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A Survey of the Sky at 610.5 MHz. II. The Region between Declinations +15° and +22°

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The second section of the catalogue of radio sources being made with the 400-ft radio telescope at the Vermilion River Observatory of the University of Illinois has been completed. The declination range is +15° to +22°; however, approximately 6% of this region has been omitted to avoid sidelobe confusion. All sources are tabulated whose 610.5 MHz flux densities are greater than 0.8 f.u.

I. INTRODUCTION

THE 400-ft radio telescope at the Vermilion River Observatory of the University of Illinois is being used to observe systematically the sky for sources at 610.5 MHz. The first section of the catalogue, containing sources between declinations of +40° and +44°, was published in Paper I (MacLeod, Swenson, Yang, and Dickel 1965). A catalogue of sources on 178 MHz has been compiled at Cambridge University (Pilkington and Scott 1965) and a few small regions of the sky have been surveyed at 1415 MHz at the Ohio State University (Kraus 1964; Dixon, Meng, and Kraus 1965).

The present paper contains the second section of the VRO catalogue, which includes sources between declinations +15° and +22° whose flux densities lie above a limiting value of 0.8 f.u.

II. EQUIPMENT

The 400-ft radio telescope has been described previously in Paper I (MacLeod, Swenson, Yang, and Dickel 1965) and in detail by Yang and Swenson (1967). In the declination range of interest for this part of the catalogue, the beamwidth in right ascension is 16 min of arc, as before, and in declination is 22 min of arc.

The sidelobe pattern of the telescope has been described in Paper I, where it was mentioned that the level of the strongest sidelobes should be more than 16 dB below the response of the main beam. Near declination 20°, however, there is a stronger sidelobe slightly more than 1° south of the main beam in the plane of the meridian. This sidelobe has a response about 13 dB below that of the main beam. We have therefore excluded from the survey small blocks of the sky 10^m wide in right ascension and 4° wide in declination around the positions of all sources with flux densities greater than 10 f.u. We have also excluded narrow strips of the sky 10^m wide in right ascension at the right ascensions of the strong sources Cassiopeia A, Cygnus A, and Virgo A. Taurus A presents an additional problem because it lies at the edge of the region surveyed. In order to eliminate any possible sidelobe responses to this source, we have excluded the block of sky between right ascension 05^h and 06^h and declinations +20° to +22° and also a strip 10^m wide along the meridian plane. Thus about 6% of the available sky has not been included in the survey.

An improvement to the system has been the addition of a second Dicke radiometer which operates in synchronism with the original receiver. When one receiver is switched to the comparison load the other is on the antenna and vice versa. This system provides two independent records at the same time and thus doubles the rate of data acquisition. In practice, the number of observing periods on each declination was reduced from 3 to 2 and either 3 or 4 usable records were averaged together.

III. OBSERVATIONS AND DATA REDUCTION

The general procedures used in the observations and data reduction are the same as those described in Paper I. Since the telescope is a fixed instrument, its parameters change with zenith distance, however, and so the calibration and survey limits for the declination range of interest are discussed below.

A. Calibration

As before, no attempt has been made to carry out absolute flux density measurements. Calibration of the flux density scale has been made by interpolations from the spectra of several sources published by Kellermann (1964). The sources used and their flux densities at 610.5 MHz are listed in Table I. The first column contains the source name and the second, the flux density interpolated from Kellermann's values. In Column 3 is listed the measured value on the mean scale adopted for these measurements. Column 4 gives the ratio of the value predicted by Kellermann's spectrum to that adopted. On the basis of these data, a change of 1°K in antenna temperature at the input terminals of the receiver corresponds to a flux density for a point source of 5.2 f.u. in this range of declinations.

Regular observations of 3C84 and other standard sources have shown that the sensitivity and the pointing of the radio telescope have not changed since observations were begun in 1963. Furthermore, periodic surveys of the telescope's structure have indicated no

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TABLE I. List of sources used for calibration.

Source	Flux densities (f.u.) Predicted (Kellermann 1964)	Measured	Ratio predicted / measured
3C47	8.8	9.1	0.97
3C79	9.5	9.1	1.04
CTA21	10.3	8.8	1.17
3C138	13.5	14.5	0.97
3C166	5.4	5.3	1.02
3C264	11.2	9.9	1.13
3C318	5.0	4.9	1.02
3C324	5.1	5.5	0.93
3C334	4.6	4.5	1.02
3C386	12.2	13.1	0.93
3C437	6.2	6.6	0.94

changes. Thus the present sections of the catalogue should be completely consistent with Sec. I.

B. Lower Limit of the Survey

Several investigators have attempted to determine the distributions of very faint sources for various cosmological models and to determine thereby the confusion limits of radio surveys. The models by Priester (1958), Hewish (1961), and von Hoerner (1961) give large ranges for the confusion limit, so that no unique value can be adopted. We have therefore determined the confusion limit by an observational method. The fluctuation of the sky background caused by the random distribution of sources appears as noise on the output records and is added quadratically to the receiver noise. Statistical theory shows that the fluctuating receiver noise can be reduced by the square root of the number of independent records which are averaged together. If the term "noise" is defined as five times the rms deviation from the mean, and N_1 is the noise measured on one record, N_n is the noise measured on the average of n records, R is the receiver noise, and C is the confusion noise, then two simultaneous equations are obtained, namely

$$N_1^2 = R^2 + C^2,$$
$$N_n^2 = (1/n)R^2 + C^2.$$

A solution of these two equations will give the two unknowns R and C.

In order to determine these noise parameters, a series of 16 observations with a receiver time constant of 20 sec was made on the declination of 43°.085 in a region far from the galactic plane. The results are shown in Table II, where the noise level for an average of three records has also been included since this is the number usually used for the survey observations. A similar analysis for 11 records at the declination of 16°.610 gave approximately the same antenna temperature values for the receiver and confusion noise. This shows that the distribution of weak sources is nearly uniform in the sky. The actual flux density values at this declination are: a confusion noise of 0.37 f.u. and a receiver noise for the average of three records of 0.88 f.u. The confusion noise found is also consistent with that found by Kraus, Dixon, and Fisher (1966) at 1400 MHz if a mean spectral index of -0.75 for the faint sources is assumed.

Since most of the sources in the final catalogue appear on the records for three adjacent declinations, the total signal received from a source is approximately twice that received from the observations on the central declination. This lowers the minimum detectable signal caused by receiver noise by an additional factor of $\sqrt{2}$ so that the sensitivity limit is 0.63 f.u. Thus, the final lower limit for the flux density of sources in this section of the catalogue is 0.8 f.u.

C. Errors

A description of the error analysis is given in Paper I. A source with a flux density at the survey limit of 0.8 f.u. has an uncertainty of $\pm 29\%$ (mean error). At 1 f.u. the value is $\pm 24\%$, at 2 f.u. it is $\pm 13\%$ and for a strong source with a flux density of 10 f.u. the uncertainty is $\pm 8\%$.

The uncertainty in right ascension is about $\pm 15^s$ for the weakest sources, but it has fallen to $\pm 6^s$ for a source of 2 f.u. and $\pm 3^s$ for one of 10 f.u. The corresponding values for the declination errors are $\pm 2'.1$, $\pm 1'.1$, and $\pm 0'.8$.

IV. RESULTS

Table III is a list of the radio sources observed in this section of the survey. The first column contains the VRO source number. In columns 2–5 are listed the 1950.0 equatorial and galactic coordinates of each source. The sixth column contains the flux density in flux (10^{-26}W m^{-2} Hz^{-1}) and the seventh column contains other designations for the source. When a source is included in both the 3C and 4C catalogues, only the 3C number is recorded. The last column contains additional notes.

A total of 625 sources appears in the catalogue. Three hundred sixty-seven of these are previously uncatalogued. The 4C (Pilkington and Scott 1965; Gower, Scott, and Wills 1967) contains 511 sources in this area and 234 sources are common to both catalogues. Variations in the spectral indices of the weak sources can account for the fact that some of the weak

TABLE II. Noise determination on the declination of 43°.085.

	T_a(°K)	f.u.
Measured noise:		
N_1 (one record)	.299	1.11
N_3 (average of three records)	.144	0.74
N_{16} (average of sixteen records)	.104	.39
Receiver noise R	.292	1.08
$R/\sqrt{3}$	.168	0.63
Confusion noise C	.079	0.29

TABLE III. The VRO list of sources.

All sources with flux densities below 10 f.u. were omitted in the following regions:

Right ascension From	Right ascension To	Declination From	Declination To
05h00m	06h00m	20°00′	22°00′
05 13	05 23	15 00	18 30
05 27	05 37	15 00	20 00
06 01	06 11	15 00	17 40
06 02	06 20	18 30	22 00
06 10	06 20	18 00	18 30
11 37	11 47	17 50	22 00
12 24	12 34	15 00	22 00
18 31	18 41	15 10	19 10
19 32	19 42	15 10	19 10
19 53	20 03	15 00	22 00
22 46	22 56	15 00	18 00
23 17	23 27	15 00	22 00

Source No.	Right ascension (1950.0)	Declination (1950.0)	Galactic longitude	Galactic latitude	Flux density (f.u.)	Other designations	Notes
15.00.01	0h 3m17s	15°55.4	107	−45	1.3	4C1501	
15.00.02	0 14 5	15 7.2	111	−47	0.9		
15.00.03	0 17 44	15 24.0	112	−47	3.9	3C9, P0017+15, N19	(4)
15.00.04	0 25 47	15 29.3	115	−47	1.2		
15.00.05	0 48 56	15 4.9	123	−48	0.8		
15.01.01	1 3 1	15 37.9	128	−47	1.1		
15.01.02	1 10 27	15 11.5	131	−47	1.9		
15.01.03	1 13 32	15 18.5	132	−47	1.2	4C1504	
15.01.04	1 20 17	15 58.2	134	−46	1.1		
15.01.05	1 39 17	15 13.4	140	−46	0.8		
15.02.01	2 10 55	15 54.6	150	−42	1.4		
15.02.02	2 23 21	15 42.9	154	−41	1.1		
15.02.03	2 33 58	15 36.7	157	−40	1.3	4C1507	
15.02.04	2 37 43	15 31.0	158	−40	1.0	4C1508	
15.02.05	2 49 12	15 40.1	161	−38	1.8	4C1509, P0249+15	
15.03.01	3 9 13	15 14.9	166	−35	1.5	4C1510	
15.04.01	4 17 33	15 6.7	180	−24	2.2	4C1513, P0417+15	
15.04.02	4 26 10	15 45.8	180	−22	1.2	4C1514	(1)
15.05.01	5 5 35	15 51.4	186	−14	0.8		
15.05.02	5 26 26	15 23.8	190	−10	2.8	4C1516	
15.05.03	5 38 46	15 16.0	191	− 8	1.8		
15.05.04	5 45 24	15 5.4	192	− 7	1.0		
15.05.05	5 55 31	15 31.5	193	− 4	0.8	4C1517	
15.05.06	5 57 48	15 7.2	194	− 4	1.0		(1)
15.06.01	6 6 5	15 44.8	194	− 2	10.6		(8)
15.06.02	6 16 21	15 21.5	196	0	3.5		(10)
15.06.03	6 48 17	15 24.7	199	7	1.7	4C1518	
15.07.01	7 16 31	15 33.3	202	13	0.9		
15.07.02	7 21 21	15 15.2	203	14	2.9	3C177, P0721+15, N261	(9)
15.07.03	7 27 55	15 20.6	203	15	2.4	4C1520, P0727+15	
15.08.01	8 30 18	15 29.7	210	29	0.8	4C1524	
15.08.02	8 39 33	15 40.5	211	31	1.0		
15.08.03	8 41 2	15 58.0	211	32	2.4	4C1525, P0841+15	(2)
15.08.04	8 55 50	15 44.7	212	35	1.2		
15.09.01	9 32 56	15 7.4	218	43	0.9		
15.09.02	9 39 50	15 17.0	218	45	1.4		
15.10.01	10 25 36	15 23.3	225	55	2.0	4C1532	
15.10.02	10 43 42	15 58.7	228	59	2.6	4C1534, P1044+15	
15.12.01	12 1 47	15 18.7	258	74	1.4	4C1539	(3)
15.12.02	12 39 32	15 59.2	292	78	0.8		
15.12.03	12 44 40	15 13.3	298	78	1.0		
15.12.04	12 54 44	15 22.7	310	78	1.4	4C1541	
15.12.05	12 58 10	15 56.8	314	78	0.8		
15.13.01	13 25 56	15 34.6	341	75	0.8		
15.13.02	13 45 5	15 19.6	353	72	1.2		
15.13.03	13 52 46	15 58.1	359	71	1.0		
15.14.01	14 1 28	15 11.8	1	69	0.8		
15.14.02	14 8 54	15 35.6	5	68	1.3		
15.14.03	14 31 16	15 29.7	12	63	0.9		
15.14.04	14 39 50	15 9.7	13	62	1.0		
15.14.05	14 41 39	15 13.0	14	61	1.8		
15.14.06	14 51 55	15 25.9	17	59	0.8		
15.15.01	15 10 3	15 56.2	21	55	1.4	4C1545, P1509+15	
15.15.02	15 18 9	15 39.8	22	54	0.8	4C1547	
15.16.01	16 0 1	15 50.9	29	44	1.1	4C1553(+52?)	
15.16.02	16 32 30	15 14.3	32	37	1.4		

TABLE III (*continued*)

Source No.	Right ascension (1950.0)	Declination (1950.0)	Galactic longitude	Galactic latitude	Flux density (f.u.)	Other designations	Notes
15.16.03	16 40 34	15 35.3	33	35	1.4	4C1558	
15.16.04	16 48 34	15 59.6	35	34	1.2		
15.16.05	16 51 49	15 15.2	34	33	2.6		
15.17.01	17 21 10	15 58.8	38	26	0.9		
15.17.02	17 29 30	15 19.3	38	24	1.3		
15.17.03	17 31 21	15 13.1	38	24	0.9		
15.17.04	17 44 20	15 24.4	40	21	1.1		
15.17.05	17 46 46	15 56.7	41	21	1.2		
15.18.01	18 33 33	15 11.8	45	10	0.9	4C1561, P1833+15	
15.19.01	19 37 49	15 16.1	52	− 3	1.6	4C1567	
15.20.01	20 3 22	15 9.3	55	− 9	1.3		
15.20.02	20 4 9	15 31.4	56	− 9	0.8		
15.20.03	20 7 57	15 9.6	56	10	1.1		
15.20.04	20 24 47	15 26.9	58	−13	4.4	4C1570	
15.20.05	20 27 25	15 36.0	59	−13	2.2		
15.20.06	20 41 57	15 19.4	61	−16	1.0		
15.20.07	20 50 9	15 57.7	62	−18	1.6		
15.21.01	21 21 16	15 30.5	67	−24	2.4	3C434, N657	
15.21.02	21 35 20	15 41.2	70	−26	0.8	4C1574	
15.21.03	21 44 55	15 24.0	71	−28	1.2		
15.21.04	21 45 3	15 7.6	71	−28	6.6	3C437, N666	(4)
15.21.05	21 49 24	15 42.1	72	−29	1.0		
15.22.01	22 2 12	15 56.4	75	−31	0.8		
15.22.02	22 3 46	15 11.9	75	−32	1.6		
15.22.03	22 33 4	15 22.6	81	−36	1.1		
15.22.04	22 39 20	15 12.1	83	−37	1.6		
15.22.05	22 52 7	15 53.6	86	−38	15.6	3C454.3, N701	(4)
15.23.01	23 3 32	15 31.6	89	−40	1.2		
15.23.02	23 46 40	15 24.7	102	−45	1.6		
15.23.03	23 53 22	15 32.2	104	−45	1.4		
15.23.04	23 56 51	15 17.5	105	−45	0.9		
16.00.01	0 1 29	16 59.9	107	−44	1.6	4C1702, N1	
16.00.02	0 3 27	16 30.2	108	−45	0.9		
16.00.03	0 15 16	16 33.1	111	−45	1.5	4C1601	
16.00.04	0 51 17	16 25.4	124	−46	1.9	4C1602	(1)
16.01.01	1 1 42	16 19.9	127	−46	0.9		
16.01.02	1 5 10	16 52.5	129	−46	1.3		
16.01.03	1 48 9	16 9.4	143	−44	1.5		
16.01.04	1 50 11	16 27.1	143	−44	1.2	4C1604	
16.01.05	1 50 38	16 56.7	143	−43	1.1		
16.02.01	2 2 49	16 52.0	147	−42	1.1		
16.02.02	2 12 53	16 26.8	150	−42	1.2		
16.02.03	2 45 58	16 58.0	159	−37	0.9		
16.03.01	3 0 31	16 10.2	163	−36	4.7	3C76.1, P0300+16, N122	(6)
16.03.02	3 4 11	16 10.2	164	−35	0.8		
16.03.03	3 7 4	16 53.1	164	−34	9.1	3C79, P0307+16, N125	(6)
16.03.04	3 13 17	16 34.6	166	−34	1.1		
16.03.05	3 16 12	16 15.5	167	−34	8.8	CTA21, 4C1609, P0316+16	
16.03.06	3 54 45	16 34.2	174	−27	0.8		
16.04.01	4 1 51	16 0.4	176	−26	2.4	P0401+15, N160+161	
16.04.02	4 4 46	16 24.4	176	−25	1.1		
16.04.03	4 9 29	16 28.3	177	−25	1.0		
16.04.04	4 19 44	16 24.6	179	−23	1.3		(2)
16.04.05	4 31 4	16 36.9	180	−20	1.8		
16.04.06	4 39 43	16 45.0	182	−19	1.1	4C1611	
16.04.07	4 43 53	16 59.3	182	−18	1.1		
16.04.08	4 49 43	16 32.1	183	−17	1.0		
16.05.01	5 3 46	16 46.7	185	−14	1.2		
16.05.02	5 10 23	16 9.9	187	−13	0.9		
16.05.03	5 18 15	16 38.0	187	−11	14.6	3C138, P0518+16, N205	(4)
16.05.04	5 48 25	16 37.8	191	− 5	3.8	4C1614	
16.06.01	6 29 57	16 7.8	197	3	1.5	4C1618	
16.06.02	6 59 21	16 50.5	199	10	0.9		
16.06.03	6 59 35	16 5.2	200	10	1.3		
16.07.01	7 11 19	16 58.6	200	13	0.9		
16.07.02	7 15 29	16 50.7	201	13	0.9		
16.07.03	7 16 43	16 6.3	202	13	1.2		
16.07.04	7 48 15	16 34.0	204	20	1.4	P0748+16	
16.08.01	8 2 12	16 19.1	206	23	1.4	P0802+16	
16.08.02	8 10 34	16 13.0	207	25	1.2		
16.08.03	8 39 4	16 21.2	210	32	1.1		
16.08.04	8 43 3	16 9.2	211	32	1.0		
16.09.01	9 2 41	16 32.4	212	37	0.9		

TABLE III (*continued*)

Source No.	Right ascension (1950.0)	Declination (1950.0)	Galactic longitude	Galactic latitude	Flux density (f.u.)	Other designations	Notes
16.09.02	9 3 41	16 56.1	212	37	3.5	3C215, P0903+16, N315	(4)
16.09.03	9 9 26	16 34.9	213	38	3.3	4C1627, P0909+16	
16.09.04	9 16 15	16 49.9	214	40	2.0		
16.09.05	9 29 52	16 17.8	216	43	1.3		
16.09.06	9 52 35	16 40.1	218	48	1.2		(1)
16.10.01	10 19 44	16 9.5	223	54	1.6		
16.10.02	10 59 24	16 54.6	230	63	1.6		
16.11.01	11 4 47	16 52.1	231	64	1.0	4C1630	
16.11.02	11 13 52	16 19.7	235	65	1.0		
16.11.03	11 17 27	16 53.7	235	66	0.9		
16.11.04	11 21 39	16 31.9	237	67	1.2	4C1631	
16.11.05	11 26 22	16 53.8	238	68	0.9		
16.11.06	11 47 15	16 51.8	246	72	1.2		
16.12.01	12 33 48	16 50.8	284	79	3.8	4C1633, P1233+16, N403	(11)
16.12.02	12 41 35	16 41.9	294	79	6.1	3C275.1, P1241+16, N406	(4)
16.12.03	12 51 5	16 3.3	306	79	4.2	3C277.2, P1251+15, N410	
16.13.01	13 13 50	16 25.7	332	78	1.2	4C1635(?)	
16.13.02	13 24 8	16 48.6	342	77	0.9		
16.13.03	13 48 41	16 2.3	357	72	1.6	4C1637	
16.13.04	13 52 25	16 31.0	360	72	3.3	3C293.1, P1352+16, N434	(5)
16.14.01	14 0 32	16 15.6	3	70	1.8	4C1639	
16.14.02	14 51 54	16 35.7	19	60	3.0	P1452+16, N457	
16.14.03	14 53 46	16 42.2	19	59	4.5	4C1643, P1453+16, N461	
16.15.01	15 23 13	16 9.5	24	53	1.9	4C1645	
16.15.02	15 57 45	16 29.4	29	45	1.4	4C1646	
16.16.01	16 5 15	16 52.8	31	44	1.3		
16.16.02	16 6 43	16 39.9	30	43	1.5		
16.16.03	16 10 2	16 45.9	31	43	1.1		
16.16.04	16 35 35	16 0.1	33	37	1.2		
16.16.05	16 48 26	16 49.5	35	34	1.3	4C1647, P1648+16	
16.17.01	17 3 54	16 59.8	37	31	1.9	4C1744	
16.17.02	17 9 4	16 48.7	38	29	1.2		
16.17.03	17 11 29	16 58.6	38	29	1.1		
16.17.04	17 32 33	16 3.1	39	24	3.1	4C1649, P1732+16	
16.17.05	17 36 14	16 12.2	40	23	1.8	4C1650	
16.17.06	17 40 31	16 9.3	40	22	1.2	4C1652	
16.17.07	17 42 58	16 40.5	41	22	1.2	4C1653	
16.17.08	17 54 26	16 3.1	42	19	1.9		
16.17.09	17 55 3	16 46.8	42	19	2.6		
16.18.01	18 44 9	16 29.5	47	9	1.1		
16.19.01	19 9 37	16 5.0	50	3	2.2	4C1663	
16.19.02	19 14 16	16 39.8	51	2	1.3		
16.20.01	20 4 40	16 8.9	56	−9	1.4		
16.20.02	20 12 53	16 16.0	57	−10	2.7	4C1667	
16.20.03	20 18 8	16 57.3	59	−11	1.5		
16.20.04	20 20 11	16 24.4	59	−12	4.0		(7)
16.20.05	20 20 54	16 53.4	59	−11	4.6	4C1668	(7)
16.20.06	20 42 1	16 59.7	62	−16	2.2	P2041+17	
16.20.07	20 42 35	16 20.7	62	−16	1.3	4C1670	
16.21.01	21 10 21	16 54.6	66	−21	1.2		
16.21.02	21 12 29	16 55.7	67	−21	1.2		
16.21.03	21 20 22	16 52.9	68	−23	3.6	3C432, P2120+16, N656	
16.21.04	21 55 4	16 3.0	74	−29	1.2		
16.22.01	22 0 38	16 1.9	75	−30	1.2		
16.22.02	22 29 4	16 2.9	81	−35	1.2	4C1676, P2228+16	
16.22.03	22 38 54	16 54.7	84	−36	1.0		
16.22.04	22 41 23	16 20.9	84	−36	1.6	4C1677	
16.22.05	22 54 34	16 41.5	87	−38	2.3	4C1680, P2254+16	
16.23.01	23 48 41	16 2.0	103	−44	1.3	4C1684, P2348+16	
17.00.01	0 15 10	17 51.9	112	−44	1.6	4C1705, P0015+17	
17.00.02	0 21 45	17 51.0	114	−44	0.9		
17.00.03	0 40 31	17 18.5	120	−45	0.8	4C1706	
17.00.04	0 49 18	17 31.5	123	−45	2.3	3C23, P0049+17, N41	
17.00.05	0 51 12	17 10.4	124	−45	1.1		
17.01.01	1 0 58	17 38.4	127	−45	1.0		
17.01.02	1 9 26	17 28.6	130	−45	1.1	P0109+17(?)	
17.01.03	1 14 8	17 20.4	131	−45	0.9		
17.01.04	1 19 25	17 14.5	133	−45	1.2		
17.02.01	2 13 43	17 45.6	150	−40	1.6	4C1711, P0213+17	
17.02.02	2 20 24	17 19.2	152	−40	1.5	4C1712	
17.02.03	2 46 21	17 56.3	158	−36	0.9		
17.02.04	2 55 49	17 46.5	161	−35	1.3	4C1714	
17.03.01	3 19 12	17 37.1	166	−32	2.7	3C85, P0319+17, N133	

TABLE III (*continued*)

Source No.	Right ascension (1950.0)	Declination (1950.0)	Galactic longitude	Galactic latitude	Flux density (f.u.)	Other designations	Notes
17.03.02	3 22 49	17 22.7	167	−32	1.4		
17.03.03	3 25 18	17 58.3	167	−31	1.7	P0325+17	
17.03.04	3 29 29	17 0.8	169	−31	1.2	4C1716, P0329+16	
17.03.05	3 45 18	17 39.6	172	−28	1.2	4C1718, P0345+17	
17.03.06	3 48 27	17 1.1	173	−28	1.0	P0348+17.1	
17.03.07	3 51 35	17 14.2	173	−27	1.2	4C1720	
17.04.01	4 2 18	17 49.0	175	−25	1.6		
17.04.02	4 4 37	17 39.8	175	−25	1.2	4C1722	
17.04.03	4 8 40	17 7.0	176	−24	1.5	4C1723, P0408+17	
17.04.04	4 17 30	17 41.1	177	−22	1.8	3C114, P0417+17, N174	(5)
17.04.05	4 22 2	17 4.8	179	−22	1.0		
17.04.06	4 22 31	17 45.4	178	−21	1.2	4C1725, P0422+17	
17.04.07	4 24 58	17 46.2	179	−21	1.2	4C1726	
17.04.08	4 31 30	17 40.8	180	−20	0.8		
17.04.09	4 34 6	17 52.0	180	−19	1.2		
17.04.10	4 46 9	17 39.7	182	−17	1.0	4C1729, P0446+17	
17.04.11	4 51 32	17 9.5	183	−16	0.9		
17.05.01	5 4 53	17 17.7	185	−14	1.4	4C1731	
17.05.02	5 37 44	17 23.2	189	− 7	2.6	4C1734	
17.05.03	5 54 0	17 23.7	191	− 4	1.5		
17.06.01	6 9 34	17 57.7	193	− 0	4.2		(12)
17.06.02	6 10 49	17 53.6	193	0	1.2		(13)
17.06.03	6 22 3	17 53.2	194	2	2.1	4C1736	
17.06.04	6 43 23	17 19.4	197	7	1.1	4C1737	
17.06.05	6 57 26	17 21.1	198	10	1.3	4C1738	
17.06.06	6 59 53	17 18.8	199	10	1.1		
17.07.01	7 17 31	17 7.8	201	14	1.1	3C176, N260	
17.07.02	7 35 4	17 47.1	202	18	2.2	P0735+17	
17.07.03	7 41 1	17 25.0	203	19	1.1		
17.08.01	8 14 21	17 6.8	207	26	0.8		
17.08.02	8 19 2	17 56.1	206	28	2.5	4C1744, P0818+17	(5)
17.08.03	8 23 22	17 17.7	207	28	0.9		
17.08.04	8 32 6	17 13.9	208	30	5.9	3C201+202, P0831+17.2, N294+295, P0831+17.5	(14)
17.08.05	8 55 37	17 30.2	210	36	1.5		
17.09.01	9 11 20	17 25.4	212	39	2.5	4C1748, P0911+17	
17.09.02	9 14 38	17 32.5	212	40	0.9		
17.09.03	9 42 36	17 6.5	216	46	1.1	4C1749, P0942+17	
17.09.04	9 52 10	17 49.3	217	48	1.9		
17.10.01	10 3 38	17 31.1	219	51	1.1		
17.10.02	10 30 48	17 57.8	222	57	1.9	4C1750	
17.10.03	10 33 34	17 22.7	224	57	1.0		
17.10.04	10 53 40	17 58.1	226	62	1.1		
17.11.01	11 37 40	17 55.5	239	71	1.8	4C1752	
17.11.02	11 49 42	17 26.4	246	73	1.1	4C1753	
17.12.01	12 12 54	17 40.0	261	77	1.2	4C1754	
17.12.02	12 13 15	17 14.8	262	77	1.6		
17.12.03	12 41 46	17 48.7	293	80	1.9		
17.12.04	12 45 37	17 1.9	299	80	1.1	4C1755, P1245+17	
17.12.05	12 55 5	17 53.4	312	80	1.2		
17.13.01	13 17 54	17 58.1	340	78	3.8	4C1756, P1317+17	
17.13.02	13 33 27	17 49.8	352	76	0.8		
17.13.03	13 57 6	17 25.0	4	71	1.3		
17.14.01	14 7 54	17 43.3	9	69	3.0	4C1757, P1407+17	
17.14.02	14 27 44	17 32.5	15	65	0.9		
17.14.03	14 30 46	17 20.8	15	64	1.1	4C1758	
17.14.04	14 33 26	17 34.9	16	64	2.0		
17.14.05	14 43 42	17 40.3	19	62	1.3		
17.14.06	14 44 34	17 56.3	20	62	2.0	4C1761, P1444+17	
17.15.01	15 2 30	17 46.6	23	58	1.1		
17.15.02	15 26 28	17 27.9	26	52	0.8		(1)
17.15.03	15 34 15	17 36.8	27	51	1.2		
17.15.04	15 50 42	17 59.6	30	47	2.0	4C1764	
17.15.05	15 54 25	17 43.3	30	46	0.8		
17.15.06	15 59 7	17 20.3	30	45	1.0	4C1765	(1)
17.16.01	16 2 52	17 52.2	32	45	1.2	4C1766	
17.16.02	16 18 10	17 40.5	33	41	4.5	3C334, P1618+17, N500	(4)
17.16.03	16 25 21	17 1.4	33	39	0.8		
17.16.04	16 41 33	17 21.3	35	36	8.9	3C346, P1641+17, N515	(1) (6)
17.16.05	16 45 14	17 22.2	36	35	4.5	4C1771, P1645+17, N517	
17.16.06	16 48 57	17 19.5	36	34	1.7		
17.16.07	16 52 33	17 24.2	37	33	1.0		
17.17.01	17 17 45	17 45.4	40	28	1.7		

TABLE III (*continued*)

Source No.	Right ascension (1950.0)	Declination (1950.0)	Galactic longitude	Galactic latitude	Flux density (f.u.)	Other designations	Notes
17.17.02	17 27 47	17 23.2	40	26	2.4	4C1776	
17.17.03	17 39 27	17 23.9	41	23	3.9	4C1777, P1739+17	
17.18.01	18 1 1	17 2.7	43	18	0.8		
17.18.02	18 10 53	17 22.9	45	16	1.2		
17.18.03	18 10 58	17 2.8	44	16	1.2	4C1778	
17.18.04	18 20 2	17 55.5	46	14	3.5	4C1779, P1820+17	
17.18.05	18 36 3	17 9.5	47	11	13.2	3C386, P1836+17, N574	(15)
17.19.01	19 36 32	17 10.5	54	− 2	10.8	3C400.2, N611	(3) (7)
17.20.01	20 8 6	17 19.9	58	− 9	0.8	4C1783	
17.20.02	20 12 6	17 45.9	59	− 9	1.2		
17.20.03	20 24 44	17 13.7	60	−12	1.5	4C1784	
17.20.04	20 33 14	17 32.7	61	−13	2.4		
17.20.05	20 45 27	17 43.5	63	−16	0.9		
17.20.06	20 57 37	17 40.0	65	−18	0.8		
17.21.01	21 12 26	17 20.2	67	−21	0.9	4C1786	
17.21.02	21 21 51	17 4.6	68	−23	1.2		
17.21.03	21 37 35	17 5.6	71	−26	3.6	4C1788, P2137+17	(2)
17.21.04	21 39 37	17 2.6	71	−26	1.4		
17.21.05	21 41 27	17 4.5	72	−26	1.0		
17.22.01	22 18 59	17 39.9	80	−32	1.0		
17.22.02	22 41 33	17 59.5	85	−35	1.4	3C451, P2241+18, N695	
17.22.03	22 49 36	17 3.2	86	−37	1.7		
17.23.01	23 29 23	17 15.4	97	−41	1.2	4C1794, P2329+17	
17.23.02	23 31 7	17 51.2	98	−41	1.1		
18.00.01	0 10 17	18 17.1	110	−43	1.1	4C1801	
18.00.02	0 13 38	18 31.2	111	−43	0.8		
18.00.03	0 33 31	18 20.8	118	−44	3.8	3C14, P0033+18, N29	(3) (5)
18.01.01	1 24 2	18 54.6	134	−43	1.1	4C1806, P0124+18	(6)
18.01.02	1 50 6	18 25.3	143	−42	1.2		
18.01.03	1 58 56	18 26.0	145	−41	1.0	4C1807, P0158+18	
18.02.01	2 29 53	18 35.2	154	−38	1.2		
18.03.01	3 1 18	18 2.9	162	−34	1.1		
18.03.02	3 15 24	18 12.3	165	−32	1.0		
18.03.03	3 49 18	18 26.9	172	−27	1.5	4C1810, P0349+18	
18.03.04	3 53 42	18 53.2	172	−26	1.7	4C1811, P0353+18	(1)
18.04.01	4 28 55	18 0.5	179	−20	1.5		
18.04.02	4 49 52	18 1.5	182	−16	1.4		
18.05.01	5 58 13	18 1.1	191	− 2	1.0		
18.06.01	6 1 30	18 37.2	191	− 2	0.8	4C1818	
18.06.02	6 11 13	18 18.4	192	0	0.8		
18.06.03	6 31 1	18 24.4	195	5	1.2		
18.07.01	7 7 53	18 18.8	199	12	1.2	4C1820	
18.07.02	7 38 16	18 41.7	201	19	1.1		
18.07.03	7 52 31	18 26.1	203	22	1.4	4C1823	
18.08.01	8 17 51	18 18.7	206	28	3.3	P0817+18	
18.08.02	8 29 27	18 34.0	207	30	1.5	P0829+18	
18.08.03	8 57 52	18 41.5	209	37	2.8	3C213, P0858+18, N311	
18.09.01	9 7 10	18 36.9	210	39	2.5	P0907+18	
18.09.02	9 17 22	18 35.4	211	41	1.0		
18.09.03	9 17 34	18 2.4	212	41	3.2	4C1829, P0917+18	
18.09.04	9 26 11	18 34.6	212	43	1.5		
18.10.01	10 15 2	18 40.5	219	54	1.1		
18.10.02	10 17 37	18 13.9	220	54	1.1		
18.10.03	10 20 15	18 46.9	219	55	0.8		
18.10.04	10 31 16	18 40.5	221	57	1.1		
18.11.01	11 4 48	18 25.5	228	64	0.9		
18.11.02	11 18 44	18 41.0	231	68	0.8		
18.11.03	11 34 54	18 11.2	237	71	1.0		
18.11.04	11 55 59	18 4.2	248	75	1.0		
18.11.05	11 59 39	18 57.1	247	76	1.0		
18.12.01	12 12 47	18 46.6	257	78	1.6		
18.12.02	12 37 20	18 8.7	286	80	1.0		
18.12.03	12 38 35	18 48.7	287	81	0.9	4C1835	
18.13.01	13 4 25	18 50.9	326	81	0.8		
18.13.02	13 9 42	18 58.2	333	80	1.3		
18.13.03	13 21 31	18 10.1	344	78	1.6	4C1837	
18.13.04	13 36 47	18 6.4	355	76	1.4		
18.13.05	13 45 54	18 48.3	3	74	1.3		
18.13.06	13 53 57	18 31.1	6	73	1.0	P1353+18	
18.15.01	15 8 48	18 11.0	25	57	1.3	4C1841, P1508+18	
18.15.02	15 14 39	18 37.8	26	55	3.6	3C316, P1514+18, N475	
18.15.03	15 30 28	18 11.8	28	52	1.3		
18.16.01	16 4 10	18 16.3	32	44	1.2	4C1846	

TABLE III (*continued*)

Source No.	Right ascension (1950.0)	Declination (1950.0)	Galactic longitude	Galactic latitude	Flux density (f.u.)	Other designations	Notes
18.16.02	16 6 54	18 7.2	32	44	2.3	4C1847	
18.16.03	16 17 58	18 10.2	34	41	0.9		
18.16.04	16 53 49	18 43.6	38	34	1.1		
18.17.01	17 0 53	18 2.3	38	32	1.2	4C1773	
18.17.02	17 9 9	18 51.7	40	30	0.9		
18.17.03	17 39 43	18 32.7	43	23	2.2	4C1851, N536	
18.17.04	17 44 59	18 28.2	43	22	2.6	3C362, N537	
18.18.01	18 16 39	18 44.4	46	15	1.1	4C1855	
18.18.02	18 24 5	18 32.1	47	14	1.8		
18.18.03	18 28 28	18 54.9	48	13	1.3		
18.19.01	19 43 46	18 13.2	55	− 3	1.3	4C1858	
18.19.02	19 50 44	18 14.5	56	− 5	0.8		
18.19.03	19 54 7	18 51.7	57	− 5	1.2		
18.20.01	20 5 45	18 1.0	58	− 8	0.9		
18.20.02	20 13 18	18 38.0	59	− 9	1.3		
18.20.03	20 29 46	18 41.7	62	−12	1.0	3C415, P2029+18(?), N631	
18.20.04	20 33 25	18 46.8	62	−13	2.9	P2033+18, N634, 4C1860	(1)
18.21.01	21 6 19	18 7.8	67	−19	0.9		
18.21.02	21 16 16	18 1.8	68	−21	3.0	4C1862, P2116+18	
18.21.03	21 18 12	18 11.3	69	−22	1.1		
18.21.04	21 38 24	18 55.3	73	−25	1.0		
18.21.05	21 40 11	18 13.9	73	−25	1.2		
18.21.06	21 41 23	18 15.4	73	−26	1.1		
18.21.07	21 52 42	18 15.1	75	−27	1.0		
18.22.01	22 49 9	18 32.5	87	−36	2.7	3C454, P2249+18, N699	(4)
18.22.02	22 55 32	18 8.1	89	−37	1.2		
18.23.01	23 5 21	18 15.7	91	−38	0.9	4C1869, P2305+18.3, N704	
18.23.02	23 5 30	18 45.1	92	−37	1.2	4C1868, P2305+18.8, N703	
18.23.03	23 9 54	18 27.7	93	−38	3.0	3C457, P2309+18, N706	
18.23.04	23 15 40	18 6.9	94	−39	1.1		
18.23.05	23 42 26	18 55.8	102	−41	1.0		
18.23.06	23 46 3	18 26.6	103	−42	1.8	3C467, N719	
18.23.07	23 55 18	18 58.1	106	−42	0.8	4C1978	
19.00.01	0 3 11	19 32.7	108	−42	1.1	3C1, P0003+19, N2	
19.00.02	0 17 15	19 3.4	113	−43	1.3		
19.00.03	0 23 12	19 27.8	115	−43	0.9		
19.00.04	0 30 2	19 35.2	117	−43	1.9	3C12, P0030+19, N26	
19.00.05	0 34 16	19 46.7	118	−43	0.9		
19.00.06	0 34 30	19 24.1	118	−43	1.1		
19.01.01	1 0 32	19 46.0	127	−43	1.1		
19.01.02	1 33 36	19 23.0	137	−42	1.0		
19.02.01	2 0 47	19 29.3	145	−40	4.0	4C1907, P0200+19	(3)
19.02.02	2 12 16	19 48.7	148	−39	1.2	3C61, N97	
19.02.03	2 22 52	19 39.6	151	−38	1.3		
19.02.04	2 51 7	19 59.6	158	−34	1.8	3C74, P0251+20, N117	
19.02.05	2 51 39	19 10.3	159	−35	1.2	4C1909	
19.03.01	3 24 35	19 52.8	166	−30	1.1		
19.03.02	3 59 24	19 20.5	173	−24	1.2	4C1910, P0359+19, N155	(6)
19.04.01	4 34 7	19 49.1	178	−18	3.2		
19.04.02	4 52 38	19 46.4	181	−15	0.8		
19.04.03	4 58 33	19 18.6	182	−14	1.2	4C1913	
19.05.01	5 38 54	19 34.3	188	− 6	2.9		
19.05.02	5 44 56	19 19.4	188	− 5	1.2		
19.05.03	5 47 43	19 8.9	189	− 4	1.4		
19.05.04	5 50 2	19 14.1	189	− 4	1.2		
19.05.05	5 50 53	19 35.4	189	− 3	2.0	4C1917	
19.05.06	5 59 39	19 38.7	190	− 1	1.0		
19.06.01	6 28 35	19 14.7	194	4	1.5	4C1921, N238	
19.06.02	6 32 5	19 8.3	194	5	2.6	4C1922, N239	
19.06.03	6 42 36	19 49.8	195	8	0.9		
19.06.04	6 48 42	19 42.1	195	9	5.1		(3) (16)
19.06.05	6 57 50	19 20.8	197	11	1.0		
19.07.01	7 21 6	19 12.8	199	16	2.1	4C1929, P0721+19	
19.07.02	7 33 16	19 3.4	200	18	1.3		
19.08.01	8 39 25	19 3.0	207	33	1.2		
19.09.01	9 3 53	19 11.5	209	38	1.0		
19.09.02	9 54 51	19 28.2	215	49	1.9		
19.11.01	11 4 41	19 32.6	226	65	1.2		
19.11.02	11 18 21	19 59.9	228	68	1.2		
19.11.03	11 21 58	19 35.7	230	69	1.3	3C258, P1122+19, N373	(5)
19.11.04	11 29 9	19 41.2	232	70	1.0	4C1939	
19.11.05	11 42 31	19 54.6	236	73	9.9	3C264, P1142+19, N384	(2) (6)
19.11.06	11 55 0	19 7.2	244	75	1.3		

TABLE III (*continued*)

Source No.	Right ascension (1950.0)	Declination (1950.0)	Galactic longitude	Galactic latitude	Flux density (f.u.)	Other designations	Notes
19.12.01	12 2 53	19 30.1	247	77	0.8		
19.12.02	12 17 0	19 1.0	260	79	1.4		
19.13.01	13 3 37	19 18.0	326	81	1.0	4C1943	
19.13.02	13 13 59	19 52.1	342	81	1.3		
19.13.03	13 25 37	19 2.7	350	78	1.3		(1)
19.13.04	13 28 11	19 6.5	352	78	1.6		
19.13.05	13 40 34	19 24.5	2	76	1.4		
19.13.06	13 54 37	19 38.1	9	73	3.6	4C1944, P1354+19	(4)
19.14.01	14 0 48	19 43.5	12	72	1.0		
19.14.02	14 20 27	19 51.8	18	68	4.8	3C300, P1420+19, N443	(2) (6)
19.14.03	14 21 23	19 44.1	18	68	2.1		
19.14.04	14 35 44	19 55.4	22	65	0.8		
19.15.01	15 6 28	19 12.5	26	58	1.0	4C1948	
19.15.02	15 43 27	19 17.3	31	49	1.0	4C1951	
19.15.03	15 52 15	19 56.1	33	48	1.1	4C1952	
19.15.04	15 55 41	19 47.8	33	47	1.2		
19.16.01	16 1 37	19 40.4	34	45	1.1		
19.16.02	16 16 10	19 46.0	36	42	0.9		
19.16.03	16 17 53	19 45.6	36	42	1.1		
19.16.04	16 49 7	19 11.6	38	35	1.2		
19.17.01	17 7 58	19 54.7	41	31	1.4		
19.17.02	17 12 2	19 45.2	41	30	1.0	4C1957	
19.17.03	17 18 42	19 11.6	41	28	1.3	3C354, P1718+19, N525	
19.17.04	17 27 12	19 30.1	42	26	1.3		
19.17.05	17 31 48	19 44.6	43	26	0.9		
19.18.01	18 13 57	19 27.8	47	16	1.1		
19.18.02	18 14 58	19 44.2	47	16	1.5		
19.18.03	18 18 45	19 0.5	47	15	0.8		
19.18.04	18 34 25	19 42.8	49	12	2.9	P1834+19	
19.18.05	18 53 50	19 33.8	51	8	1.8		
19.19.01	19 16 25	19 45.5	54	3	1.5	4C1967(?)	(1)
19.19.02	19 42 32	19 40.3	57	− 2	1.1		
19.19.03	19 46 17	19 34.9	57	− 3	0.9		
19.20.01	20 20 47	19 11.5	61	−10	1.4		
19.20.02	20 33 20	19 45.5	63	−12	1.7	4C1969, P2033+19	
19.20.03	20 46 52	19 22.1	65	−15	1.4		
19.20.04	20 49 21	19 11.8	65	−16	0.9		
19.20.05	20 53 32	19 49.2	66	−16	1.4		
19.21.01	21 41 57	19 9.7	74	−25	1.0	4C1971	
19.21.02	21 48 27	19 44.3	75	−26	1.2	4C1972, P2148+19	
19.21.03	21 55 28	19 15.6	76	−27	0.9		
19.22.01	22 14 25	19 38.7	80	−30	0.9		
19.22.02	22 43 56	19 8.1	87	−34	0.9		
19.22.03	22 48 18	19 12.8	88	−35	1.3	4C1974	
19.22.04	22 58 55	19 22.5	90	−36	2.3	4C1975, P2258+19	
19.23.01	23 14 51	19 15.6	94	−38	0.8		
20.00.01	0 11 9	20 27.6	111	−41	2.2	4C2001	
20.00.02	0 43 45	20 16.8	121	−42	1.2	3C21, N39	
20.01.01	1 13 27	20 25.8	131	−42	1.0		
20.01.02	1 33 36	20 40.6	137	−41	9.1	3C47, N78	(4)
20.01.03	1 53 30	20 45.1	143	−39	1.1	4C2009	
20.02.01	2 17 22	20 21.8	149	−38	1.9	4C2010	
20.04.01	4 3 9	20 42.0	172	−23	1.6	4C2013	
20.04.02	4 28 6	20 31.3	177	−19	3.0		
20.04.03	4 33 41	20 46.7	177	−17	0.9		
20.04.04	4 34 0	20 13.2	178	−18	1.9		
20.04.05	4 36 50	20 32.0	178	−17	1.1	4C2014	
20.04.06	4 46 22	20 34.5	180	−15	1.1	4C2015	
20.04.07	4 50 57	20 28.6	180	−14	1.1		
20.04.08	4 53 28	20 32.7	181	−14	1.3	4C2016	
20.06.01	6 1 26	20 25.0	190	− 1	3.4	3C152, N226	
20.06.02	6 6 37	20 32.9	190	0	27.0	3C153.1, N229	(17)
20.06.03	6 22 43	20 31.6	192	4	1.1		
20.06.04	6 32 0	20 25.7	193	6	1.2		
20.06.05	6 34 57	20 6.9	194	6	0.8		
20.06.06	6 35 21	20 36.3	193	6	1.2	4C2019	
20.07.01	7 14 55	20 18.6	197	15	1.1		
20.07.02	7 49 55	20 43.1	200	22	1.0		
20.08.01	8 52 4	20 22.4	207	36	1.2		
20.08.02	8 58 29	20 6.3	208	37	1.0	4C1932	
20.09.01	9 5 31	20 33.5	208	39	1.2		
20.09.02	9 19 21	20 34.4	209	42	1.0		
20.09.03	9 37 27	20 35.8	211	46	0.9		

TABLE III (*continued*)

Source No.	Right ascension (1950.0)	Declination (1950.0)	Galactic longitude	Galactic latitude	Flux density (f.u.)	Other designations	Notes
20.10.01	10 0 22	20 11.2	214	51	2.2	4C2020	
20.10.02	10 1 24	20 38.2	214	51	1.2	4C2021	
20.10.03	10 22 55	20 32.5	217	56	2.3	E and C, 4C2022	
20.10.04	10 42 50	20 35.8	219	60	0.9		
20.10.05	10 49 44	20 36.1	221	62	1.8		
20.10.06	10 55 35	20 8.9	222	63	3.5	4C2024	
20.10.07	10 55 43	20 36.5	222	63	0.8		
20.11.01	11 23 0	20 11.3	229	69	2.4	4C2025	(1)
20.11.02	11 30 10	20 40.5	229	71	0.9		
20.11.03	11 49 32	20 26.3	237	75	1.3		
20.12.01	12 10 21	20 48.9	248	79	2.7	4C2027	
20.12.02	12 16 33	20 21.3	255	80	1.2	4C2028	
20.12.03	12 37 23	20 8.1	282	82	1.1		
20.13.01	13 8 10	20 48.7	338	82	1.4		
20.13.02	13 55 2	20 25.3	12	73	0.9		
20.14.01	14 1 16	20 56.9	16	72	0.8		
20.14.02	14 22 32	20 19.0	20	68	2.7	4C2033	(1)
20.14.03	14 46 33	20 46.3	26	62	2.1	3C304, N454	
20.14.04	14 58 26	20 1.5	26	60	0.9		
20.15.01	15 17 48	20 30.9	30	55	4.9	3C318, N476	(5)
20.15.02	15 30 9	20 25.4	31	53	1.1	4C2036	
20.15.03	15 50 3	20 18.8	33	48	4.1	3C326, N485+487	(5)
20.15.04	15 54 1	20 20.0	34	47	5.1	3C326.1, N488	(2)
20.16.01	16 12 29	20 51.4	37	43	0.9		
20.16.02	16 14 42	20 34.7	36	43	1.6	4C2039	
20.16.03	16 25 32	20 23.1	37	40	0.8		
20.16.04	16 29 1	20 27.7	38	40	1.2		
20.16.05	16 48 57	20 28.0	40	35	1.1		
20.16.06	16 56 43	20 24.0	40	34	1.2		
20.17.01	17 30 33	20 41.4	44	26	1.5	3C359, N531	
20.17.02	17 41 23	20 17.7	44	24	1.0		
20.17.03	17 42 42	20 55.5	45	24	0.8		
20.17.04	17 46 42	20 57.7	46	23	1.1		
20.17.05	17 53 17	20 7.5	45	21	1.8		(2)
20.18.01	18 3 25	20 27.7	47	19	1.0	4C2044	
20.18.02	18 20 39	20 3.4	48	15	1.4		
20.18.03	18 31 46	20 20.7	49	13	1.2		
20.19.01	19 13 51	20 21.2	54	4	1.5		
20.19.02	19 50 4	20 23.7	58	− 3	1.1		
20.20.01	20 4 12	20 57.9	60	− 6	0.9		
20.20.02	20 8 22	20 39.7	61	− 7	1.0	4C2050	
20.21.01	21 43 36	20 34.6	75	−24	1.1	4C2053	
20.22.01	22 7 22	20 24.2	79	−28	0.9		
20.22.02	22 33 49	20 25.9	85	−32	1.1	4C2054	
20.22.03	22 44 17	20 42.9	88	−33	1.4		
20.22.04	22 46 55	20 38.7	88	−34	2.6	4C2055	
20.22.05	22 47 16	20 7.9	88	−34	1.2		
20.22.06	22 57 12	20 47.9	91	−35	1.0		
20.23.01	23 14 15	20 47.4	95	−37	1.1		
20.23.02	23 44 16	20 39.2	103	−39	1.2		
20.23.03	23 48 27	20 12.2	104	−40	1.1		
21.00.01	0 15 34	21 31.2	113	−40	1.2	4C2102	
21.00.02	0 25 39	21 3.6	116	−41	1.2	3C11, N24	
21.00.03	0 54 33	21 26.7	125	−41	1.1		
21.01.01	1 35 22	21 18.0	137	−40	1.3		
21.01.02	1 49 21	21 54.8	141	−39	0.9		
21.01.03	1 57 7	21 41.9	143	−38	1.3		
21.02.01	2 8 14	21 9.4	147	−38	2.1	3C60, N94	
21.02.02	2 47 53	21 12.7	157	−34	1.2	4C2110	
21.03.01	3 15 43	21 21.1	163	−30	1.1		
21.03.02	3 53 36	21 31.3	170	−24	1.2		(1)
21.03.03	3 57 47	21 45.4	171	−23	1.0		
21.04.01	4 15 19	21 51.7	174	−20	1.4		
21.04.02	4 20 30	21 53.5	174	−19	1.0		
21.04.03	4 21 14	21 20.7	175	−19	1.6	4C2116	
21.04.04	4 25 51	21 23.4	176	−18	2.3	4C2117	
21.04.05	4 29 55	21 35.9	176	−18	0.8		
21.04.06	4 53 51	21 24.2	180	−13	1.5		
21.05.01	5 31 36	21 58.7	185	− 5	931.2	Taurus A	(18)
21.06.01	6 0 52	21 38.6	188	− 0	0.8		
21.06.02	6 42 34	21 25.6	193	8	5.3	3C166, N242	(5)
21.06.03	6 48 12	21 48.3	193	10	1.0		
21.07.01	7 47 16	21 44.9	199	22	0.8		

TABLE III (*continued*)

Source No.	Right ascension (1950.0)	Declination (1950.0)	Galactic longitude	Galactic latitude	Flux density (f.u.)	Other designations	Notes
21.08.01	8 10 6	21 43.8	201	27	0.8		
21.08.02	8 18 13	21 28.0	202	29	1.2		
21.08.03	8 34 32	21 13.4	204	32	1.1		
21.09.01	9 17 36	21 56.0	207	42	1.1		
21.09.02	9 19 41	21 47.3	208	42	1.0	4C2125	
21.09.03	9 51 19	21 40.1	211	49	1.5	4C2126	
21.09.04	9 54 47	21 3.1	212	50	1.0		
21.10.01	10 8 32	21 23.5	213	53	1.7	4C2127	(1)
21.10.02	10 33 55	21 12.9	217	59	0.8		
21.10.03	10 59 7	21 41.5	220	64	0.8		
21.11.01	11 19 54	21 30.3	224	69	1.3		
21.11.02	11 59 44	21 37.3	238	77	1.2	4C2134	
21.12.01	12 2 56	21 37.2	239	78	1.2		
21.12.02	12 22 0	21 45.8	254	82	1.4	4C2135	(14)
21.12.03	12 22 35	21 34.3	256	82	1.1		
21.12.04	12 32 50	21 34.9	270	83	5.4	3C274.1, N402	(2) (5)
21.13.01	13 12 31	21 3.6	344	82	1.2	4C2031	
21.13.02	13 29 3	21 0.9	0	79	1.0		
21.13.03	13 40 18	21 51.9	10	77	1.1		
21.13.04	13 46 58	21 24.6	12	76	2.1	3C291, N431	
21.14.01	14 0 44	21 19.8	17	73	0.9		
21.14.02	14 9 44	21 9.3	19	71	1.0		(1)
21.14.03	14 22 11	21 23.6	22	68	1.5	E and C	
21.14.04	14 44 17	21 48.0	27	63	0.9	4C2142	
21.15.01	15 3 8	21 4.4	29	59	1.1		
21.15.02	15 45 31	21 6.1	34	49	3.0	3C323.1, N483	(4)
21.15.03	15 47 34	21 33.4	35	49	5.5	3C324, N484	
21.15.04	15 49 38	21 41.0	35	49	0.9		
21.15.05	15 58 31	21 8.7	35	47	1.7		
21.16.01	16 12 40	21 50.9	38	44	0.8		
21.16.02	16 14 52	21 15.4	37	43	3.3	3C333, N497	
21.16.03	16 25 32	21 22.3	38	41	2.6	4C2148	
21.16.04	16 27 53	21 27.0	39	40	1.3		
21.16.05	16 32 4	21 2.4	39	39	1.2		
21.17.01	17 13 41	21 49.0	43	30	1.0		
21.17.02	17 23 18	21 7.5	44	28	0.9		
21.17.03	17 25 7	21 11.2	44	28	1.1		
21.17.04	17 28 58	21 7.0	44	27	0.9	4C2150	
21.17.05	17 47 34	21 43.0	47	23	1.0		
21.18.01	18 5 57	21 0.8	48	19	0.9		(1)
21.18.02	18 20 13	21 12.1	49	16	0.9		
21.18.03	18 25 59	21 19.8	50	14	0.8		
21.18.04	18 27 48	21 2.9	50	14	1.2		
21.18.05	18 37 5	21 19.2	51	12	1.2		
21.18.06	18 47 1	21 5.1	52	10	2.0		
21.19.01	19 11 32	21 52.7	55	5	0.9		
21.19.02	19 16 18	21 4.3	55	4	1.6		
21.20.01	20 31 5	21 35.0	64	−11	3.0	4C2155	
21.20.02	20 44 47	21 12.6	66	−14	1.0		
21.21.01	21 6 33	21 13.2	69	−18	0.9	Possibly N646	
21.21.02	21 42 14	21 11.8	75	−24	0.9		
21.21.03	21 45 29	21 20.5	76	−24	1.2		
21.21.04	21 48 54	21 51.0	77	−24	1.1		
21.21.05	21 49 31	21 19.0	77	−25	3.2	4C2159	
21.22.01	22 10 15	21 33.3	81	−28	4.3		
21.22.02	22 17 18	21 20.4	82	−29	0.9		
21.22.03	22 23 7	21 5.2	83	−30	3.7		
21.23.01	23 5 22	21 11.1	93	−35	1.0		
21.23.02	23 33 29	21 0.7	100	−38	1.0	4C2057(?)	(19)

Designations

4C—Pilkington and Scott 1965; Gower, Scott, and Wills 1967.
N—Pauliny-Toth, Wade, and Heeschen 1965.
P—Day *et al.* 1966.
E and C—Erickson and Cronyn 1966.

Explanations of Notes

(1) uncertain
(2) extended
(3) complex
(4) quasi-stellar radio source
(5) galaxy
(6) E galaxy
(7) on edge of galactic ridge
(8) Sharpless 261
(9) N galaxy
(10) Sharpless 226, H II region
(11) DB galaxy
(12) Sharpless 254
(13) near a complex of H II regions
(14) confused
(15) D galaxy
(16) spiral galaxy near edge
(17) NGC 2175, H II region
(18) receiver linearity uncertain
(19) IC5337/8

sources which are in one catalogue do not appear in the other and vice versa. A comparison with the Parkes catalogue of radio sources (Day *et al.*, 1966) in the area of overlap shows 420 VRO sources and 138 Parkes sources with 97 of these appearing in both catalogues.

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