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CALAN-TOLOLO SURVEY II: SEYFERT 1 GALAXIES

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RESUMEN

Se presenta la segunda lista de la Exploración Calán-Tololo. Contiene información para 40 galaxias Seyferts nuevas, en el hemisferio sur. Los objetos fueron encontrados en placas de prisma objetivo tomadas con el telescopio Curtis-Schmidt del Observatorio Interamericano de Cerro-Tololo; se utilizaron placas IIIaJ y el prisma *UV*. La presente lista sólo contiene galaxias Seyferts confirmadas, obtenidas de una larga lista de candidatos. La naturaleza Seyfert de estas galaxias fue establecida con espectrofotometría de rendija realizada en el Observatorio Carnegie Austral de Cerro Las Campanas, utilizando el telescopio du Pont de 2.5 metros. La espectrofotometría será publicada posteriormente.

ABSTRACT

The second list of the Calán-Tololo Survey is presented. It contains information for 40 new confirmed type 1 Seyfert galaxies in the southern hemisphere. The objects were found searching objective prism plates from the Curtis Schmidt telescope at Cerro Tololo Inter-American Observatory, using the thin *UV* prism and IIIaJ plates. The present list contains only confirmed Seyfert galaxies, drawn from a larger unpublished list of Seyfert galaxy candidates. The Seyfert nature of these objects was established through slit spectrophotometry obtained at Las Campanas Observatory using the du Pont 2.5-m telescope and will be published elsewhere.

Key words: **GALAXIES-SEYFERT – QUASARS**

I. INTRODUCTION

In 1984 we started an objective prism survey at Cerro Calán using plates obtained at Cerro Tololo Inter-American Observatory (CTIO) with the Curtis Schmidt telescope and the thin *UV* prism. The survey is similar to those conducted at CTIO by Malcolm Smith (the Tololo Survey: Smith 1975; Smith, Aguirre, & Zemelman 1976) and by Gordon MacAlpine (the Michigan Survey: MacAlpine, Lewis, & Smith 1977; MacAlpine, Smith, & Lewis 1977a, 1977b; MacAlpine & Lewis 1978; MacAlpine & Williams 1981). The Calán Tololo Survey has been described by Maza *et al.* 1988a, 1988b, 1989 and 1991. The first list published (Maza *et al.* 1989, hereafter List 1) contains information for 30 new Seyfert galaxies of type 1 (Maza & Ruiz 1989). Here we present data for a group of 40 additional Seyfert galaxies, all of which have been checked through slit spectrophotometry at the Las Campanas Observatory 2.5-m du Pont telescope. The spectroscopic information will be presented elsewhere (Maza & Ruiz 1993).

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II. OBSERVATIONS

We have obtained plates exposed to the sky limit (90 minutes) for 163 fields at galactic latitude b such that $|b| \geq 20°$, covering 3400 deg^2 on the southern sky (see Figure 1 in List 1). We have used the Curtis Schmidt telescope at CTIO, the thin *UV* prism (Blanco 1974), and unfiltered Eastman Kodak IIIaJ plates baked in forming gas. Spectra cover the range from the atmospheric cutoff (3300 A) to the red limit of the IIIaJ plate sensitivity (5350 A) at a reciprocal dispersion of 1740 A/mm at Hβ, 1360 A/mm at Hγ and 1100 A/mm at λ3727 A. Unwidened spectra, under seeing conditions of 2″, have a typical resolution of the order of 35 A at Hβ and 30 A at Hγ.

Each photographic plate is searched using a

binocular microscope at 12x, usually by two of us (L.E.G. and M.W.). A final selection is made checking each candidate against the ESO Quick Blue Charts or against our own direct plates taken with the Curtis Schmidt telescope at CTIO or with the Maksutov camera (70/100/210 cm

TABLE 1

CALAN-TOLOLO SURVEY LIST 2

N	Object[a]	α (1950)	δ	B	D	ESO field	x (mm)	y (mm)
31	C17.06	$0^h15^m16.9^s$	$-45°42'38''$	17.01	17″	242	264	107
32	B15.01	0 31 33.0	−39 3 37	17.30	12	294	87	198
33	C19.01	1 8 57.7	−47 43 18	14.91	27	195	63	264
34	C20.01	1 18 8.0	−44 23 16	14.55	75	244	206	183
35	A21.01	1 49 30.9	−36 25 52	15	75	354	248	77
36	B20.02	2 14 30.1	−40 32 53	17.30	10	298	99	113
37	B20.01	2 27 14.7	−41 23 17	16.94	7	299	235	75
38	C24.20	2 50 32.9	−43 59 56	16.95	7	247	122	201
39	C26.01	3 7 29.7	−47 26 27	16.78	27	248	224	7
40	B23.15	3 17 32.2	−41 57 17	16.96	17	301	250	34
41	C26.03	3 20 44.9	−46 17 16	17.77	7	248	188	69
42	C28.02	3 50 14.4	−45 53 39	16.43	40	249	87	91
43	A27.02	3 58 50.7	−37 13 15	16.53	15	359	149	27
44	A27.01	4 3 12.4	−37 19 7	15.38	20	359	102	21
45	B26.08	4 20 23.6	−42 0 14	16.46	40	303	142	36
46	A29.15	4 34 6.5	−36 42 33	17.34	11	360	40	63
47	A29.09	4 38 54.5	−34 47 18	17.11	16	361	246	160
48	B27.01	4 39 1.5	−41 16 19	16.40	<11	304	215	86
49	A29.01	4 44 47.8	−34 48 51	16.00	< 9	361	182	160
50	A32.04	5 30 49.2	−37 55 9	16.52	< 9	306	221	254
51	A32.01	5 45 6.9	−33 38 30	15.62	34	363	51	226
52	C34.02	5 45 13.1	−45 21 15	16.01	22	253	56	122
53	A34.03	6 18 20.7	−34 36 17	16.32	48	365	207	168
54	R04.01	10 19 58.2	−14 13 37	16.65	< 8	...	...	...
55	R05.01	10 43 48.8	−13 46 23	16.47	10	...	...	...
56	J05.09	10 51 23.5	−20 41 45	17.40	20	569	140	114
57	J07.04	11 34 4.9	−22 12 57	16.10	13	571	131	32
58	R08.10	11 40 10.1	−16 49 56	17	14	...	...	...
59	J07.05	11 40 19.6	−21 30 4	16.41	< 8	571	53	69
60	J07.02	11 43 8.4	−18 10 35	15	34	571	16	246
61	G03.04	19 34 14.5	−51 16 23	15.56	41	232	111	80
62	C08.02	21 4 56.7	−44 2 28	16.65	10	286	99	199
63	B06.01	21 25 54.9	−39 42 46	16.63	19	342	20	156
64	B08.06	22 29 46.6	−41 49 50	16.89	13	345	168	49
65	B09.01	22 31 48.5	−37 22 5	17.22	10	405	62	22
66	B09.04	22 41 53.8	−40 51 14	16.75	21	345	46	100
67	A12.01	22 51 12.2	−33 15 59	15.77	21	406	110	234
68	B11.01	23 22 42.1	−38 43 8	14.92	23	347	161	211
69	A14.01	23 32 13.3	−35 55 3	17.09	15	408	187	99
70	C16.16	23 58 19.4	−44 56 4	17.19	8	241	159	148

[a] Alternate designations: Object 34 = ESO244-G17; Object 35 = ESO354-G4; Object 42 = AM0350-455 (Arp & Madore 1987); Object 45 = AM0420-420 (Arp & Madore 1987); Object 52 = AM0545-453 (Arp & Madore 1987); Object 60 = H1143-182 (Véron-Cetty & Véron 1987); Object 61 = H1934-513 (Véron-Cetty & Véron 1987).

°×5° on 18 cm × 18 cm plates at 99″/mm) t the Cerro El Roble Astronomical Station of he University of Chile. The selection criteria or Seyfert galaxy candidates have been explained n List 1 and by Maza & Ruiz (1989). Only alaxies with an ultraviolet excess are selected as andidates. Sometimes the Hβ line is seen in mission; very seldomly more than two lines are etectable on the objective prism spectrum of a eyfert galaxy. The limiting magnitude depends on he plate quality; for Seyfert galaxies we estimate he limiting magnitude of our survey to be around 8th magnitude, but severe incompleteness occurs or galaxies fainter than 17th (Barrientos & Maza 993).

We have performed slit spectrophotometry of ach candidate using the 2.5-meter du Pont telecope at Las Campanas Observatory and/or using he 4-meter telescope at CTIO. On the average ne out of three Seyfert galaxy candidates turns out o be a new Seyfert galaxy of type 1. Our good andidates (those with a very bright nucleus and strong ultraviolet excess) almost always turn out o be Seyfert galaxies while our poor candidates faint nucleus with a moderate ultraviolet excess) re more often liners or galaxies with a starburst n their nucleus. In this list we present only the uccessful candidates.

III. LIST NUMBER 2

Table 1 presents the data for this new group of eyfert 1 galaxies. The equatorial coordinates were btained by measuring an objective prism Curtis chmidt plate, using the X-Y measuring engine at erro Calán (ASCORECORD by Zeiss Jena). The osition on the sky relative to twenty reference stars rom the Perth-70 Catalog is listed in Table 1. he precision of the right ascension is ±2″; the eclination is more uncertain, with errors that could e as high as −20″ or +5″ (the dispersion of the bjective prism plate runs north-south with the red nd to the south; that end is used to measure ositions. For faint objects, many magnitudes ainter than the reference stars, the declination neasured usually situates the object a bit to the orth, up to 20″). For a few objects a direct plate as measured either from the Curtis Schmidt or the Maksutov telescope, to determine R.A. and DEC. olumn 9 of Table 1 presents the *B* magnitude as neasured from CCD observation using the Swope elescope at Las Campanas Observatory (Barrientos & Maza 1993). For objects Nos. 35, 58 and 60 crude magnitude was estimated from the ESO Quick Blue Charts (a CCD magnitude is not available for them). An angular size or an upper limit to it, was estimated from the ESO Quick Blue Charts or Maksutov plates for objects with $\delta \geq -17.5°$. The last three columns of Table 1 give the ESO field number of the Chart where the galaxy can be found and the (x,y) coordinates in millimeters from the lower left corner of each chart. Figures 1a and 1b present finding charts for each galaxy.

The spectrophotometric observations of these galaxies will be presented in a forthcoming paper (Maza & Ruiz 1993). *UBVRI* CCD data for these galaxies and those of List 1 will be presented elsewhere (Barrientos & Maza 1993).

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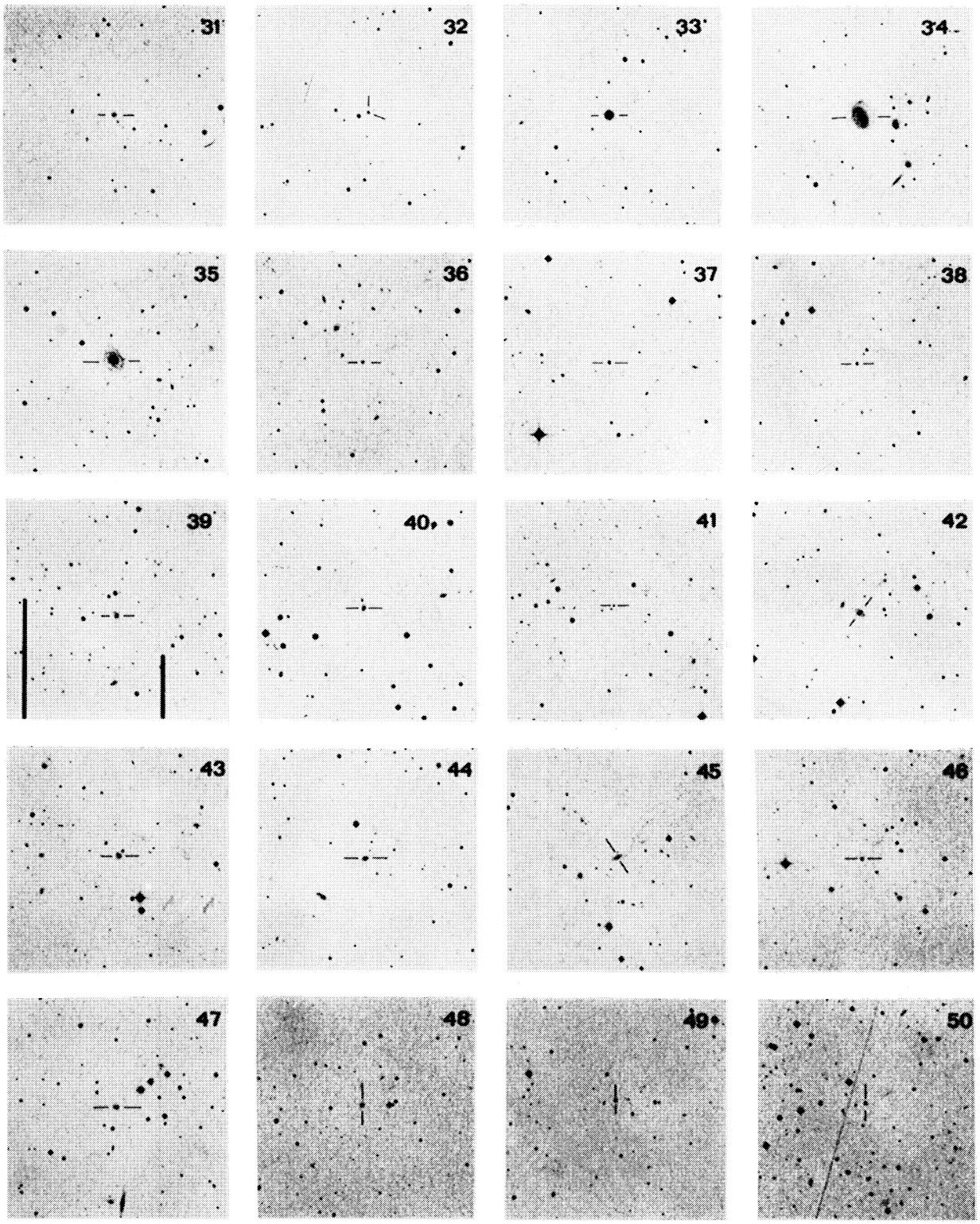

Fig. 1a. Finding charts from the ESO Quick Blue Survey. North is to the top and east to the left. Each chart covers 9′×9′.

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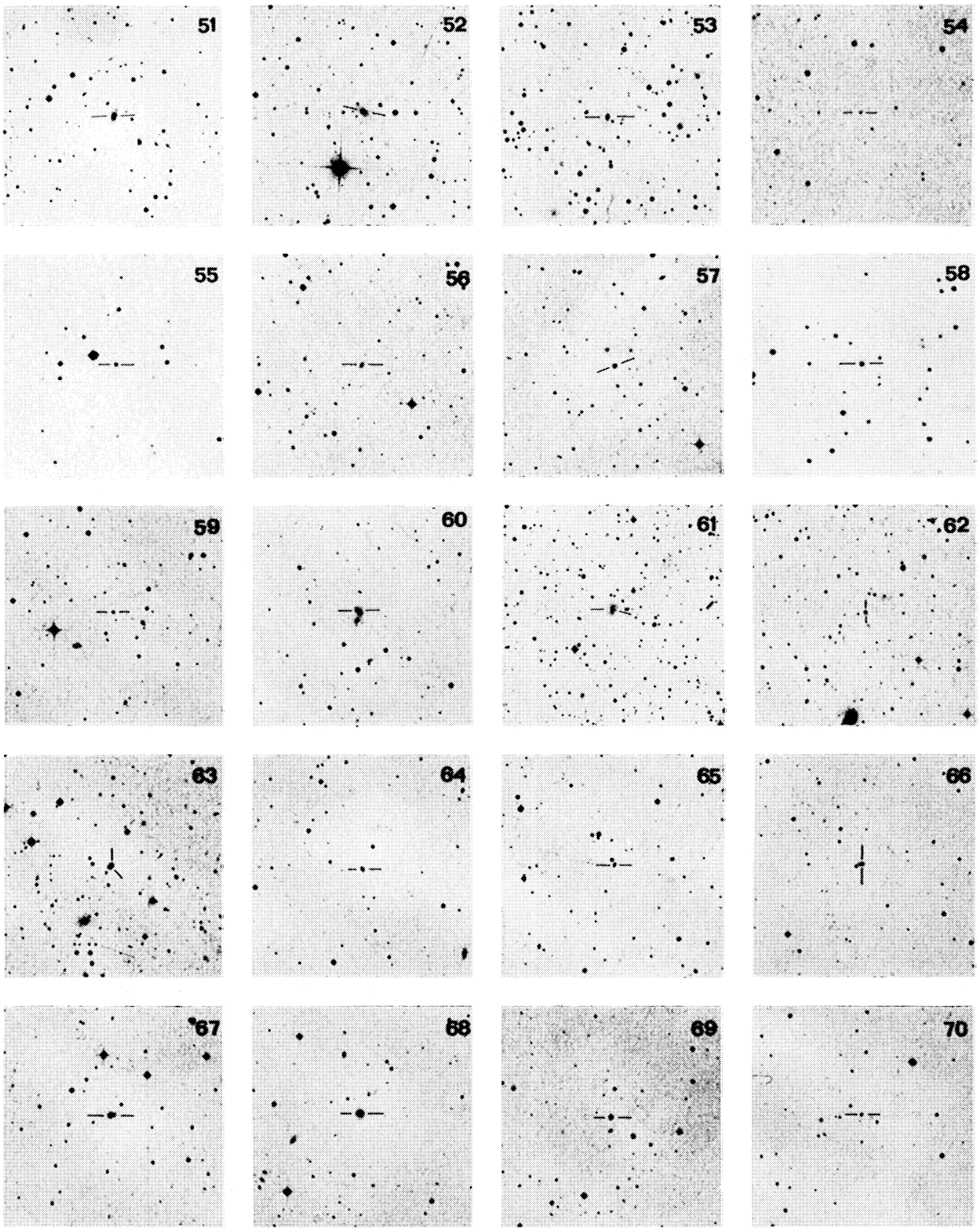

Fig. 1b. Finding charts from the ESO Quick Blue Survey, except for objects 54, 55 and 58 for which a Maksutov plate was used. North is to the top and east to the left. Each chart covers $9' \times 9'$.