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An Atlas of QSO Spectra

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Introduction

We present here the low-dispersion optical spectra of 295 QSO candidates. The great majority of the objects were originally selected as QSOs from the Parkes 2700 MHz radio survey, although we have also included spectra of several optically selected QSOs. A few of the QSO candidates are now better described as radio galaxies and BL Lac objects. This collection of spectra is not suitable for statistical studies unless due consideration is given to selection effects.

During the last six years three of us (AEW, DLJ, and BAP) have obtained low-dispersion spectroscopic data for a large number of QSO candidates, using the 4-m Anglo-Australian telescope and the associated image dissector scanner and the image photon counting spectrographic systems (see for example Peterson *et al.* 1979). Most of these objects are radio sources drawn from the Parkes 2700 MHz catalogue (see e.g. Bolton *et al.* 1979). Similar and complementary work has also been performed by J. G. Bolton, I. W. A. Brown and Ann Savage and some of their data are included here. The spectra were obtained as part of a number of programmes in order to confirm radio identifications, to obtain redshifts or to reveal absorption features. Line identifications and redshifts have previously been published for most of the objects but the spectra themselves have not been published.

To the best of our knowledge this is the first time spectral data have been published on a large scale for QSOs having a wide range of redshifts. However, we warn that the data are neither complete nor unbiased. Objects were chosen in order to examine a variety of features: e.g. radio spectra, optical colours and morphology, and the presence of emission lines in objective prism spectra. The data therefore should be used for statistical studies with extreme care and after serious consideration of the selection effects that may be involved. We believe that in spite of this the atlas will be of use to interested workers since it shows the diversity of QSO spectra and also because the data quality and line shapes etc. are easily estimated when the data are presented in graphical form.

Extragalactic sources found in radio surveys are mainly QSOs, galaxies or BL Lac objects. Unfortunately these categories are not always clear cut: for example, the observational difference can be very small between a radio galaxy at large redshift and a QSO, or between a weak emission line QSO and a BL Lac object. Thus, although most of the objects for which spectra are included in this atlas are QSOs, the reader should carefully check the identification information contained in the references given in Table 1 before using the data.

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Spectra

The spectra are presented in order of increasing right ascension as plots of spectral flux density (units of ergs $cm^{-2}s^{-1}Hz^{-1}$) versus wavelength (angstroms).

Several points should be noted concerning these spectra:

(1) The wavelength range of the plots is always 3000 to 7650 Å, even though no single spectrum covers this full range. The wavelength range for each individual plot was set by the estimated wavelength range of useful data.

(2) The wavelength resolution differs between spectra. In some cases this is because the objects are being observed under varying seeing conditions and with a variety of instrumental parameters. In other cases, particularly where the data were noisy, the spectra have been smoothed in order to make weak features more recognizable. However, the resulting wavelength resolution is usually between 5 and 15 Å, and can best be estimated by considering the narrowest features in the spectrum of each object.

(3) Many of the objects for which data are given have been observed several times. In these cases we have generally summed the individual spectra after reduction to a linear wavelength scale, to improve the signal-to-noise ratio. Where the individual spectra covered different wavelength ranges the data have been rescaled to produce a continuous spectrum. As a result the signal-to-noise ratio is wavelength-dependent for such objects.

(4) The flux scales have been calibrated using photometric-standard star data. However, since the data for both the standard stars and the individual objects were often taken under non-photometric conditions, or with small apertures, they are sometimes subject to serious systematic errors. Our estimate of the photometric quality of each spectrum is given in column 5 of Table 1.

Table

In Table 1 the source name is given in column 1. Column 2 gives the emission redshift. Generally this is taken from the reference given in column 3, although it may differ slightly from the published value if further observations have been made. In a few cases the redshifts given here have not been published previously. A redshift enclosed in parentheses means that it is based essentially on only one line, usually Mg II, and is therefore subject to doubt. Those objects for which we find only a smooth continuum devoid of emission lines have been labelled 'continuous' in column 2. They may be BL Lac objects. A small number of objects in Table 1 have no redshift entry in column 2. Because of low signal-to-noise ratio and the lack of obvious emission lines the true nature of these objects cannot be established from our spectra.

Column 3 contains a reference to the most informative published paper containing the object. This is generally a redshift or identification paper which usually contains references to accurate positions and/or finding charts. Additional information for many objects can be found in the compendium of Hewitt and Burbidge (1980) and its errata

(1981). Column 4 gives the total spectroscopic integration time in seconds for each object.

Column 5 contains our estimate of the photometric quality of the data (see Note (4) above). The code is:

A Good — photometric conditions, large aperture or 2″→3″ arc aperture with ~1″ arc seeing and telescope close to zenith.

B Fair — clear conditions, aperture of 2″→3″ arc and seeing ~2″ arc, probably resulting in a good zero point flux near 5000 Å but a suspect UV/blue continuum slope.

C Poor — conditions non-photometric or aperture less than the size of the seeing disk; both zero point and continuum slope unreliable.

The notes given in column 6 contain other names for some of the objects as well as identifications for those objects that are not radio-selected QSOs.

Anquita, C., and Pedreros, M., *Astron. J.*, **82**, 102 (1977).

Arp, H., Bolton, J. G., and Kinman, T. D., *Astrophys. J.*, **147**, 840 (1967).

Bolton, J. G., Savage, A., and Wright, A. E., *Aust. J. Phys. Astrophys. Suppl.*, No. 46, 1 (1979).

Bolton, J. G., Peterson, B. A., Wills, B. J., and Wills, D., *Astrophys. J.*, **210**, Ll (1976).

Browne, I. W. A., and Savage, A., *Mon. Not. R. Astron. Soc.*, **179**, 65P (1977).

Browne, I. W. A., Savage, A., and Bolton, J. G., *Mon. Not. R. Astron. Soc.*, **173**, 87P (1975).

Condon, J. J., Hicks, P. D., and Jauncey, D. L., *Astron. J.*, **82**, 692 (1977).

Condon, J. J., Jauncey, D. L., and Wright, A. E., *Astron. J.*, **83**, 1036 (1978).

Hewitt, A., and Burbidge, G., *Astrophys. J. Suppl. Ser.*, **43**, 57 (1980).

Hewitt, A., and Burbidge, G., *Astrophys. J. Suppl. Ser.*, **46**, 113 (1981).

Hunstead, R. W., Murdoch, H. S., and Shobbrook, R. R., *Mon. Not. R. Astron. Soc.*, **185**, 149 (1978).

Jauncey, D. L., Wright, A. E., Peterson, B. A., and Condon, J. J., *Astrophys. J.*, **219**, Ll (1978a).

Jauncey, D. L., Wright, A. E., Peterson, B. A., and Condon, J. J., *Astrophys. J.*, **223**, Ll (1978b).

Jauncey, D. L., Wright, A. E., Peterson, B. A., and Condon, J. J., 'Redshifts of southern radio sources -IV' (in preparation) (1983).

Kinman, T. D., and Burbidge, E. M., *Astrophys. J. (Lett.)*, **148**, L59 (1967).

Morton, D. C., Chen Jian-Sheng, Wright, A. E., Peterson, B. A., and Jauncey, D. L., *Mon. Not. R. Astron. Soc.*, **193**, 399 (1980).

Osmer, P. S., and Smith, M. G., *Astrophys. J. Suppl. Ser.*, **42**, 333 (1980).

Peterson, B. A., and Bolton, J. G., *Astrophys. Lett.*, **10**, 105 (1972).

Peterson, B. A., and Bolton, J. G., *Astrophys. Lett.*, **13**, 187 (1973).

Peterson, B. A., Bolton, J. G., and Savage, A., *Astrophys. Lett.*, **17**, 137 (1976).

Peterson, B. A., Jauncey, D. L., Wright, A. E., and Condon, J. J., *Astrophys. J.*, **207**, L5 (1976).

Peterson, B. A., Jauncey, D. L., Wright, A. E., and Condon, J. J., *Astrophys. J.*, **222**, L81 (1978).

Peterson, B. A., Wright, A. E., Jauncey, D. L., and Condon, J. J., *Astrophys. J.*, **232**, 400 (1979).

Rogers, A. W., and Peterson, B. A., *Astrophys. J. (Lett.)*, **212**, L9 (1977).

Savage, A., Browne, I. W. A., and Bolton, J. G., *Mon. Not. R. Astron. Soc.*, **177**, 77P (1976).

Savage, A., Bolton, J. G., Tritton, K. P., and Peterson, B. A., *Mon. Not. R. Astron. Soc.*, **183**, 473 (1978).

Schmidt, M., *Nature*, **197**, 1040 (1963).

Wills, D., and Wills, B. J., *Astrophys. J.*, **190**, 271 (1974).

Wills, D., and Wills, B. J., *Astrophys. J. Suppl. Ser.*, **31**, 143 (1976).

Wills, D., and Lynds, R., *Astrophys. J. Suppl. Ser.*, **36**, 317 (1978).

Wright, A. E., Peterson, B. A., and Jauncey, D. L., *Mon. Not. R. Astron. Soc.*, **188**, 711 (1979b).

Wright, A. E., Jauncey, D. L., Peterson, B. A., and Condon, J. J., *Astrophys. J.*, **211**, L115 (1977).

Wright, A. E., Morton, D. C., Peterson, B. A., and Jauncey, D. L., *Mon. Not. R. Astron. Soc.*, **189**, 611 (1979c).

Wright, A. E., Peterson, B. A., Jauncey, D. L., and Condon, J. J., *Astrophys. J.*, **226**, L61 (1978).

Wright, A. E., Peterson, B. A., Jauncey, D. L., and Condon, J. J., *Astrophys. J.*, **229**, 73 (1979a).

Zwicky, F., *Adv. Astron. Astrophys.*, **5**, 267 (1967).

Table 1

Sources in the QSO Atlas

(1) Source name	(2) Redshift z	(3) Ref.*	(4) Integration time (s)	(5) Estimated photometric quality	(6) Notes
0002-422	2.760	1	960	C	Optically selected QSO.
0003-066	Cont.	2	4000	C	
0005-239	1.410	3	480	B	PHL 6304.
0007+106	0.089	5	960	C	III Zw2.
0008-264	1.096	4	840	C	
0010-840	Cont.	6	960	B	Emission line at 5577 Å is night sky.
0029-414	0.896	7	7960	B	Z_{abs} = 0.781.
0035+121	Cont.	7	480	B	
0036-392	0.592	8	960	C	Name given as 0035-392 in ref. 8.
0044+030	0.624	8	880	C	
0046-315	2.721	8	1970	B	
0047-832	1.112	7	800	B	
0047-579	1.797	8	960	C	
0047-051	Cont.	9	1600	B	
0048-09	Cont.	7	1500	B	
0048-071	1.980	4	1920	C	
0049-393	2.836	1	960	C	Optically selected QSO.
0054-006	2.77	8	1920	B	
0100-270	1.597	7	960	B	
0101-802	0.057	6	960	B	Galaxy.
0101-76	(1.017)	7	960	B	Redshift wrong in ref. 7.
0108-079	1.779	4	840	C	
0110-842	Cont?	6	1440	C	
0113-118	(0.670)	4	840	C	
0116-219	1.165	4	2040	B	
0118-272	Cont.	8	840	B	
0122-042	0.56	32	1200	C	
0123-226	(0.72)?	10	3000	B	
0125-414	(1.10)	11	480	B	
0127-81	Cont.	6	1440	C	
0130-17	1.021	4	840	C	
0133-203	1.144	4	840	C	
0135-247	0.837	7	4440	B	
0136-231	1.90	4	800	B	
0138-097	Cont.	32	1675	B	
0142-278	1.155	4	840	C	
0146-500	2.261	12	960	C	Optically selected QSO.
0148-518	0.055	12	1440	B	
0150-334	1.907?	3	960	B	z = 0.61 possible.
0158-490	0.306	12	2880	C	Optically selected QSO.
0202-76	0.389	7	720	C	
0203-497	1.42	12	960	C	Optically selected QSO.
0208-512	1.003	8	480	C	
0213-484	0.168	12	1440	B	Optically selected QSO.
0217-189	Cont?	2	3520	C	
0219-164	0.698	4	1600	C	
0222-00	0.687	3	1920	B	
0222+000	(0.523)	8	1920	B	
0234-301	2.102	8	1440	C	
0237-23	2.220	13	480	C	
0240-217	(0.314)	4	3840	B	Galaxy.
0252-549	0.537	7	1440	B	
0253-218	1.47	32	647	C	
0254-334/R	1.901	8,14	3840	C	
0254-334/2	1.849	15	8760	B	Optically selected QSO.

Table 1 (contd.)

(1) Source name	(2) Redshift z	(3) Ref.*	(4) Integration time (s)	(5) Estimated photometric quality	(6) Notes
0301-243	Cont.	3,9	240	B	Name wrong in ref. 3.
0312-77	0.223	7	960	B	
0325-222	2.22	32	1800	B	
0329-255	2.685	7	1440	B	
0338-214	Cont.	9	960	B	Redshift wrong in ref. 3.
0341-256	Cont.	9	1200	C	
0346-27	0.355	4	1600	C	
0346-163	Cont.	16	960	B	
0347-241	1.880	4	800	B	
0355-483	1.010	17,3	960	B	
0355-079	1.052	32	960	C	
0402-362	1.417	8	800	A	
0403-179	1.64	32	1800	B	
0406-127	1.563	16	1200	B	
0413-21	0.807	4	1600	C	
0414-189	1.54	16,10	1200	B	z = 0.402 (ref. 16) unlikely.
0419-836	0.05	6	480	B	Galaxy; absorption at 5577 Å is night sky.
0422-380	(0.78)	3	960	B	
0426-380	Cont.	18	960	B	
0434-188	2.702	4	1600	C	
0435-300	1.328	16	200	A	
0436-129	1.276	4	1600	C	
0439-433	(0.594)	11,32	480	B	
0440-285	(0.63)?	32	1500	C	
0448-392	1.290	3	2520	B	
0448-187	2.05	4	1600	B	
0451-28	2.560	4	960	C	
0454-234	1.009?	4	1800	C	z_{abs} = 0.8896.
0454-22	0.534	16	2226	C	z_{abs} = 0.4733.
0454+039	1.345	3	1600	B	z_{abs} = 0.8590.
0506-61	1.089	3	3360	B	
0511-220	Cont?	32	960	B	
0514-161	1.278	3	480	B	
0521-36	Cont.	3	480	B	Galaxy, z = 0.06?
0522-611	(1.40)	16	960	B	
0528-250	2.813	3,19	6000	B	
0537-441	0.894	8	1440	C	CIII] λ1909 also present in original spectrum.
0537-286	3.11	20	4000	B	
0537-158	0.947	16	640	B	
0602-319	0.452	3	960	B	
0606-223	1.926	16,14	2000	B	
0621-786	0.942	7	960	B	
0622-441	0.688	3	960	B	
0637-75	0.651	17	960	C	
0642-349	2.165	3	960	B	
0722+145	-	2	960	B	
0723-008	0.127	3	1200	B	N galaxy.
0745+241	-	2	960	B	
0748+126	0.889	21	960	A	
0754+100	Cont.	21	960	A	
0812+02	0.402	22	1200	C	
0819-032	2.352	3	960	B	
0823-223	Cont.	16,21	960	A	
0829+046	Cont.	16,21	960	A	
0845-051	1.242	16	2000	B	Emission line at 5577 Å is night sky.

Table 1 (contd.)

(1) Source name	(2) Redshift z	(3) Ref.*	(4) Integration time (s)	(5) Estimated photometric quality	(6) Notes
0851+202	Cont.	16	400	A	OJ287. Emission line at 5577 Å is night sky.
0858-77	0.487	32	1440	C	
0859-14	1.333	32	1200	C	
0902-256	1.635	16	1000	B	
0906+01	1.020	3	960	B	
0915-213	0.847	16	1000	B	
0919-260	2.300	16	1000	B	
0925-203	0.347	21	3600	A	
0952+179	-	22	400	A	
0959-443	0.840	3	2280	B	Chart correct but position given by ref. 11 wrong. Redshift correction in ref. 16 incorrect. Ref. 3 gives correct position and z.
1004-217	0.330	23	1200	C	
1004+141	2.713	16	960	C	
1009-321	1.742	17	960	C	
1032-199	2.198	16	400	A	
1034-293	Cont.	7	3360	B	
1101-325	0.355	3	1200	A	
1103-006	0.426	3	480	B	
1104-445	1.598	21	960	A	
1111+149	(0.864)	21	1920	A	
1117-248	0.466	17	960	C	
1127-14	1.187	32	1200	C	
1136-13	0.558	32	1200	C	
1143-287	(0.45)?	32	960	C	
1145-071	1.345	32	1960	C	
1146-037	0.341	3	480	B	
1148-171	1.751	16	1000	B	
1151-34	0.258	7	1920	C	
1155+169	-	32	960	C	
1156-221	0.565	16	971	B	
1157-215	0.927	17	960	C	
1157+014	1.986	3	1920	B	Also absorption; see ref. 33.
1158+007	1.370	3	1440	B	Redshift wrong in ref. 3.
1200-051	0.381	16	400	B	
1203-26	0.790	16	2000	B	
1203+011	0.104	3	1440	B	
1205-008	(1.002)	3	1440	B	Galaxy companion, z = 0.306.
1207-399	0.966	7	2760	C	
1215-002	Cont.	32	960	B	
1215+013	0.118	3	960	B	Galaxy?
1216-010	Cont.	3	960	B	
1219+04	0.967	32	960	B	
1226+02	0.158	24	1680	B	3C273.
1229-02	1.041	32	1800	C	
1232-249	0.355	16	960	B	
1236+077	-	32	1920	A	
1240-294	1.135	3,14	960	B	
1243-072	(1.286)	16	1000	B	Z_{abs} = 0.436. New data refutes z given in ref. 16.
1244-255	0.633	17	960	C	
1254-333	0.190	7	1440	C	
1311-270	2.26	23	507	A	Redshift revised from ref. 23.
1327-311	1.335	21	1440	C	
1327-21	0.526	32	1800	C	Absorption line at 5577 Å is night sky.
1327-206	1.167	17	1440	C	Has close galaxy companion: see ref. 17.
1335-127	(0.540)	4	2640	C	
1335+023	1.350	21	960	B	

Table 1 (contd.)

(1) Source name	(2) Redshift z	(3) Ref.*	(4) Integration time (s)	(5) Estimated photometric quality	(6) Notes
1336-237	Cont?	21	960	A	Name given as 1336_237 in ref. 21.
1336-000	1.81?	32	1440	B	Galaxy companion, $\bar{z}$ = 0.143.
1348-011	2.07	32	1920	C	
1349-439	Cont.	14	480	C	
1352-104	0.330	25	800	A	
1354-152	1.885	32	1920	A	
1355-41	0.313	4	480	C	
1402+044	3.202	26	1920	A	
1403-085	1.763	16	1000	A	
1405-287	0.575	16	1920	B	
1406-076	1.494	21	2880	C	
1424-11	(0.803)	21	2120	B	
1424+240	Cont.	32	1200	B	
1425-274	(1.079)?	4	960	B	
1427+109	1.71?	32	960	B	
1430-178	2.331	16	960	B	
1434-076	0.689	27	960	C	
1448-232	2.215	17	480	B	
1452-217	(0.773)	17	1440	C	
1502+106	(1.833)	16	960	B	z = 0.563?
1508-05	1.186	32	1800	C	
1509+022	0.219	17	3360	C	Galaxy.
1510-08	0.359	32	1200	C	
1511-10	1.520	32	2400	A	
1514-24	Cont.	28	2400	C	AP Lib, Z_{abs} = 0.0486.
1514+197	-	32	2520	B	
1532+01/R	-	14	1920	A	
1532+01/2	0.310	14,32	1920	A	Optically selected QSO.
1542+042	2.182	16	480	B	Unidentified feature at 4196 Å.
1555-140	0.097	21	1680	A	Galaxy.
1556-245	2.81?	16	481	B	
1602-002	1.625	29	960	C	
1604+159	Cont?	32	1920	C	NS emission at 5577.
1614+051	3.214	32	2400	C	
1618+17	(0.557)	32	1200	C	3C334.
1625-141	(1.10)?	32	940	A	
1655+077	(0.625)	4	1440	C	
1656+053	(0.883)	21	1920	B	
1705+018	2.565	21	1920	A	
1717+177	Cont?	32	1440	A	
1725+044	0.293	21	960	A	
1743+173	1.705	32	1920	A	
1756+237	1.72	30	480	C	
1912-549	0.398	7	1440	C	
1921-293	0.352	32	960	A	OV-236.
1929-457	0.652	7	1440	C	
1933-400	(0.966)	4	840	C	
1942-571	0.528	21	960	B	
1953-325	-	8	1440	A	Close galaxy has z = 0.018.
1954-388	(0.630)	25	701	C	
2002-185	0.857	4	5280	A	
2008-159	1.175	21	3720	A	
2020-370	1.048	8	960	C	
2024-217	0.463	8	1920	C	
2037-253	1.573	4	3360	C	

Table 1 (contd.)

(1) Source name	(2) Redshift z	(3) Ref.*	(4) Integration time (s)	(5) Estimated photometric quality	(6) Notes
2044-168	1.940	25,8	5280	C	
2053-044	1.176	4	1800	C	
2058-425	0.221	7	1440	C	
2058-297	(0.70)	32	1920	A	
2112-407	2.54	1	480	C	Optically selected QSO.
2121+053	1.878	34	960	A	
2126-15	3.275	31	5240	B	
2135-248	(0.819)	21	1920	G	
2142-75	1.139	7	7380	B	Z_{abs} = 0.9596.
2143-156/R	(0.700)	8,14	480	C	
2143-156/2	2.055	8,14	960	C	Optically selected QSO.
2144-362	2.081	7	960	B	
2149-306	2.34	4	2880	B	
2153-209	1.852	12	3360	C	Optically selected QSO.
2154-325	1.81?	32	960	C	
2158-214	2.079	12	1920	B	Optically selected QSO.
2159-194	1.173	12	1920	C	Optically selected QSO.
2200-238	2.118	7	960	C	
2202-189	-	12	960	C	Optically selected QSO.
2202-185	1.808	12	960	C	Optically selected QSO.
2202-181	-	12	1440	C	Optically selected QSO.
2203-18	(0.618)	4	1440	C	
2204-573	2.725	17	960	C	
2204-54	1.215	25	960	A	Redshift given by ref. 25 is wrong.
2204-191	1.067	12	960	C	Optically selected QSO.
2204-181	-	12	960	C	Optically selected QSO.
2205-196	1.282	12	1920	C	Optically selected QSO.
2206-237	0.087	4	960	C	Galaxy.
2206-199	2.555	12	960	C	Optically selected QSO.
2206-187	2.157	12	960	C	Optically selected QSO.
2206-180	1.071	12	1920	B	Optically selected QSO.
2207-201	2.067	12	960	C	Optically selected QSO.
2208-137	0.392	8	480	C	
2209-187	2.092	12	480	C	Optically selected QSO.
2210-25	1.833	4	480	C	
2211-192	1.958	12	960	C	Optically selected QSO.
2212-299	2.703	7	3300	B	
2212-199	2.021	12	1920	C	Optically selected QSO.
2213-202	1.046	12	1920	C	Optically selected QSO.
2213-189	-	12	960	C	Optically selected QSO.
2214-208	1.684	12	960	C	Optically selected QSO.
2227-08	1.562	4	960	C	
2232-211/R	(1.44)	4	2610	C	See ref. 35.
2232-211/2	-	4	1920	B	See ref. 35; optically selected QSO.
2233-173	Cont?	32	1200	B	
2233-148	Cont?	9	2400	B	
2240-260	Cont.	32	960	C	
2244-372	2.248	32	474	C	
2245-328/R	2.268	21,14	2400	A	
2245-328/2	-	14	3860	A	Optically selected QSO.
2245-128	1.888	4	1600	B	
2246-309	1.307	8	960	C	
2254-204	Cont.	32	2420	B	
2254+074	Cont?	7	1760	B	Emission line at 5577 Å is night sky.
2255-282	0.926	25,8	1280	C	

Table 1 (contd.)

(1) Source name	(2) Redshift z	(3) Ref.*	(4) Integration time (s)	(5) Estimated photometric quality	(6) Notes
2257-270	1.481	4	1200	B	Abnormally strong lines.
2300-683	0.512	7	1440	C	
2300-18	0.127	7	960	C	N galaxy?
2302-279	1.435	21	1920	B	
2303-052	(1.138)	21	3840	A	
2310-322	0.340	25	800	A	
2314-116	(0.549)	7	960	B	
2325-150	2.465	4	480	C	Very strong lines.
2326-477	1.302	3	480	B	
2329-384	1.202	7	960	B	
2329-16	1.153	4	2400	C	
2331-240	0.046	4	960	C	Galaxy.
2335-18	1.441	8	480	C	
2351-154	2.67	21	1920	C	
2352-342	0.702	7	960	B	
2352-04	(0.72)?	32	1319	C	
2353-302	Cont?	32	480	C	
2355-106	1.622	4	1440	C	
2358-161	2.044	4	840	C	
2359-259	-	32	960	C	

*References: 1, Osmer and Smith (1980); 2, Condon et al. (1977); 3, Wright et al. (1977); 4, Jauncey et al. (1983); 5, Zwicky (1967); 6, Anquita and Pedreros (1977); 7, Jauncey et al. (1978a); 8, Peterson et al. (1976); 9, Condon et al. (1978); 10, Hunstead et al. (1978); 11, Peterson and Bolton (1972); 12, Savage et al. (1978); 13, Arp et al. (1967); 14, Bolton et al. (1976); 15, Wright et al. (1979b); 16, Wright et al. (1979a); 17, Savage et al. (1976); 18, Peterson and Bolton (1973); 19, Morton et al. (1980); 20, Wright et al. (1978); 21, Peterson et al. (1979); 22, Kinman and Burbidge (1967); 23, Browne and Savage (1977); 24, Schmidt (1963); 25, Browne et al. (1975); 26, Peterson et al. (1978); 27, Bolton et al. (1979); 28, Rogers and Peterson (1977); 29, Wills and Lynds (1978); 30, Wills and Wills (1976); 31, Jauncey et al. (1978b); 32, Jauncey et al. (unpublished data); 33, Wright et al. (1979c); 34, Wills and Wills (1974); 35, Peterson et al. (1976).