.6	III	T20	214	51	4C20.20
1000+26	10 00 59	+26 20.4	3.40 -17.4		(1.0)	0.5	0.3	0.8±0.7	1.4±0.4	III CONF AT635	T21	205	53	NPC
1001+20	10 01 39	+20 42.1	3.32 -17.4	3.6	1.3	0.3	0.2	1.1±0.3	1.6±0.8	III	T20	214	51	4C20.21
1002+22	10 02 00	+22 39.9	3.35 -17.4	3.8	1.2	0.6	0.3	1.0±0.3	1.9±0.7	III	T20	211	52	4C22.26
1008+21	10 08 26	+21 26.9	3.32 -17.7	5.1	1.4	0.5	0.3	1.1±0.2	2.1±0.8	III	T11B	213	53	4C21.27
1011+23	10 11 59	+23 16.7	3.33 -17.9	3.5	1.9	1.1	0.7	0.7±0.2	2.5±0.6	III	T11B	211	54	4C23.24
1019+22	10 19 09	+22 14.3	3.31 -18.1	11.1	4.8	1.7	0.8	1.0±0.1	6.2±1.1	III	T10			4C22.28 3C241 NRA0352
												213	56	
1019+25	10 19 21	+25 38.0	3.35 -18.1	3.1	1.4	0.8	0.4	0.8±0.3	2.2±0.6	III	T11B	207	57	4C25.32
1022+20	10 22 36	+20 25.5	3.28 -18.3	6.8	2.1	0.9	0.7	0.8±0.2	3.0±0.7	III QSO? 18.5M	T10.			4C20.22 3C242 NRA0354
												217	56	
1028+23	10 28 06	+23 20.3	3.30 -18.5	3.7	1.0	0.4	0.2	1.1±0.3	1.6±0.8	III	T11B	212	58	4C23.25
1030+25	10 30 02	+25 18.6	3.31 -18.5	4.3	1.2	0.8	0.5	0.8±0.2	2.2±0.6	III	T11B	209	59	4C25.33
1044+22	10 44 10	+22 33.2	3.25 -19.0	3.6	1.3	0.5	0.3	0.9±0.3	1.8±0.7	III	T11B	216	61	4C22.29
1048+24	10 48 49	+24 04.0	3.26 -19.1	2.9	1.6	0.5	0.2	1.1±0.3	2.0±0.8	III	T20	213	63	4C24.23 CTD 68
1049+21	10 49 07	+21 35.6	3.23 -19.1	2.4	(1.6)	1.4	1.3	0.2±0.3	1.8±0.3	CONF WITH 1049+20	T21			4C21.28
												218	62	
1049+20	10 49 47	+20 45.5	3.23 -19.1	2.3	(2.2)	1.5	1.1	0.4±0.3	2.5±0.5	III CONF WITH 1049+21	T21			4C20.23
												220	62	

TABLE 2 (Continued)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
SOURCE NUMBER	POSITION (1950)		ANNUAL PRECESSION		FLUX DENSITY				SPECTRUM		REMARKS	DATE	GALACTIC COORDS		OTHER CATALOGUE NUMBERS	
	R.A.	DEC.	+	+	S178	S635	S1410	S2650	INDEX	S400			L2	B2	4C	OTHER
1053+24	10 53 29	+24 12.0	3.24	-19.2		1.1	0.2	0.2	1.0±0.7	1.3±0.8	II	T21	213	64		NPC
1055+20	10 55 36	+20 08.2	3.21	-19.3	9.5	4.7	2.2	1.9	0.6±0.1	5.2±0.7	III QSO? 18.5M	T10	222	63	4C20.24	
1102+21	11 02 48	+21 08.2	3.20	-19.4		1.9	0.9	0.5	0.9±0.4	3.0±0.8	III	T20	222	65		NPC
1106+25	11 06 11	+25 17.4	3.22	-19.5	7.9	4.0	1.1	0.6	1.1±0.1	4.6±1.0	III	T10			4C25.34	CTD 70 3C250 NRA0365
													212	67		
1112+21	11 12 54	+21 50.6	3.18	-19.6	2.8	1.3	0.4	0.2	1.1±0.3	1.6±0.8	III	T20	222	68	4C21.30	
1114+26	11 14 06	+26 04.2	3.20	-19.6	3.7	1.9	0.5	0.3	1.0±0.2	2.1±0.8	III	T11B	211	69	4C26.31	
1118+23	11 18 05	+23 44.4	3.18	-19.7	9.2	3.0	1.2	0.7	1.0±0.1	4.3±0.9	II D 17.5M	T10		218	69	4C23.27 3C256 NRA0371
1119+21	11 19 50	+21 40.9	3.17	-19.7		2.2	0.6	0.3	1.3±0.4	3.7±1.4	III	T20	224	69		NPC
1123+26	11 23 14	+26 26.6	3.18	-19.8		0.6	0.7	0.7	-0.0±0.5	0.7±0.2	III	T11B	211	71		CTD 74
1123+201	11 23 20	+20 08.7	3.15	-19.8	(3.5)	(2.3)	(0.6)	0.3	-		II CONF WITH 1123+20.3	T11B		229	69	4C20.25
1123+203	11 23 22	+20 22.1	3.15	-19.8	(3.5)	(2.0)	(0.8)	0.6	-		II CONF WITH 1123+20.1	T11B		228	69	(4C20.25)
1125+26	11 25 30	+26 03.1	3.17	-19.8	2.8	1.2	0.4	0.2	1.0±0.3	1.5±0.7	III	T20	212	71	4C25.35	
1128+20	11 28 40	+20 12.2	3.14	-19.9	(2.7)	(0.8)	0.3	0.2	0.6±1.0	0.7±0.3	III	T21	230	70	(4C20.26)	
1128+21	11 28 48	+21 47.6	3.15	-19.9	3.0	1.0	0.3	0.1	1.3±0.4	1.4±0.9	II	T11B	226	71	4C21.31	
1129+19	11 29 01	+19 43.9	3.14	-19.9		(1.0)	0.4	0.3	0.5±0.7	0.7±0.2	III	T21	231	70		NPC
1131+21	11 31 23	+21 21.6	3.14	-19.9	(2.3)	(1.2)	0.7	0.4	0.9±0.5	2.1±0.5	II CONF WITH 1132+21	T21		228	71	4C21.32
1132+21	11 32 37	+21 21.9	3.14	-19.9	(2.3)	(1.2)	0.2		-		II CONF WITH 1131+21	T21		228	72	(4C21.32)
1133+26	11 33 13	+26 14.6	3.15	-19.9	4.3	1.5	0.6	0.2	1.2±0.3	2.3±0.9	III	T11B	213	73	4C26.32	NRA0379
1134+26	11 34 53	+26 35.9	3.15	-19.9	3.1	0.5	0.4	0.2	1.0±0.3	1.4±0.7	III	T20	211	73	4C26.33	

1139+234	11 39 00	+23 24.8	3.13	-20.0	(5.4)	(1.6)	0.5	0.2	1.5±0.8	3.1±1.0	II	CONF WITH 1139+23.0	T20	223	74	4C23.28
1139+230	11 39 00	+23 04.0	3.13	-20.0	(5.4)	(1.6)	0.3	-			III	CONF WITH 1139+23.4	T20	224	74	(4C23.28)
1140+20	11 40 00	+20 13.2	3.12	-20.0		(1.3)	0.3	-			III	CONF	T21	234	73	NPC
1140+21	11 40 25	+21 45.8	3.12	-20.0	(5.7)	1.6	1.0	0.4	1.2±0.4	4.2±1.2	III		T11B	229	73	(4C21.33)
1140+22	11 40 48	+22 23.6	3.12	-20.0	18.3	7.0	2.9	1.6	0.9±0.1	9.6±1.2	III		T10	227	74	4C22.30 3C263.1 NRA0383
1144+25	11 44 40	+25 40.0	3.12	-20.0	3.7	1.6	0.9	0.4	0.9±0.2	2.6±0.7	III		T20	216	76	4C25.36 CTD 75
1148+22	11 48 24	+22 42.0	3.10	-20.0	2.4	(1.2)	0.3	0.1	1.2±0.5	1.2±0.9	III	CONF WITH 1150+22	T21	229	76	4C22.31
1150+20	11 50 14	+26 31.4	3.10	-20.0	2.7	1.3	0.4	0.2	1.1±0.3	1.6±0.7	III		T20	213	77	4C26.34
1150+22	11 50 40	+22 44.4	3.10	-20.0	2.4	(1.2)	0.3	0.1	1.2±0.5	1.2±0.9	II	CONF WITH 1148+22	T21	229	76	4C22.32
1151+22	11 51 37	+22 44.7	3.09	-20.0		(1.2)	0.4	0.2	1.1±0.8	1.6±0.6	II	CONF WITH 1150+22	T21	229	76	NPC
1155+26	11 55 47	+26 38.2	3.09	-20.0	2.9	3.0	0.9	0.4	1.1±0.2	3.7±1.0	II		T20	214	78	4C26.35
1158+252	11 58 16	+25 15.0	3.08	-20.0	4.2	2.3	0.7	0.3	1.1±0.2	2.8±0.9	III		T11B	221	78	4C25.37
1158+256	11 58 51	+25 37.6	3.08	-20.0	3.6	2.2	0.6	0.4	0.9±0.2	2.3±0.7	III		T11B	219	79	4C25.38
1201+24	12 01 03	+24 00.3	3.07	-20.0		1.4		0.2	1.4±0.5	2.6±1.2			T12B	228	79	NPC
1202+26	12 02 50	+26 50.7	3.06	-20.0	2.4	1.2	0.5	0.2	1.0±0.3	1.7±0.7			T21	213	80	4C26.36
1204+22	12 04 01	+22 32.1	3.06	-20.0	3.4	(3.2)	1.1	0.6	0.8±0.3	2.7±0.7	I		T11B	236	79	4C22.33
1206+23	12 06 30	+23 26.5	3.06	-20.0	3.7	1.7	0.6	0.3	1.0±0.3	2.1±0.7	III		T11B	233	80	4C23.29
1210+20	12 10 23	+20 49.5	3.05	-20.0	6.5	2.7	1.4	0.8	0.8±0.2	3.8±0.7	III		T10	248	79	4C20.27
1210+24	12 10 13	+24 15.5	3.05	-20.0	2.5	0.8	0.2		1.2±0.7	1.1±1.2	II		T20	231	81	4C24.25
1215+25	12 15 25	+25 45.7	3.03	-20.0	4.2	1.6	0.8	0.4	0.9±0.2	2.4±0.7	III		T11B	223	82	4C25.39 3C269 NRA0394
1216+20	12 16 29	+20 12.4	3.04	-20.0	3.3	2.2	1.1	0.6	0.8±0.2	2.9±0.7	II		T11B	255	80	4C20.28
1218+22	12 18 11	+22 49.8	3.03	-20.0	4.0	2.0	0.7	0.4	0.9±0.2	2.4±0.7	III		T20	244	82	4C22.35
1222+26	12 22 03	+26 30.0	3.01	-20.0	4.0	1.5	0.6	0.4	0.9±0.2	2.0±0.6	III		T12A	220	84	4C26.37

TABLE 2 (Continued)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
SOURCE NUMBER	POSITION (1950)		ANNUAL PRECESSION		FLUX DENSITY				SPECTRUM		REMARKS	DATE	GALACTIC COORDS		OTHER CATALOGUE NUMBERS	
	R.A.	DEC.	+	+	S178	S635	S1410	S2650	INDEX	S400			L2	B2	4C	OTHER
1222+21	12 22 24	+21 39.5	3.02	-19.9	6.6	2.6	1.5	1.1	0.6±0.2	3.5±0.6	III QSO 18M	T10	255	82	4C21.35	
1225+20	12 25 41	+20 40.2	3.02	-19.9	4.3	2.5	1.3	0.8	0.7±0.2	3.1±0.6	III	T21	263	81	4C20.29	
1229+26	12 29 57	+26 23.3	2.99	-19.9	3.3	1.4	0.4	0.2	1.1±0.3	1.7±0.8	III	T11B	225	86	4C26.38	
1232+21	12 32 58	+21 37.2	3.00	-19.8	14.3	5.5	3.0	1.6	0.8±0.1	8.2±1.1	III	T10			4C21.36	3C274.1 NRA0402
													270	83		
1233+26	12 33 59	+26 51.4	2.97	-19.8	4.2	2.8	0.4	0.2	1.4±0.2	3.0±1.2	III	T11B	221	87	4C26.39	
1237+22	12 37 25	+22 29.3	2.98	-19.8	2.1	1.3	0.3	0.3	0.8±0.3	1.3±0.5	III	T21	274	84	4C22.36	
1241+23	12 41 22	+23 02.0	2.97	-19.7	2.5	1.7	0.3	0.2	1.2±0.3	1.8±0.9	III	T20	281	85	4C23.32	
1246+23	12 46 39	+23 51.2	2.95	-19.6	2.5	1.3	0.5	0.3	0.9±0.3	1.6±0.6	III	T20	294	86	4C23.33	
1251+26	12 51 44	+26 46.6	2.92	-19.5	3.3	1.0	0.4	0.2	1.1±0.3	1.5±0.7	II CONF	T21	348	89	4C26.40	
1256+21	12 56 10	+21 34.9	2.94	-19.4	3.0	1.1	0.4	0.2	1.0±0.3	1.5±0.7	III	T11B	319	84	4C21.37	
1257+23	12 57 51	+23 43.6	2.93	-19.4	2.5	1.0	0.3		1.1±0.6	1.3±1.1	III	T20	332	86	4C23.34	
1309+21	13 09 32	+21 03.7	2.92	-19.1	(2.2)	1.0	(0.4)	0.3	0.8±0.7	1.5±0.5	II	T21	341	82	(4C21.39)	
1312+21	13 12 36	+21 00.4	2.91	-19.0	3.5	1.5	1.0	0.6	0.7±0.2	2.3±0.6	III	T11B	344	82	4C20.31	
1317+25	13 17 30	+25 49.5	2.86	-18.9	2.5	1.6	0.7	0.2	1.1±0.3	2.5±0.9	III	T20	21	83	4C25.42	
1319+27	13 19 55	+27 00.7	2.84	-18.8	3.9	1.6	1.1	0.6	0.7±0.2	2.7±0.6	III	T11B	32	83	4C27.25	
1319+23	13 19 59	+23 01.9	2.88	-18.8	3.1	1.0	0.6	0.4	0.7±0.3	1.6±0.5	III	T11B	3	82	4C23.35	
1323+24	13 23 30	+24 47.9	2.85	-18.7		0.7	0.2	0.1	1.3±1.1	1.2±1.1	III	T21	16	82		NPC
1324+23	13 24 33	+23 01.2	2.87	-18.7	5.2	(1.0)	0.6	0.4	0.9±0.3	2.2±0.8	III	T11B	6	81	4C22.38	
1328+254	13 28 17	+25 24.5	2.83	-18.6	16.0	12.0	7.0	4.6	0.6±0.1	13.9±1.4	III QSO 17.7M	T11B			4C25.43	3C287 CTD81 NRA0424
													23	81		

1328+251	13 28 53	+25 06.2	2.84	-18.6	6.0	2.2	0.7	0.3	1.2±0.2	2.9±0.9	II	T20	21	81	4C25.44
1341+22	13 41 41	+22 33.2	2.83	-18.1	2.3	0.9	0.5	0.3	0.8±0.3	1.3±0.5	III	T11B	14	77	4C22.40
1345+26	13 45 46	+26 49.9	2.77	-17.9	(4.9)	1.8	1.0	0.5	1.0±0.4	3.4±0.9	III	T11B	34	77	(4C26.42)
1345+24	13 45 52	+24 30.9	2.80	-17.9	4.8	3.2	0.5	0.3	1.3±0.2	3.4±1.1	III	T11B	24	77	4C24.28
1347+21	13 47 15	+21 22.4	2.84	-17.9	7.6	5.0	1.1	0.5	C		III QSO? 16M	T10	12	75	4C21.40 3C291 NRAO431
1354+25	13 54 44	+25 53.2	2.76	-17.6		1.5	0.3	0.2	1.3±0.6	2.2±1.3	III	T21	31	75	NPC
1357+26	13 57 00	+26 42.2	2.74	-17.5	2.4	1.1	0.3		1.1±0.7	1.3±1.1	III	T21	34	75	4C26.43
1358+24	13 58 43	+24 28.6	2.77	-17.4	2.3	1.3	0.6	0.4	0.7±0.3	1.5±0.5	III	T20	26	74	4C24.29 CTD 83
1402+20	14 02 42	+20 40.3	2.82	-17.2	2.2	(0.8)	0.2		1.2±0.6	0.9±0.7	III ON RIDGE	T21	15	72	4C20.32
1405+23	14 05 42	+23 46.9	2.77	-17.1	3.5	(3.8)	0.7	0.5	0.7±0.3	1.8±0.6	III CONF WITH 1406+24	T11B	26	72	4C23.36
1406+25	14 06 02	+25 48.3	2.74	-17.1		1.0	0.9	0.5	0.8±0.5	2.4±0.7	III	T21	32	73	NPC
1406+24	14 06 02	+24 01.3	2.76	-17.1	5.2	(3.8)	1.0	0.6	0.8±0.2	2.8±0.7	III CONF WITH 1405+23	T11B	26	72	4C24.30 CTD 84
409+21	14 09 58	+21 06.4	2.80	-16.9		1.8	0.4	0.2	1.5±0.5	3.2±1.6	III	T20	19	71	NPC
1413+25	14 13 42	+25 23.5	2.72	-16.7	2.5	0.8	0.4	0.3	0.7±0.3	1.2±0.5	III	T20	32	71	4C25.45
1422+21	14 22 07	+21 15.2	2.77	-16.3	2.9	1.1	0.4	0.3	0.8±0.3	1.4±0.6	III	T20	22	68	4C21.41
1422+26	14 22 29	+26 49.9	2.68	-16.3		1.8	0.6	0.4	0.9±0.4	2.3±0.8		T20	37	69	CTD 86
1422+20	14 22 37	+20 13.8	2.79	-16.3	7.4	1.7	1.6	1.2	0.6±0.1	3.6±0.6	III	T11B	20	67	4C20.33
1423+24	14 23 35	+24 17.2	2.72	-16.2	7.7	4.4	1.5	1.0	0.8±0.1	4.8±0.8	III QSO? 16M	T10	30	69	4C24.31 CTD 87
1427+22	14 27 07	+22 01.5	2.75	-16.1	3.2	1.4	1.0	0.4	0.9±0.3	2.7±0.7	III	T11B	25	67	4C22.41
1430+25	14 30 27	+25 08.8	2.69	-15.9	3.0	0.8	0.4	0.3	0.8±0.3	1.3±0.6	II	T11B	33	67	4C25.46
1433+23	14 33 24	+23 58.1	2.70	-15.7	4.7	1.3	0.7	0.2	1.1±0.2	2.5±0.9	III	T11B	31	66	4C23.38
1437+22	14 37 37	+22 03.7	2.73	-15.5	2.0	1.3	0.5	0.3	0.8±0.3	1.5±0.6	II	T20	27	65	4C22.42
1441+25	14 41 41	+25 14.8	2.66	-15.3		1.5	0.6	0.4	0.8±0.5	1.9±0.6	III	T20	35	65	NPC
1443+23	14 43 43	+23 15.7	2.70	-15.1	2.0	1.1	0.3	0.1	1.2±0.5	1.3±0.9	III	T20	30	64	4C23.40
1444+21	14 44 33	+21 43.9	2.72	-15.1	2.5	1.6	0.4	0.3	0.9±0.3	1.6±0.7	III	T20	27	63	4C21.42

TABLE 2 (Continued)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
SOURCE NUMMER	POSITION (1950)		ANNUAL PRECESSION		FLUX DENSITY				SPECTRUM		REMARKS	DATE	GALACTIC COORDS		OTHER CATALOGUE NUMBERS	
	R.A.	DEC.	+	+	S178	S635	S1410	S2650	INDEX	S400			L2	B2	4C	OTHER
1446+20	14 46 37	+20 36.5	2.74	-15.0	5.4	1.7	1.0	0.5	0.9±0.2	2.9±0.7	III EXT RA	T21		25 62	4C20.34	3C304 NRA0454
1455+24	14 55 30	+24 47.9	2.64	-14.4	(2.6)	(1.5)	0.6	0.5	0.3±0.5	0.9±0.2	II CONF WITH 1455+25	T20		35 62	(4C25.47)	
1455+25	14 55 40	+25 17.4	2.63	-14.4	(2.6)	(1.5)	0.6	0.4	0.6±0.6	1.3±0.3	III CONF WITH 1455+24	T20		36 62	4C25.47	
1459+217	14 59 00	+21 47.5	2.70	-14.2	(2.8)	(1.4)	0.3	-	-	-	III CONF WITH 1459+21.2	T20		29 60	(4C21.44)	
1459+212	14 59 28	+21 12.5	2.71	-14.2	(2.8)	(1.4)	(0.5)	0.1	-	-	III CONF WITH 1459+21.7	T20		28 60	(4C21.44)	
1502+26	15 02 49	+26 08.5	2.60	-14.0	46.0	17.1	7.1	3.1	1.0±0.1	25.0±2.4	I DB 16M	T6		38 60	4C26.46	3C310 CTD 89 NRA0465
1511+23	15 11 30	+23 49.4	2.64	-13.4	2.1	2.7	1.5	1.2	0.4±0.2	2.7±0.5	III	T118		35 58	4C23.41	CTD 90
1511+26	15 11 31	+26 18.4	2.58	-13.4	18.2	6.2	4.0	2.1	0.8±0.1	10.2±1.2	II DB 15M	T6		39 58	4C26.47	3C315 CTD 91 NRA0472
1516+24	15 16 32	+24 37.3	2.61	-13.1	2.8	1.3	(0.2)	0.1	1.3±0.5	1.5±1.3	III	T118		37 57	4C24.33	
1517+20	15 17 51	+20 26.7	2.69	-13.0	13.2	4.6	2.3	1.5	0.8±0.1	6.6±0.9	II GAL 19M	T6		30 55	4C20.35	3C318 NRA0476
1529+24	15 29 39	+24 13.3	2.60	-12.2	11.2	7.3	3.6	2.2	0.7±0.1	8.7±1.1	III	T10		37 54	4C24.34	3C321 CTD 92 NRA0480
1530+20	15 30 23	+20 16.3	2.68	-12.2	2.7	1.4	0.4	0.3	0.9±0.3	1.5±0.6	III	T118		31 53	4C20.36	
1545+21	15 45 31	+21 01.5	2.64	-11.1	10.0	4.5	2.3	1.6	0.7±0.1	5.7±0.8	III QSO 16M	T10		34 49	4C21.45	3C323.1 NRA0483
1547+21	15 47 36	+21 34.5	2.63	-10.9	13.6	5.0	2.8	1.5	0.8±0.1	7.6±1.0	III	T10		35 49	4C21.46	3C324 NRA0484

1549+20	15 49 05	+26 15.4	2.52	-10.8		1.5	0.6	0.3	1.1±0.5	2.5±1.0	III	T21	42	50	NPC
1550+20	15 50 12	+20 14.8	2.66	-10.8	7.8	7.6	2.2	1.0	C		II EXT	T6	33	48	4C20.37 3C326 NRA0487
1551+23	15 51 35	+23 56.5	2.57	-10.7	2.1	0.8	0.8	0.5	0.6±0.3	1.6±0.5	III	T118	39	49	4C23.42
1553+24	15 53 45	+24 15.5	2.56	-10.5	3.0	1.0	0.2	0.2	1.0±0.3	1.3±0.7	II	T118	39	49	4C24.35
1553+20	15 53 57	+20 12.9	2.65	-10.5	9.0	4.1	2.4	1.4	0.7±0.1	5.8±0.8	III	T10	34	47	4C20.38 3C326.1 NRA0488
1601+21	16 01 23	+21 35.9	2.61	-9.9		1.3	0.5	0.2	1.3±0.6	2.7±1.3	II EXT RA	T21	36	46	NPC
1602+24	16 02 50	+24 04.3	2.55	-9.8	2.6	1.0	0.6	0.3	0.9±0.3	1.7±0.6	I	T20	40	46	4C24.36
1603+20	16 03 29	+20 36.4	2.63	-9.8		1.3	0.3		1.8±1.1	3.0±1.7	III	T21	35	45	NPC
1604+22	16 04 40	+22 47.6	2.58	-9.7		1.9	0.3		2.3±0.9	5.5±2.8	III	T21	38	46	NPC
1607+26	16 07 11	+26 49.0	2.48	-9.5		4.1	4.8	3.2	0.4±0.2	7.7±0.9	III	T118	44	46	CTD 93
1610+22	16 10 09	+22 29.5	2.58	-9.2	7.1	3.9	1.2	0.7	1.0±0.1	4.4±0.9	III	T10	38	44	4C22.43 3C331 NRA0495
1614+26	16 14 35	+26 54.2	2.46	-8.9		1.0	1.2	0.9	0.4±0.4	1.9±0.4	III	T118	45	45	CTD 95
1614+20	16 14 47	+20 34.0	2.62	-8.9	2.1	1.0	0.3		1.0±0.7	1.2±1.0	III	T21	36	43	4C20.39
1615+21	16 15 04	+21 14.8	2.61	-8.9	6.9	4.1	1.8	1.0	0.8±0.1	5.0±0.8	III	T10	37	43	4C21.47 3C333 NRA0497
1619+24	16 19 47	+24 43.5	2.52	-8.5	2.8	2.1	0.7	0.3	1.1±0.3	2.6±0.9	III	T20	42	43	4C24.37
1622+23	16 22 33	+23 52.1	2.53	-8.3	12.6	5.7	2.7	1.5	0.8±0.1	7.6±1.0	III QSO 17.5M	T10	41	42	4C23.43 3C336 NRA0501
1623+25	16 23 03	+25 12.1	2.50	-8.2	3.9	1.3	0.6	0.4	0.8±0.2	1.9±0.6	III	T118	43	42	4C25.48
1623+26	16 23 17	+26 57.5	2.45	-8.2	3.5	2.3	1.2	0.5	0.9±0.2	3.5±0.8	III QSO 18M	T118	46	43	4C26.48
1625+21	16 25 21	+21 19.3	2.59	-8.0	8.6	4.7	1.1	0.6	1.1±0.1	5.2±1.1	III	T10	38	41	4C21.48
1627+23	16 27 30	+23 26.4	2.54	-7.9	10.3	6.3	2.3	1.3	0.9±0.1	7.3±1.1	III	T118	41	41	4C23.44 3C340 NRA0506
1634+26	16 34 34	+26 54.1	2.44	-7.3	6.9	2.4	1.3	0.8	0.8±0.2	3.6±0.7	III QSO 18M	T10	46	40	4C26.49 3C342 NRA0510
1638+20	16 38 37	+20 58.7	2.59	-7.0	2.6	(3.3)	0.2	0.1	1.2±0.5	1.0±0.9	III EXT HIGHER RAT20		39	38	4C20.40

TABLE 2 (Continued)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
SOURCE NUMBER	POSITION (1950)		ANNUAL PRECESSION		FLUX DENSITY				SPECTRUM		REMARKS	DATE	GALACTIC COORDS		OTHER CATALOGUE NUMBERS	
	R.A.	DEC.	+	+	S178	S635	S1410	S2650	INDEX	S400			L2	B2	4C	OTHER
1642+25	16 42 56	+25 41.8	2.47	-6.6		1.1	0.5	0.4	0.5±0.6	1.1±0.4	III	T21	45	38		NPC
1700+24	17 00 53	+24 01.9	2.50	-5.1	2.3	1.0	0.4	0.3	0.7±0.3	1.2±0.5	III	T21	45	34	4C24.38	
1706+24	17 06 50	+24 37.5	2.48	-4.6	2.7	0.7	0.4	0.2	1.0±0.3	1.3±0.7	III	T20	46	33	4C24.39	
1708+24	17 08 32	+24 09.0	2.49	-4.5	2.6	(0.5)	0.4	0.2	1.0±0.5	1.3±0.7	II	T20	46	32	4C24.40	
1717+22	17 17 03	+22 48.1	2.52	-3.7	3.5	2.8	1.7	1.1	0.6±0.2	3.5±0.6	III	T11B	45	30	4C22.45	
1717+23	17 17 46	+23 33.4	2.50	-3.7		1.7		0.2	1.5±0.5	3.4±1.5		T12B	46	30		NPC
1719+24	17 19 58	+24 17.8	2.48	-3.5	(3.2)	(2.1)	0.8	0.5	0.7±0.5	2.0±0.4	II CONF WITH 1720+24	T11B		47	30	4C24.41 CTD 100
1720+24	17 20 08	+24 24.3	2.48	-3.5	(3.2)	(2.1)	(0.3)	0.2	-		III CONF WITH 1719+24	T11B		47	30	(4C24.41)
1729+21	17 29 13	+21 07.4	2.56	-2.7	3.6	1.0	0.5	0.4	0.7±0.3	1.6±0.5	II	T11B	44	27	4C21.50	
1729+26	17 29 29	+26 01.5	2.43	-2.7	2.7	1.0	0.3	0.1	1.2±0.4	1.3±0.9	II	T20	49	28	4C26.52	
1729+22	17 29 45	+22 25.6	2.53	-2.6	2.7	0.6	0.4		0.9±0.6	1.3±0.9	III	T20	46	27	4C22.46	
1730+20	17 30 40	+20 39.9	2.57	-2.6	5.8	1.0	0.8	0.5	0.9±0.2	2.5±0.7	III	T10		44	26	4C20.42 3C359 NRA0531
1735+24	17 35 34	+24 02.5	2.48	-2.1	5.0	3.0	1.8	0.9	0.8±0.2	4.4±0.8	III	T11B	48	26	4C24.42 CTD 101	
1737+20	17 37 36	+20 29.7	2.58	-2.0		(2.2)	0.4		-		II	T20	44	25		NPC
1740+23	17 40 40	+23 34.0	2.49	-1.7		(1.1)	0.2	0.1	1.1±1.5	0.8±0.5	III	T21	48	25		NPC
1744+20	17 44 19	+20 09.9	2.58	-1.4	3.8	0.7	0.8	0.6	0.6±0.2	1.9±0.5	III	T11B	45	23	4C20.43	
1744+23	17 44 25	+23 43.8	2.49	-1.4	4.4	2.4	1.6	0.8	0.8±0.2	3.8±0.7	III	T10	48	24	4C23.45	
1749+25	17 49 43	+25 53.9	2.42	-0.9	3.2	2.1	0.5	0.3	1.1±0.3	2.2±0.8	III	T11B	51	24	4C25.52	
1751+27	17 51 15	+27 00.4	2.39	-0.8	4.8	1.3	0.8	0.5	0.8±0.2	2.3±0.6	III	T20	52	24	4C27.40 CTD 104	
1753+24	17 53 36	+24 28.4	2.46	-0.6	2.6	1.0	0.4	0.2	1.0±0.3	1.4±0.7	III	T20	50	23	4C24.43	

1759+21	17 59 38	+21 09.4	2.56	-0.0	3.7	2.2	0.9	0.4	1.0±0.2	2.9±0.8	II	T11B	47	20	4C21.51
1803+20	18 03 37	+20 27.7	2.57	0.3	3.0	1.1	1.0	0.5	0.8±0.3	2.4±0.6	III	T11B	47	19	4C20.44
1804+26	18 04 49	+26 04.7	2.42	0.4	3.4	1.8	0.8	0.4	0.9±0.2	2.4±0.7	III	T21	52	21	4C26.54 NRA0545
1804+23	18 04 50	+23 31.3	2.49	0.4	3.8	2.1	0.8	0.4	1.0±0.2	2.6±0.7	III-IV	T20	50	20	4C23.47 NRA0544
1805+20	18 05 45	+20 44.2	2.57	0.5	3.2	(0.5)	0.3	0.2	1.0±0.4	1.3±0.8	III	T11B	47	19	4C20.45
1809+21	18 09 57	+21 25.7	2.55	0.9		(1.8)	0.4	0.2	1.1±0.8	1.6±0.6	II EXT RA	T21	48	18	
1810+26	18 10 29	+26 28.4	2.41	0.9	7.0	1.4	1.1	0.5	1.0±0.2	3.4±0.8	II GAL 19.5M	T10	53	20	4C26.55
1818+26	18 18 57	+26 36.1	2.41	1.7		(1.9)	0.4	-			III	T21			(3C374) CTD106
													54	18	
1819+22	18 19 08	+22 49.6	2.51	1.7	6.0	2.2	1.1	0.6	0.9±0.2	3.3±0.7	III	T10	51	17	4C22.47
1819+24	18 19 35	+24 31.8	2.46	1.7	2.3	1.5	0.2	0.1	1.4±0.4	1.6±1.2	III CONF	T21	52	17	4C24.45
1821+23	18 21 29	+23 03.0	2.51	1.9	3.3	(0.5)	0.2	0.2	1.0±0.4	1.3±0.8	III	T11B	51	16	4C22.48
1825+23	18 25 02	+23 05.0	2.51	2.2	2.3	0.9	0.4	0.2	0.9±0.4	1.3±0.6	III	T11B	51	15	4C23.49
1834+20	18 34 26	+20 42.0	2.57	3.0	2.7	1.0	0.8	0.3	1.0±0.3	2.3±0.7	III	T20	50	12	4C20.46
1836+21	18 36 41	+21 21.5	2.56	3.2		(1.8)	0.3	0.1	1.7±1.3	2.7±1.5	III EXT RA	T21	51	12	NPC
1837+23	18 37 57	+23 59.1	2.49	3.3	7.0	(2.5)	1.2	0.7	0.9±0.2	3.6±0.8	III	T10	53	13	4C24.46 CTD 109
1840+23	18 40 47	+23 58.0	2.49	3.5	2.6	1.2	0.8	0.3	1.0±0.3	2.3±0.7	III-IV	T12A	54	12	4C23.50
1906+20	19 06 31	+20 22.9	2.60	5.7	3.3	(1.0)	0.6	0.4	0.8±0.3	1.7±0.6	III CONF AT 635	T11B	53	6	4C20.47
1906+22	19 06 31	+22 06.9	2.55	5.7	2.5	(0.6)	0.4	0.2	1.0±0.5	1.3±0.7	III-IV CONF 635	T20	55	6	4C22.51
1911+23	19 11 07	+23 27.7	2.52	6.1	3.5	1.4	0.8	0.4	0.9±0.2	2.2±0.6	IV	T11B	56	6	4C23.51
1911+22	19 11 09	+22 07.3	2.56	6.1	3.1	(1.6)	0.6	0.2	1.1±0.4	2.0±0.9	IV CONF AT 635	T11B	55	5	4C22.53
1921+22	19 21 21	+22 30.8	2.55	7.0	4.5	1.2	0.6	0.4	0.9±0.2	2.0±0.6	IV	T11B	57	3	4C22.54
1922+206	19 22 21	+20 41.9	2.60	7.0	(3.1)	(1.6)	(0.8)	0.9	-		HII CONF WITH 1922+20.4	T11B			(4C20.48)
													55	2	
1922+204	19 22 28	+20 29.0	2.61	7.1	(3.1)	(1.6)	0.8	0.5	0.7±0.5	2.0±0.4	IV CONF WITH 1922+20.6	T11B			4C20.48
													55	2	
1930+25	19 30 47	+25 52.5	2.47	7.7	2.9	2.3	0.9	0.6	0.7±0.2	2.4±0.6	IV	T11B	61	3	4C25.53
1936+26	19 36 56	+26 39.5	2.46	8.2	4.8	1.9	0.7	0.4	1.0±0.2	2.5±0.7	IV	T11B	62	2	4C26.57

TABLE 2 (Continued)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
SOURCE NUMBER	POSITION (1950)		ANNUAL PRECESSION + +		FLUX DENSITY				SPECTRUM		REMARKS	DATE	GALACTIC COORDS L2 B2		OTHER CATALOGUE NUMBERS 4C OTHER	
	R.A.	DEC.			S178	S435	S1410	S2650	INDEX	S400						
1937+25	19 37 04	+25 57.5	2.48	8.2		2.6	0.9		1.3±0.5	4.8±1.2	IV	T21	61	2		NPC
1937+21	19 37 31	+21 30.7	2.59	8.3	2.9	2.5	1.5	0.9	0.6±0.2	3.3±0.6	IV	T11B	58	-0	4C21.53	
1938+22	19 38 40	+22 57.0	2.56	8.4	2.7	1.0	0.7	0.2	1.1±0.3	2.2±0.8	IV	T20	59	0	4C23.52	
1942+256	19 42 15	+25 41.2	2.49	8.6		2.0	1.5	0.9	0.7±0.3	3.5±0.7	IV COMPLEX AREA	T21	62	1		NPC
1942+252	19 42 16	+25 13.5	2.50	8.6		2.0	0.6	0.9	C		IV COMPLEX AREA	T21	61	1		NPC
1944+258	19 44 16	+25 50.3	2.49	8.8	2.7	0.8	0.4		0.9±0.6	1.3±0.9	IV COMPLEX AREA	T21	62	1	4C25.54	
1944+250	19 44 41	+25 04.8	2.51	8.8		8.5	5.6		0.5±0.2	10.8±1.0	HII COMPLEX AREA	T21	61	0		CTD 114
1947+266	19 47 07	+26 40.7	2.47	9.0			5.4	-			HII COMPLEX AREA	T21	63	0		CTD 116
1947+24	19 47 23	+24 15.7	2.54	9.1		2.4	0.7	0.4	1.2±0.4	3.5±1.1	IV	T21	61	-1		
1950+25	19 50 43	+25 19.4	2.51	9.3	6.4	3.0	(1.6)	1.0	0.7±0.2	3.9±1.0	IV	T11B	62	-1	4C25.55	CTD 117
1953+22	19 53 37	+22 53.4	2.58	9.5	3.2	1.2	(0.8)	0.2	1.1±0.4	1.6±1.0	IV	T12A	61	-3	4C22.55	
1958+25	19 58 59	+25 42.7	2.51	9.9		3.3	1.6	1.1	0.7±0.3	4.1±0.8	IV	T11B	64	-2		CTD 120
2000+20	20 00 04	+20 57.9	2.63	10.0	4.5	(1.4)	(0.6)	0.2	1.2±0.3	1.8±0.8	III-IV CONF WITH 2000+21	T21	60	-5	4C20.49	
2000+21	20 00 59	+21 02.2	2.63	10.1		(1.4)	(0.6)	0.3	-		III-IV CONF WITH 2000+20	T21	60	-5	(4C20.49)	
2007+24	20 07 16	+24 57.0	2.54	10.6	4.6	1.6	0.8	0.4	0.9±0.2	2.5±0.7	III-IV	T21	64	-4	4C24.48	CTD 121
2008+20	20 08 19	+20 33.7	2.65	10.6	2.8	1.4	0.7	0.4	0.8±0.3	1.9±0.6	III-IV	T21	60	-7	4C20.50	
2009+25	20 09 41	+25 29.2	2.53	10.7	2.6	1.3	0.8	0.3	1.0±0.3	2.4±0.8	III-IV EXT	T21	65	-4	4C25.56	
2012+23	20 12 18	+23 25.6	2.59	10.9	79.0	34.5	13.0	7.1	C		IV	T10	63	-6	4C23.53	3C409 NRA0625
2018+23	20 18 55	+23 09.3	2.60	11.4	5.7	2.3	1.5	1.3	0.5±0.2	3.0±0.5	IV	T11B	64	-8	4C23.54	
2029+20	20 29 34	+20 15.7	2.68	12.2	(2.5)	1.0	0.4	0.1	1.7±0.9	3.0±2.0	III-IV	T12A	63	-11	(4C20.51)	

2030+25	20 30 42	+25 41.9	2.56	12.2	5.6	3.6	2.0	1.1	0.8±0.1	5.2±0.8	IV	T118	68 -8	4025.56.1 3C414 CTD124 NRA0632
2031+21	20 31 19	+21 36.0	2.65	12.3	6.2	3.2	2.2	1.4	0.6±0.1	4.5±0.7	II D 14.5M	T10	64 -11	4021.55
2039+24	20 39 26	+24 38.3	2.60	12.8	2.8	1.9	1.2	0.7	0.7±0.2	2.7±0.6	III-IV	T118	68 -10	4024.50
2045+23	20 45 38	+23 14.4	2.64	13.3	3.2	1.1	0.8	0.5	0.7±0.3	1.9±0.5	III	T118	68 -12	4023.55
2051+26	20 51 08	+26 01.6	2.59	13.6	4.5	2.4	1.2	0.6	0.9±0.2	3.3±0.7	III	T10	71 -12	4026.58
2053+22	20 53 41	+22 44.2	2.67	13.8	3.0	1.3	0.4		1.0±0.5	1.6±1.1	III	T20	69 -14	4022.57
2102+20	21 02 14	+20 19.0	2.73	14.3	2.3	(2.3)	0.3	0.2	0.9±0.5	1.1±0.6	II	T12A	68 -17	4020.52
2104+23	21 04 57	+23 20.2	2.67	14.5	4.2	1.0	0.4	0.2	1.1±0.3	1.7±0.8	III	T118	71 -16	4023.56
2105+21	21 05 52	+21 27.5	2.71	14.5	4.3	1.1	0.4	0.3	1.0±0.2	1.8±0.7	III	T21	69 -17	4021.58 NRA0646
2107+23	21 07 47	+23 51.0	2.67	14.6	3.3	1.7	0.7	0.3	1.0±0.3	2.3±0.8	III-IV	T118	72 -16	4023.57 CTD 127
2114+24	21 14 49	+24 46.9	2.67	15.1	4.9	2.5	1.5	0.7	0.8±0.2	3.9±0.8	III	T118	73 -17	4024.52 CTD 129
2121+24	21 21 31	+24 51.3	2.68	15.4	54.4	25.0	12.4	7.0	0.8±0.1	33.4±2.9	I D 17M EXT	T10	74 -18	4024.54 3C433 CTD 130 NRA0658
2137+20	21 37 30	+20 57.4	2.77	16.3		(1.6)	1.2	0.8	0.6±0.3	2.7±0.4	II	T21	74 -23	NPC
2142+22	21 42 31	+22 35.9	2.76	16.5	2.5	(1.4)	0.5	0.3	0.8±0.4	1.4±0.6	III	T21	76 -23	4022.59
2147+24	21 47 12	+24 53.0	2.73	16.8	5.5	1.9	0.6	0.4	1.0±0.2	2.5±0.8	III	T118	79 -22	4024.56
2149+20	21 49 01	+20 42.5	2.80	16.9		1.0	0.4	0.2	1.1±0.7	1.7±0.9	II	T21	76 -25	NPC
2149+21	21 49 30	+21 15.5	2.79	16.9	5.3	2.1	0.8	0.5	0.9±0.2	2.7±0.7	III	T21	77 -25	4021.59
2156+26	21 56 10	+26 38.8	2.73	17.2	2.8	1.1	0.5	0.2	1.0±0.3	1.7±0.7	III	T21	82 -22	4026.59
2159+22	21 59 06	+22 31.7	2.79	17.3	2.1	1.5	0.7	0.3	1.0±0.3	2.2±0.7	II	T21	79 -25	4022.61
2203+24	22 03 01	+24 00.8	2.78	17.5	2.7	1.0	0.4		0.9±0.6	1.4±1.0		T22	81 -25	4024.57
2203+26	22 03 41	+26 30.5	2.75	17.5	2.5	1.1	0.3		1.1±0.6	1.3±1.1	III	T20	83 -23	4026.60
2222+21	22 22 47	+21 31.5	2.86	18.3	4.5	(1.5)	1.3	0.1	C		III	T118	83 -30	4021.60
2223+21	22 23 15	+21 02.6	2.86	18.3		(2.0)	(2.7)	1.4	-		III	T20	83 -30	NPC
2227+26	22 27 15	+26 05.0	2.82	18.4	5.0	1.4	0.8	0.5	0.8±0.2	2.4±0.6	II	T118	87 -27	4026.62

TABLE 2 (Continued)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
SOURCE NUMBER	POSITION (1950)		ANNUAL PRECESSION		FLUX DENSITY				SPECTRUM		REMARKS	DATE	GALACTIC COORDS		OTHER CATALOGUE NUMBERS	
	R.A.	DEC.	+	+	S178	S635	S1410	S2650	INDEX	S400			L2	B2	4C	OTHER
2227+24	22 27 47	+24 56.3	2.83	18.4	(2.1)	(1.9)	0.4		-		III	T21	87 -28		(4C24.58)	
2232+24	22 32 35	+24 17.1	2.85	18.6	2.9	1.2	0.7	0.5	0.6±0.3	1.6±0.5	III	T11B	87 -29		4C24.59	
2234+20	22 34 09	+20 17.4	2.89	18.7	3.3	1.6	0.7	0.5	0.7±0.2	1.9±0.5	III	T11B	85 -32		4C20.54	
2240+24	22 40 24	+24 43.8	2.86	18.8	2.6	0.9	0.5	0.4	0.6±0.3	1.3±0.4	III	T20	89 -29		4C24.60	
2245+23	22 45 09	+23 12.3	2.89	19.0		1.4	0.5	0.3	1.0±0.5	1.9±0.8	III	T21	89 -31			NPC
2246+205	22 46 52	+20 31.7	2.92	19.0	3.2	(1.7)	0.4		1.0±0.4	1.4±0.7	III	T21		88 -34	4C20.55	
2246+208	22 46 52	+20 50.9	2.91	19.0		(1.7)	0.5		-		III	T21		88 -33		NPC
2251+24	22 51 45	+24 29.2	2.89	19.2	2.7	2.4	1.9	1.4	0.4±0.2	3.0±0.5	III	T11B	92 -31		4C24.61	CTD 136
2308+25	23 08 55	+25 31.5	2.93	19.5	4.0	2.6	1.1	0.7	0.7±0.2	2.9±0.6	III	T11B	96 -32		4C25.59	CTD 137
2318+20	23 18 26	+20 33.4	2.98	19.7	2.4	1.5	0.2	0.1	1.4±0.4	1.6±1.2	III	T21	96 -37		4C20.56	
2318+23	23 18 59	+23 30.5	2.97	19.7	8.1	3.1	2.0	0.9	0.9±0.1	5.3±0.9	III	T10		98 -35	4C23.58	3C460 NRA0710
2325+26	23 25 33	+26 56.4	2.97	19.8	6.0	2.9	1.3	0.6	0.9±0.2	4.0±0.8	III	T11B			4C27.52	3C463 CTD 140 NRA0713
													101 -32			
2335+26	23 35 57	+26 44.3	3.00	19.9	13.6	17.1	7.0	4.0	C		I D 12M	T10			4C26.64	CTD 143 3C 465 NRA0715
													103 -33			
2337+22	23 37 53	+22 04.3	3.02	19.9	6.1	3.5	2.2	1.4	0.6±0.1	4.6±0.7	III	T10			4C22.63	3C 466 NRA0717
													102 -38			
2339+23	23 39 09	+23 36.0	3.02	20.0	3.0	1.1	0.4	0.2	1.0±0.3	1.5±0.7	III	T11B	103 -36		4C23.59	
2339+25	23 39 28	+25 59.6	3.01	20.0	4.4	1.5	0.4	0.2	1.2±0.3	2.0±0.9	III	T11B	104 -34		4C25.60	
													0	0		

V. DETERMINATION OF FLUX DENSITIES

(a) *Measurement of Flux Densities*

Flux densities at 635 MHz were obtained by measurement of the amplitude of the source on the finding survey. A correction was applied to allow for the difference between the measured right ascension of the source and that of the nearest survey scan. In a number of cases where the flux density was in doubt, several additional scans at 635 MHz were taken through the source. Source amplitude was expressed in terms of a noise calibration, which was injected at frequent intervals during the survey. The value of the calibration signal was obtained from measurements of Hydra A, which was taken as 90.0 f.u. at 635 MHz.

Where the sources were positioned at 2650 MHz as part of the accurate position programme (Shimmins 1968) the mean flux density measured at position angles 0° and 90° was used, thus eliminating errors due to polarization. These values were calibrated by assuming a flux density of 23.5 f.u. for Hydra A. Where the source was positioned at 2650 MHz, the flux density at 1410 MHz was obtained by on-off source measurements, using the 2650 MHz positions. Amplitudes were measured against a noise calibration, the value of which was obtained by measurements of Hydra A, for which a flux density of 42.0 f.u. at 1410 MHz was adopted.

Where the sources were positioned at 1410 MHz the 1410 MHz flux densities were obtained from the amplitudes of the positioning scans and the 2650 MHz flux densities from subsequent on-off source measurements. Flux densities at 178 MHz are from the 4C catalogue.

TABLE 3
ESTIMATED ERRORS IN FLUX DENSITY MEASUREMENTS

Source of Error	R.M.S. Error at a Frequency of:		
	2650 MHz	1410 MHz	635 MHz
Variation in calibration signal	8%	8%	8%
Angular extent of source	2%	1%	—
Noise fluctuation	0.05 f.u.	0.1 f.u.	0.2 f.u.
Confusion effects	0.03 f.u.	0.1 f.u.	0.4 f.u.
Estimated total r.m.s. error	8% $\pm$ 0.06 f.u.	8% $\pm$ 0.14 f.u.	8% $\pm$ 0.5 f.u.

(b) *Errors in Flux Densities*

Table 3 gives estimates of the average errors that apply to flux density measurements. These estimates allow for variations in the calibration signal, possible source extension, noise fluctuation, and confusion effects. Where the error in a flux density is thought to be significantly greater than average, the flux density given in Table 2 is in parentheses.

VI. SPECTRA OF SOURCES

The spectral index α is defined by the expression $S = kf^{-\alpha}$, where S is the flux density measured at frequency f and k is a constant. Excluding values outside the average error range, where a source had flux density measurements at two or more frequencies (including 178 MHz) the values were used to determine the straight line

$$\log S = -\alpha \log f + \text{constant}.$$

Each flux density was weighted by the inverse square of its r.m.s. error as given in Table 3. The values with more than average errors were considered as if they had double these errors.

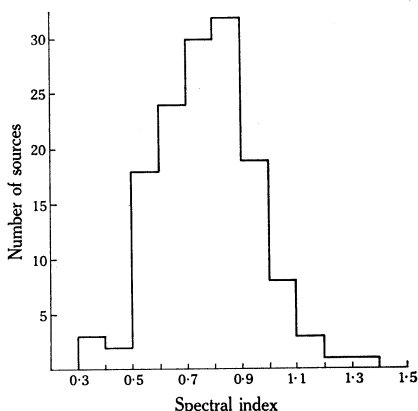


Fig. 1.—Histogram of spectral indices of 141 sources with well-defined spectra. The mean spectral index is 0.83 with a standard deviation of 0.19.

The spectral index and estimated flux density at 400 MHz are given in columns 10 and 11 of Table 2 with the r.m.s. errors determined from those quoted for flux densities. The r.m.s. error corresponding to the goodness of fit was calculated for each source, and where this was significantly greater than the expected error, indicating a departure from a power law spectrum, a C is given in column 10. As can be seen from Table 2, the errors in flux densities, particularly for the weaker sources, are high and this results in large probable errors in the determination of spectral indices.

For a sample of 141 sources for which the spectral indices are well defined with an error of ± 0.2 or less, a histogram of the distribution of spectral indices is shown in Figure 1. The mean spectral index is 0.83 with a standard deviation of 0.19.

Of the 323 sources outside $\pm 10^\circ$ from the galactic equator for which a spectral index is available, approximately 38 (i.e. 12%) have spectral indices of 0.6 or less and only 5% have spectral indices of 0.5 or less.

VII. IDENTIFICATIONS

The optical classifications given in column 12 of Table 2 refer to the field within a rectangle $\pm 1'.0$ from the position of the source. The fields are defined:

class I, the error rectangle includes one galaxy or more brighter than $m_{pg} = 17$; class II, the error rectangle includes one galaxy or more brighter than $m_{pg} = 19.5$ but fainter than $m_{pg} = 17$; class III, the error rectangle includes no galaxies above the plate limit; class IV, the field is heavily obscured; class HII, the field contains an emission nebula.

J. G. Bolton and Jeannette Merkelijn have examined the fields of all sources, using the 48 in. Palomar Sky Survey prints, and the results are being published in separate papers. Only the results for the strong sources have been included in column 12; these have been taken from Merkelijn, Shimmins, and Bolton (1968).

VIII. SOURCE COUNTS

The present survey gives the flux densities of 341 sources in an area of 0.606 steradian, i.e. excluding the region within 10° of the galactic equator. Figure 2 shows a plot of N , the number of sources per steradian of flux density equal to or greater than S , versus the flux density S , using logarithmic scales.

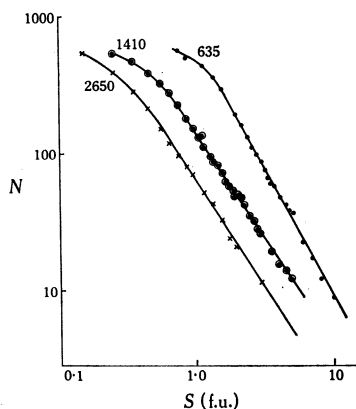


Fig. 2.—Relationship between flux density S and the number N of sources per steradian above a given level of flux density for frequencies of 2650, 1410, and 635 MHz.

The slopes of the lines for the three frequencies are 1.86 ± 0.10 at 635 MHz, 1.65 ± 0.10 at 1410 MHz, and 1.55 ± 0.10 at 2650 MHz. These slopes are very similar to those obtained for the 0° to $+20^\circ$ section of the Parkes catalogue. Of particular interest is the low slope of the $\log N - \log S$ curve at 2650 MHz. This is consistent with the sources having a small systematic increase in spectral index as they get weaker. It is not certain whether this increase is real or due to some systematic underestimation of the 2650 MHz flux densities with decreasing flux density.

As determined from the $\log N - \log S$ curves, it appears that the catalogue is substantially complete down to a flux density of 1.5 f.u. at 635 MHz (300 sources per steradian).

The density of sources at 1410 MHz is 139 sources per steradian with a flux density of 1.0 f.u. or stronger.

IX. COMPARISON WITH OTHER CATALOGUES

Two other catalogues that cover the same area of sky are: "A survey of radio sources between declinations $+20^\circ$ and $+40^\circ$ " by Pilkington and Scott (1965), which is part of the Cambridge 4C catalogue, and "A continuum survey for discrete radio sources at 1421 Mc/s" by Kellerman and Read (1965) (known as the CTD list).

(a) Comparison with 4C Catalogue

The 4C survey was carried out at 178 MHz and is complete to 2 f.u. at 178 MHz, with a positional accuracy of $0' \cdot 5$ in right ascension and $3'$ in declination. The 4C catalogue contains 436 sources in the area, of which 313 are in the present catalogue. Most of the 123 4C sources not presented here have been found on the 635 MHz finding survey but have not been positioned, 94 of them being weaker than 0.9 f.u. at 635 MHz (or 2.5 f.u. at 178 MHz).

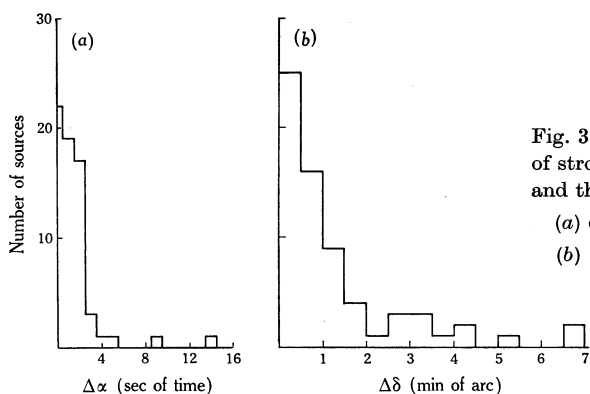


Fig. 3.—A comparison of the positions of strong sources in the present catalogue and those in the 4C catalogue:

(a) differences in right ascensions $\Delta\alpha$

(b) differences in declinations $\Delta\delta$

Of particular interest are the 82 sources in the present catalogue that are not in the 4C catalogue. Of these, 20 are close to 4C sources and 12 are within $\pm 10^\circ$ of the galactic plane. These 32 sources can be reasonably explained, but of the remaining 50 sources only 11 have spectra and flux densities at centimetre frequencies such that the expected flux density at 178 MHz would be below the 4C limit. A comparison of the positions given here with those in the 4C catalogue has been made for the stronger sources where the positional accuracy of the present catalogue is better than $30''$ arc in each coordinate. The differences in right ascension and declination are shown in histogram form in Figures 3(a) and 3(b). The agreement in right ascension is less than 3 sec of time, and the declination shows a difference of approximately $1'$ arc.

(b) Comparison with CTD List

The CTD survey was carried out at 1421 MHz and covers the declination range $+23^\circ 50'$ to $+30^\circ 10'$, thus providing a $3^\circ 10'$ overlap zone. The survey is stated to be complete to 1.15 f.u. at 1421 MHz and contains sources of flux density down to 0.5 f.u. at 1421 MHz. A comparison has been made between the CTD list and the

present catalogue in the overlap zone, in which there are 63 CTD sources. Five of these sources are not given here; CTD 26, 29, and 138 were not present on the records of the finding survey, and CTD 110 and 113 are within $\pm 10^\circ$ of the galactic plane where the present survey is incomplete. There are 58 sources in the overlap region that are not in the CTD list. Of these, 10 are stronger than 1.0 f.u. at 1410 MHz and might reasonably have been expected in the CTD list, and the others are weaker than 1.0 f.u., where it is known that the CTD list is incomplete. The CTD list gives a source density of 145 ± 18 sources per steradian, at a flux level of 1 f.u., with a $\log N - \log S$ slope of -1.57 ± 0.20 for sources more than 10° from the galactic equator. This compares with the value of 139 ± 15 sources per steradian, with slope -1.60 , obtained in the present survey.

The agreement in position is not inconsistent with the $\pm 12^s$ in right ascension and $\pm 5'$ in declination quoted in the CTD list.

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