

# ASTROPHYSIQUE APPROFONDISSEMENT À PROPOS DE L'ÂGE DE L'UNIVERS

DOCUMENTS DE TRAVAIL



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*Centre National d'Enseignement à Distance - Institut de Vanves*

K 9807 TA 03  
333

# ASTROPHYSIQUE : APPROFONDISSEMENT

\* \* \* \*

## A PROPOS DE L'AGE DE L'UNIVERS

DOCUMENTS DE TRAVAIL

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K9807 TA 03

## LISTE DES DOCUMENTS DE TRAVAIL

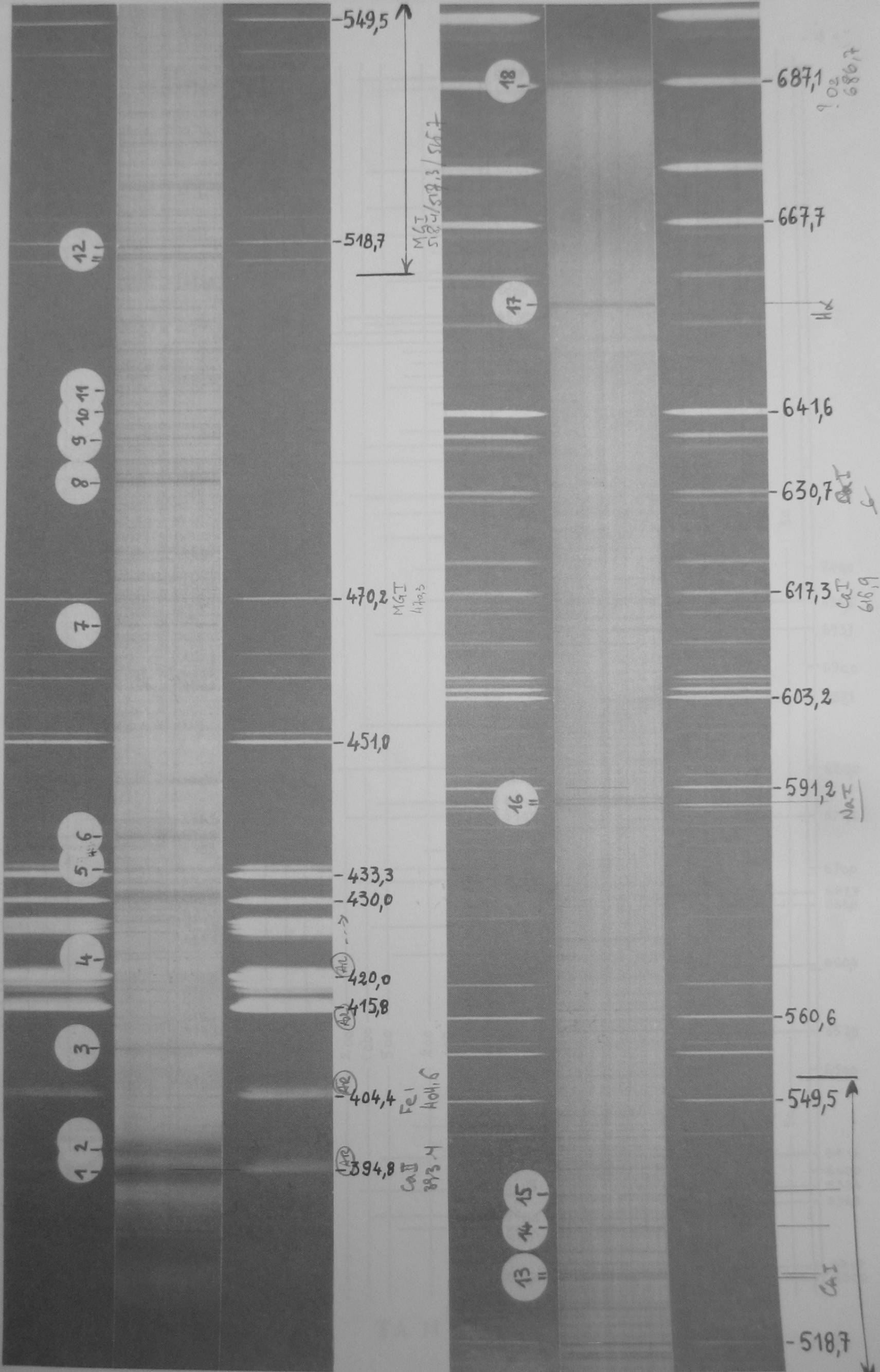
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Spectre du Soleil

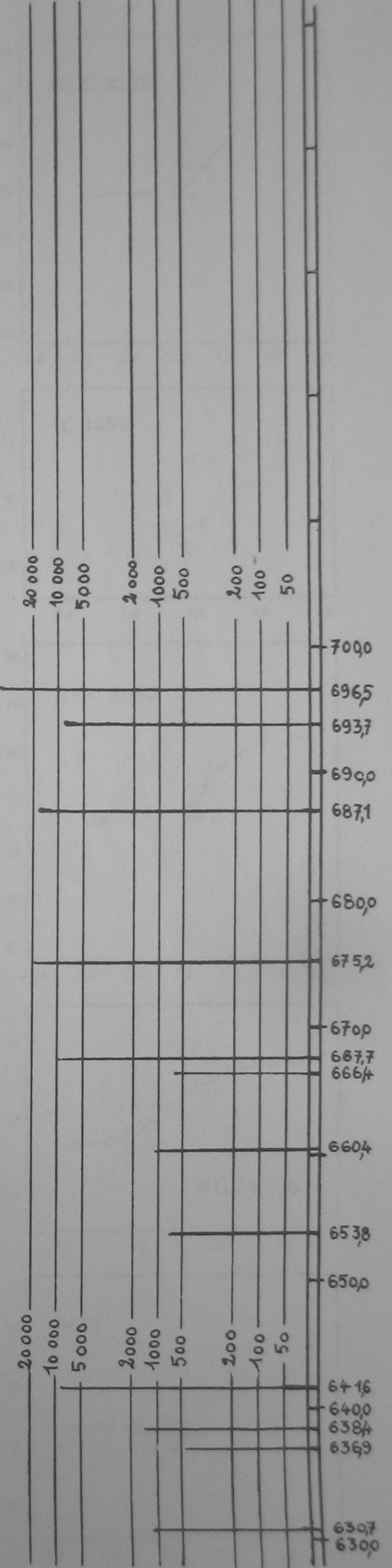
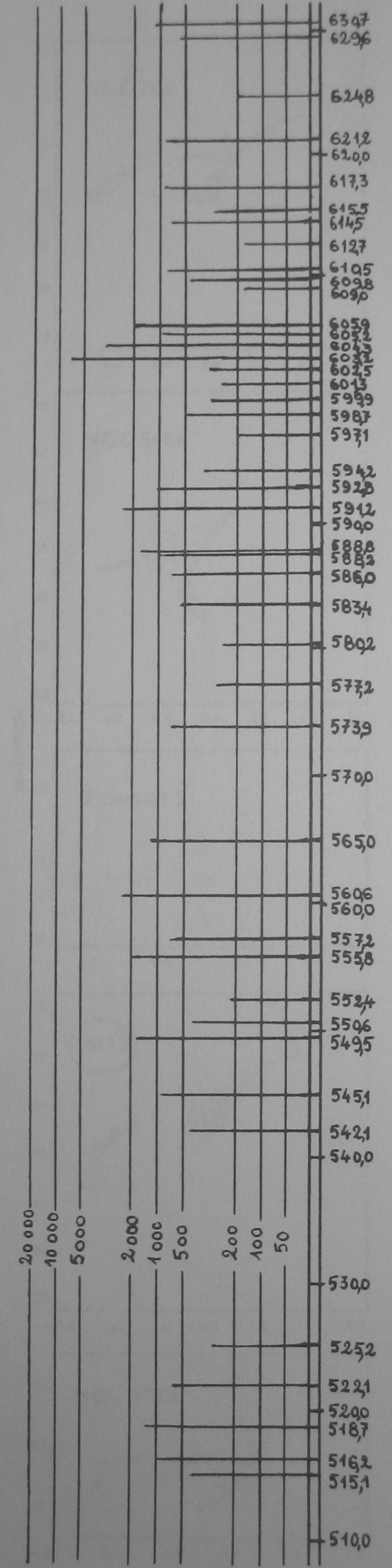
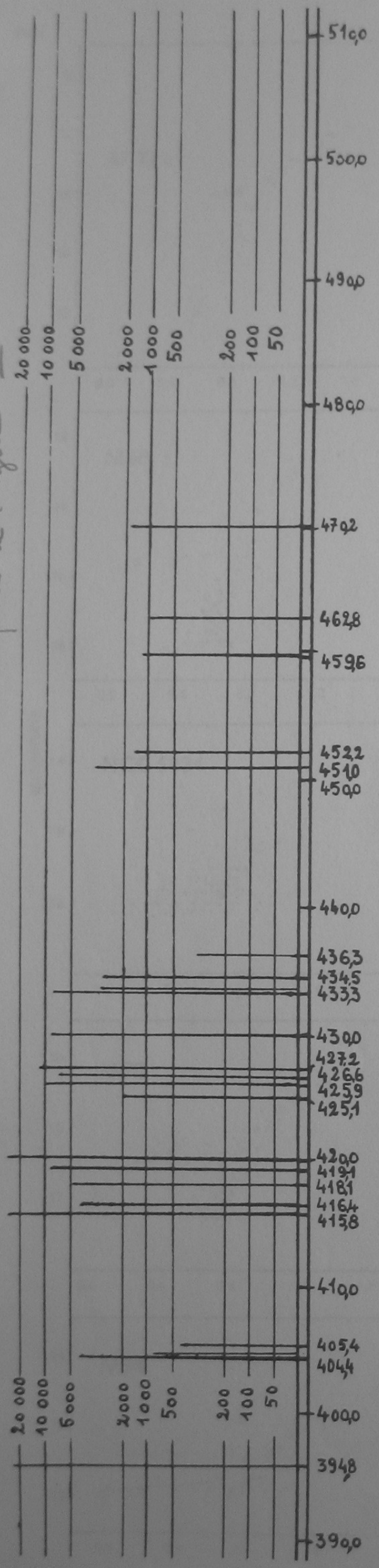
TA I

CLEA

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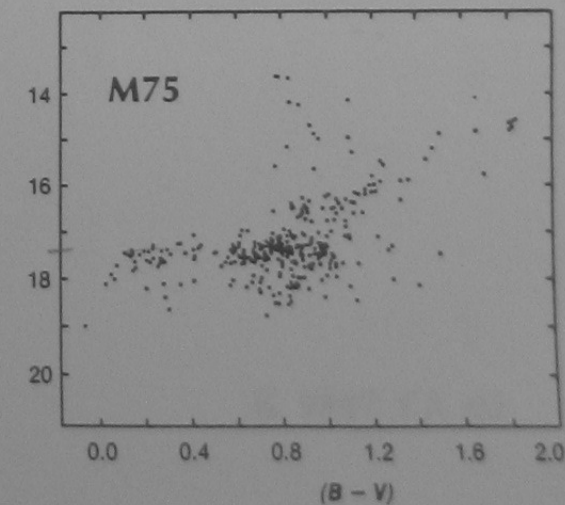
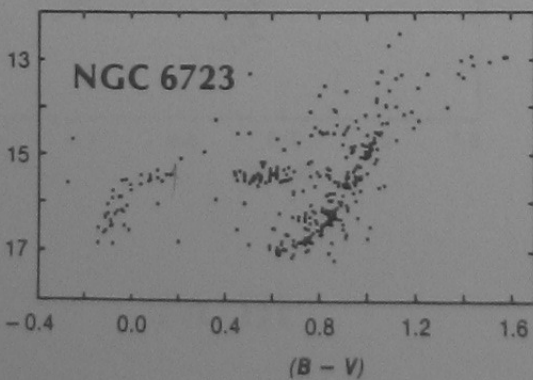
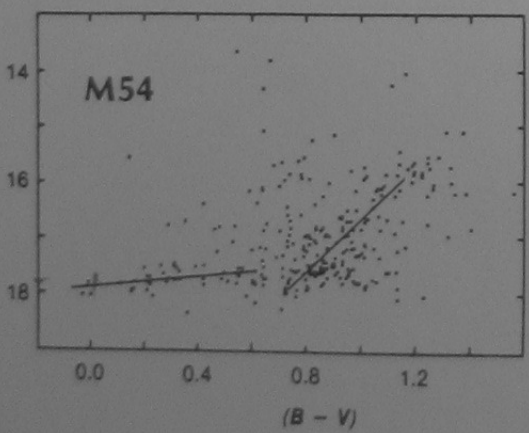
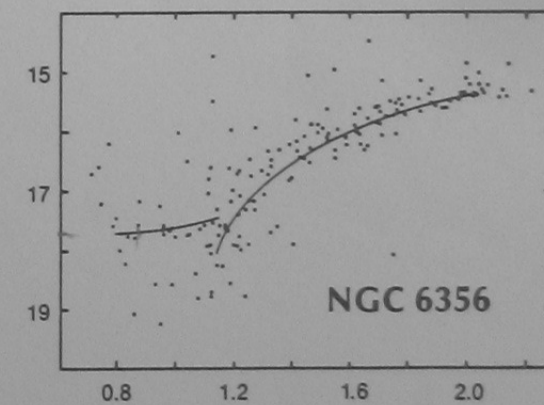
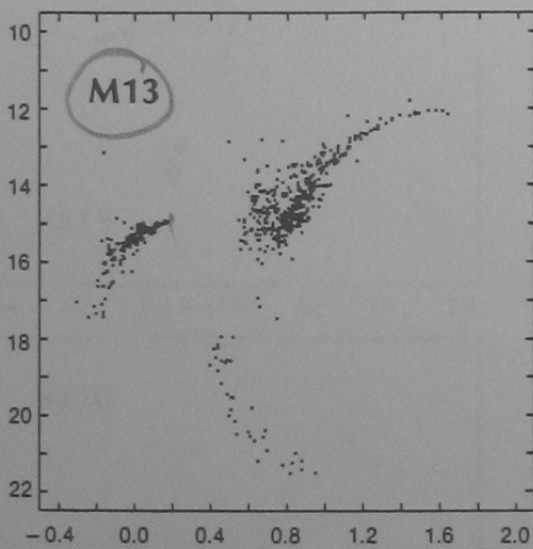
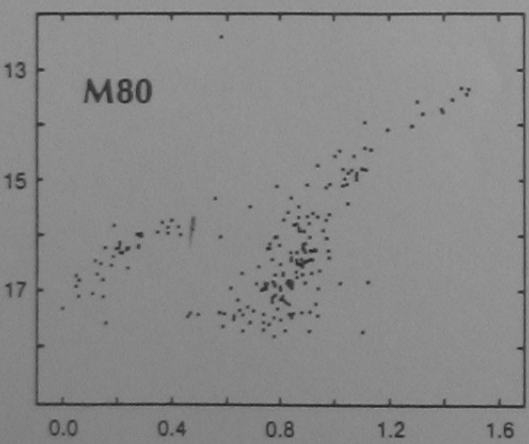
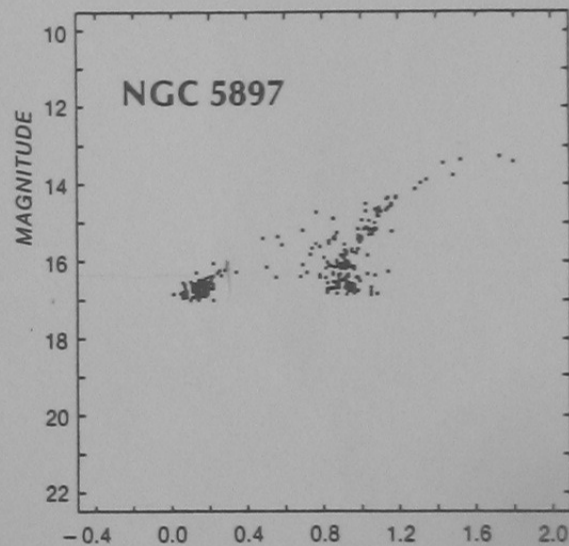
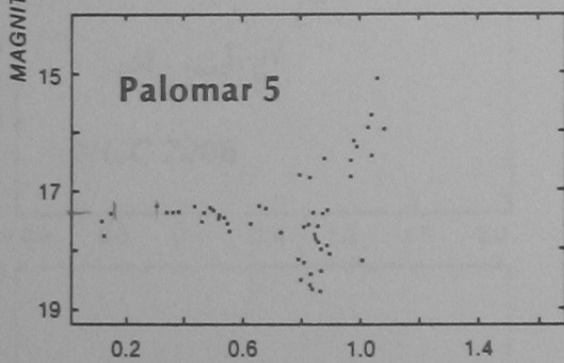
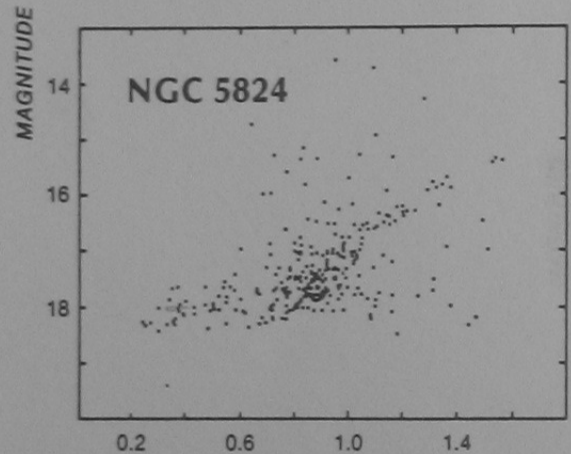
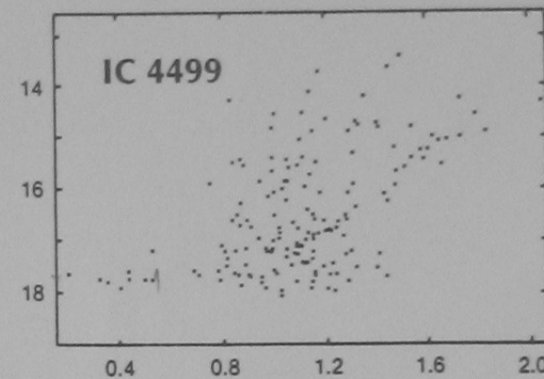
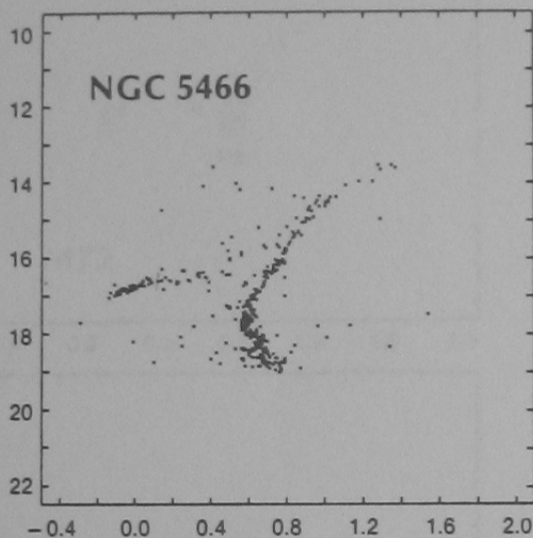
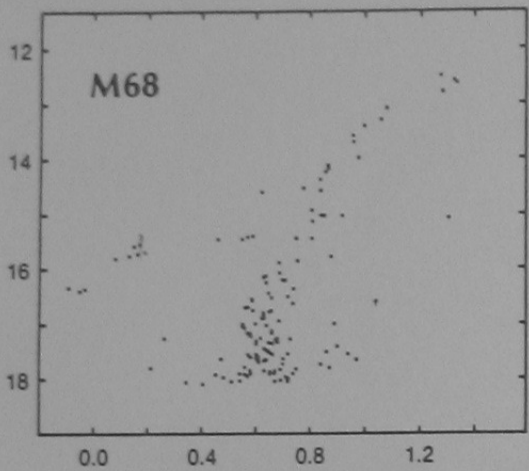
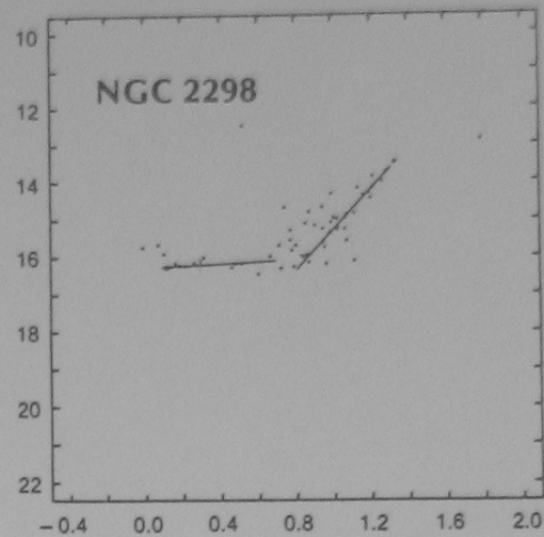
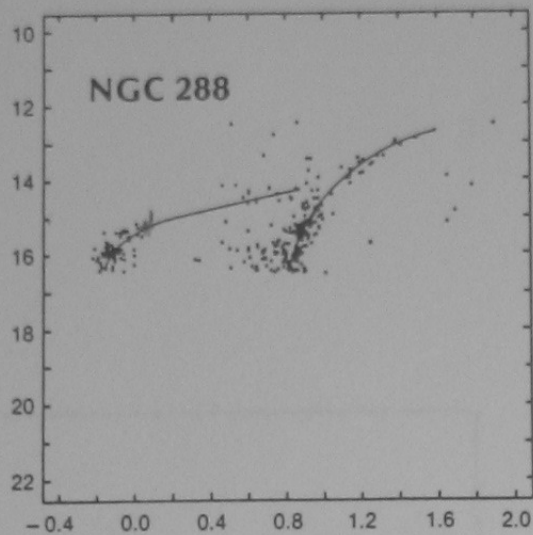
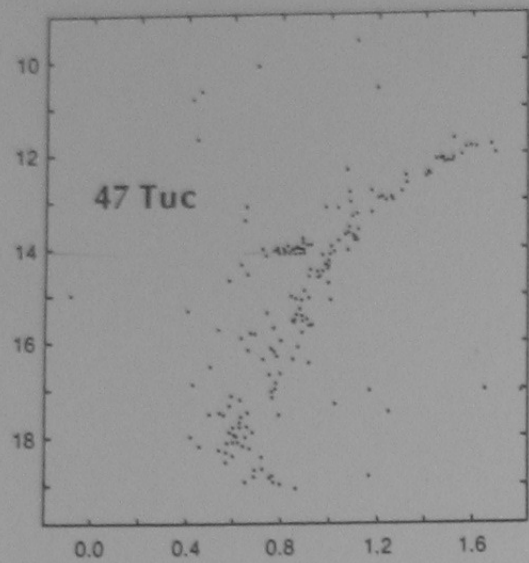
Spectre de l'Argon

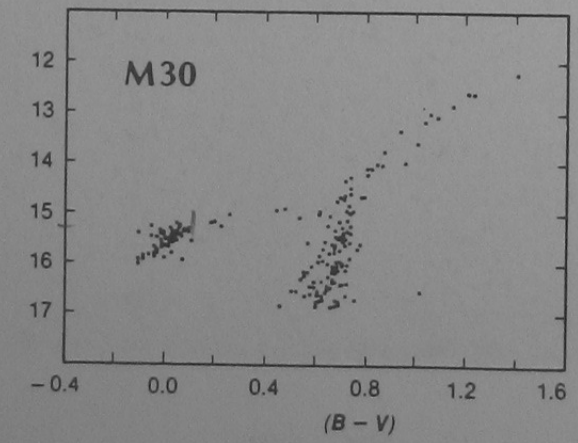
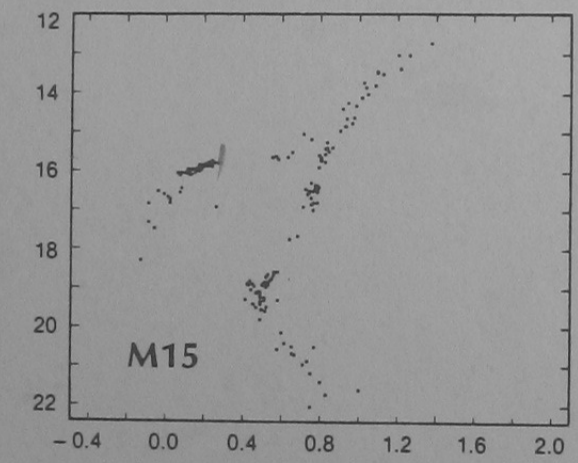
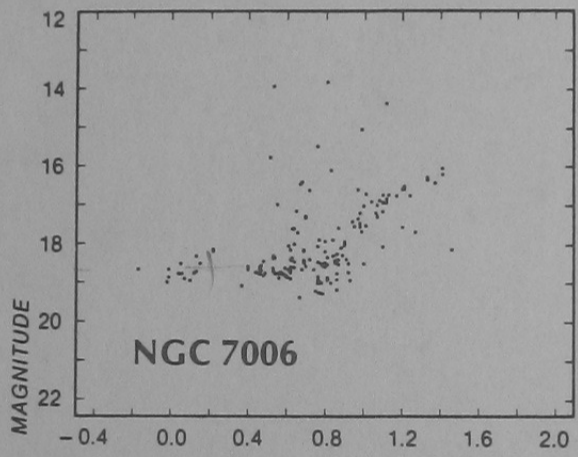
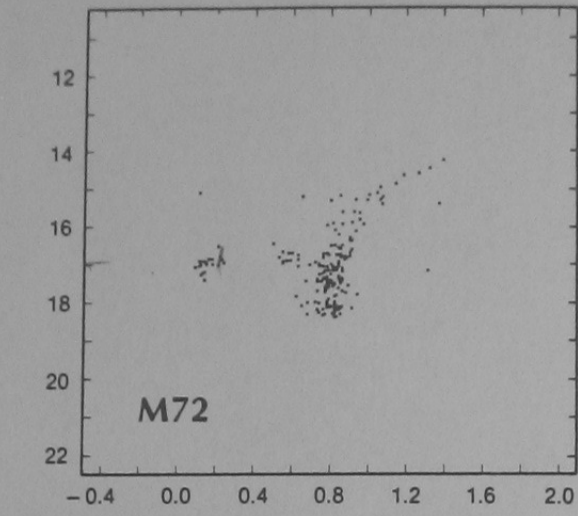


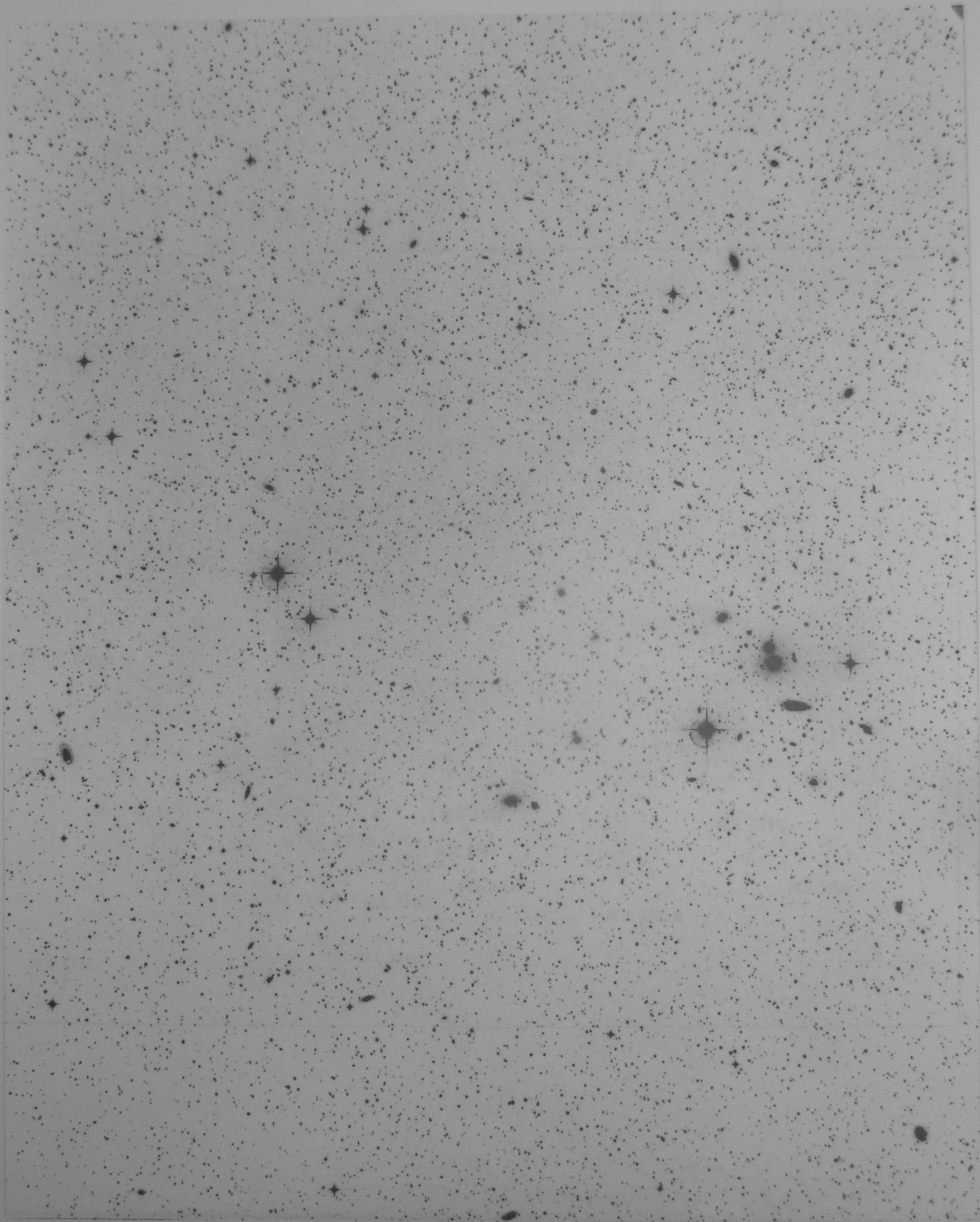
TA II

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MV



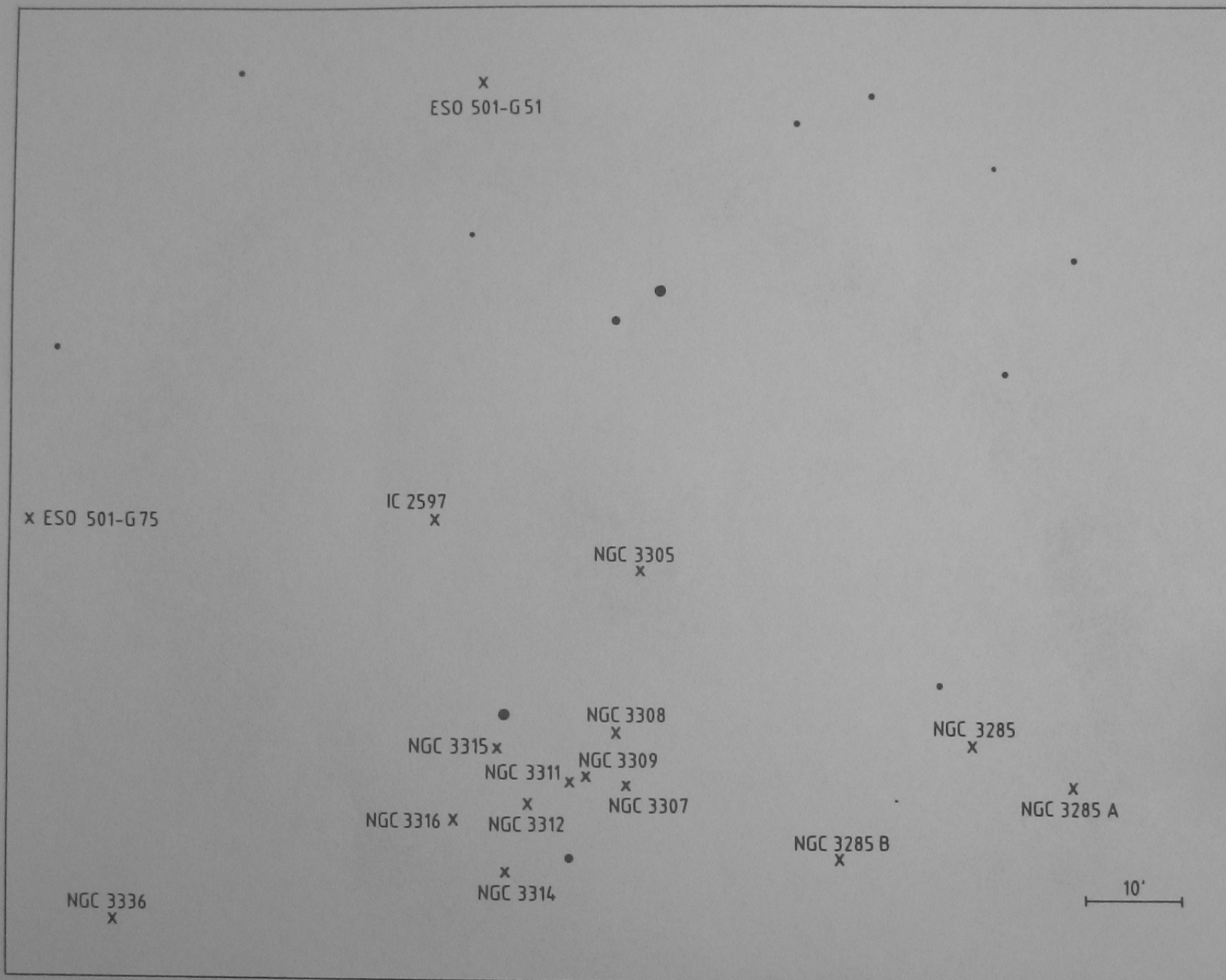




TA IV

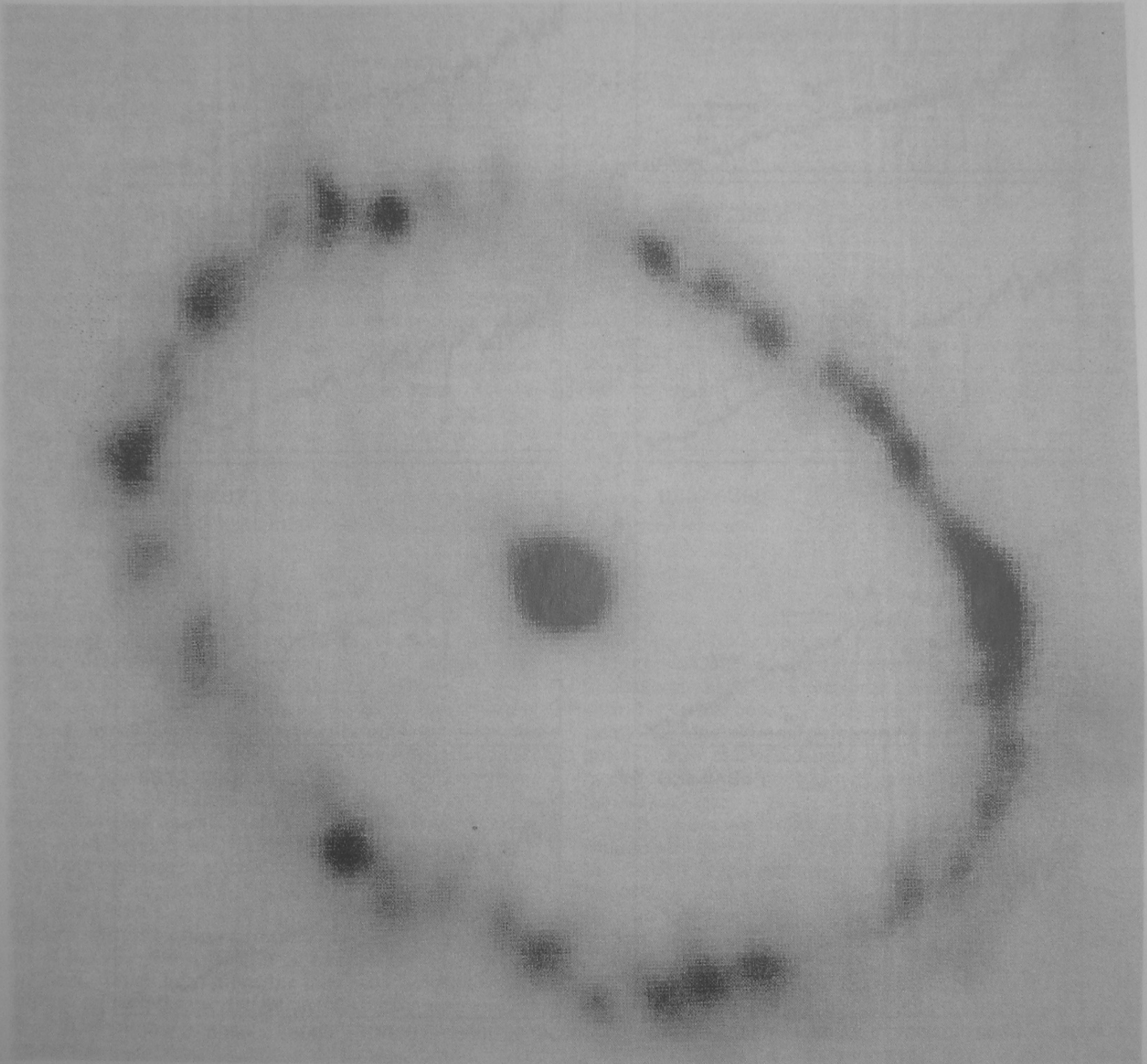
K 9807 TA 03

identification de l'amas de  
galaxies Hydra



SN 1987A

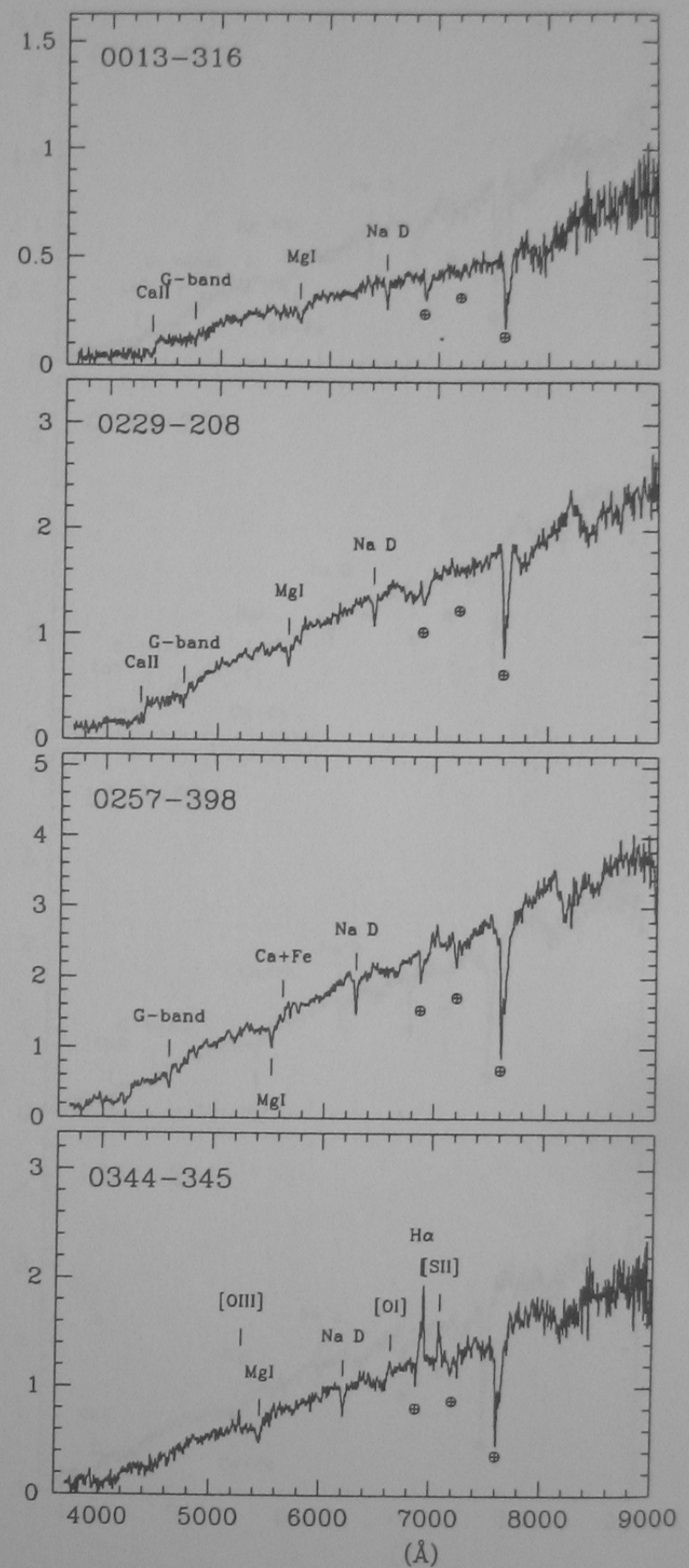
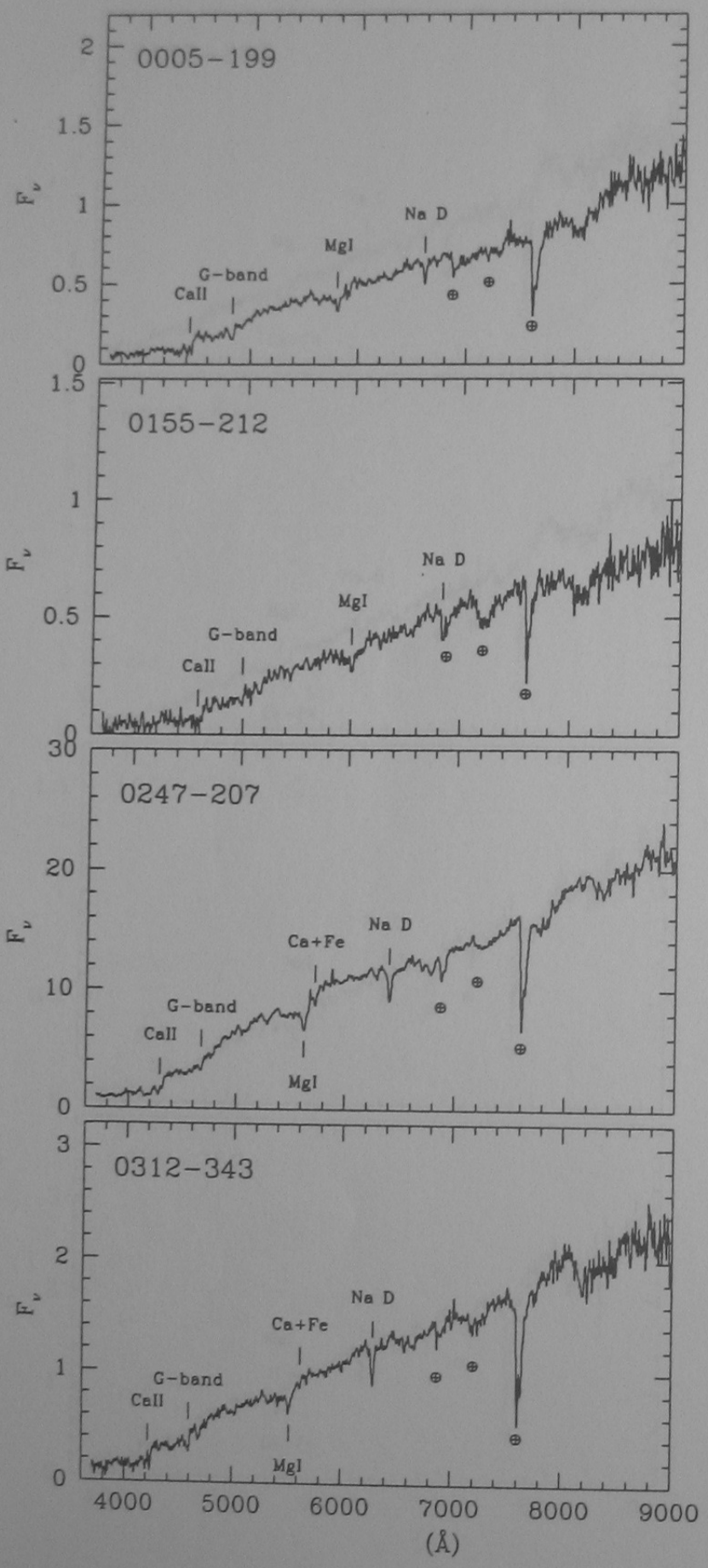
+



+ Partie centrale de la Supernova 1987A avec son anneau circumstellaire, observée le 24 août 1990 avec le télescope spatial Hubble. Cette image a été réalisée en utilisant la caméra pour objet faible construite par l'ESA, équipée d'un filtre étroit centré à la longueur d'onde de  $5007 \text{ \AA}$ , dans la raie de l'oxygène deux fois ionisé. Le champ couvert est approximativement de  $2,4'' \times 2,4''$ .

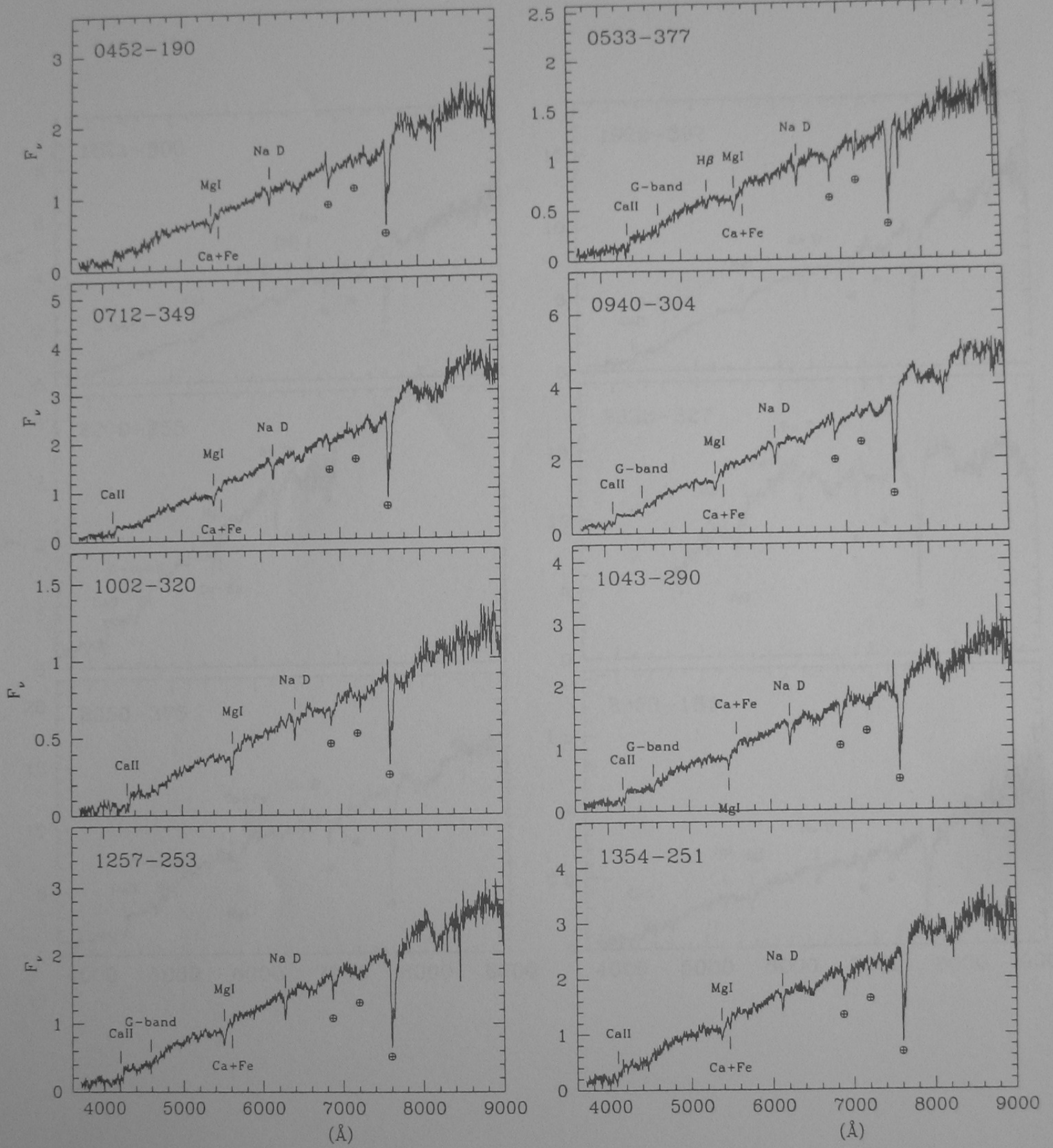
TA VI

K 9807 TA 03



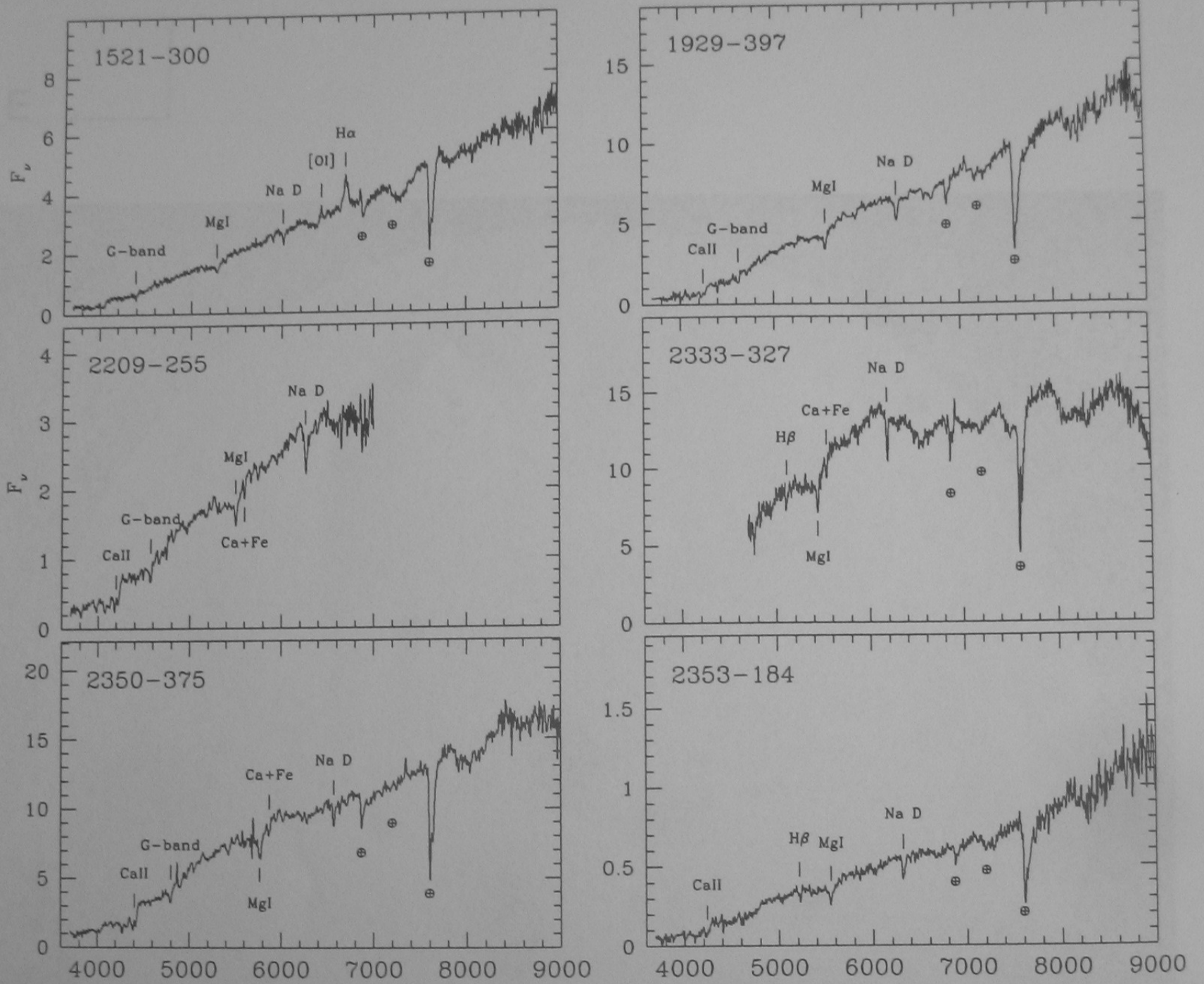
TA VII

*Spectres de radiogalaxies*



TA VII

*Spectres de radiogalaxies*

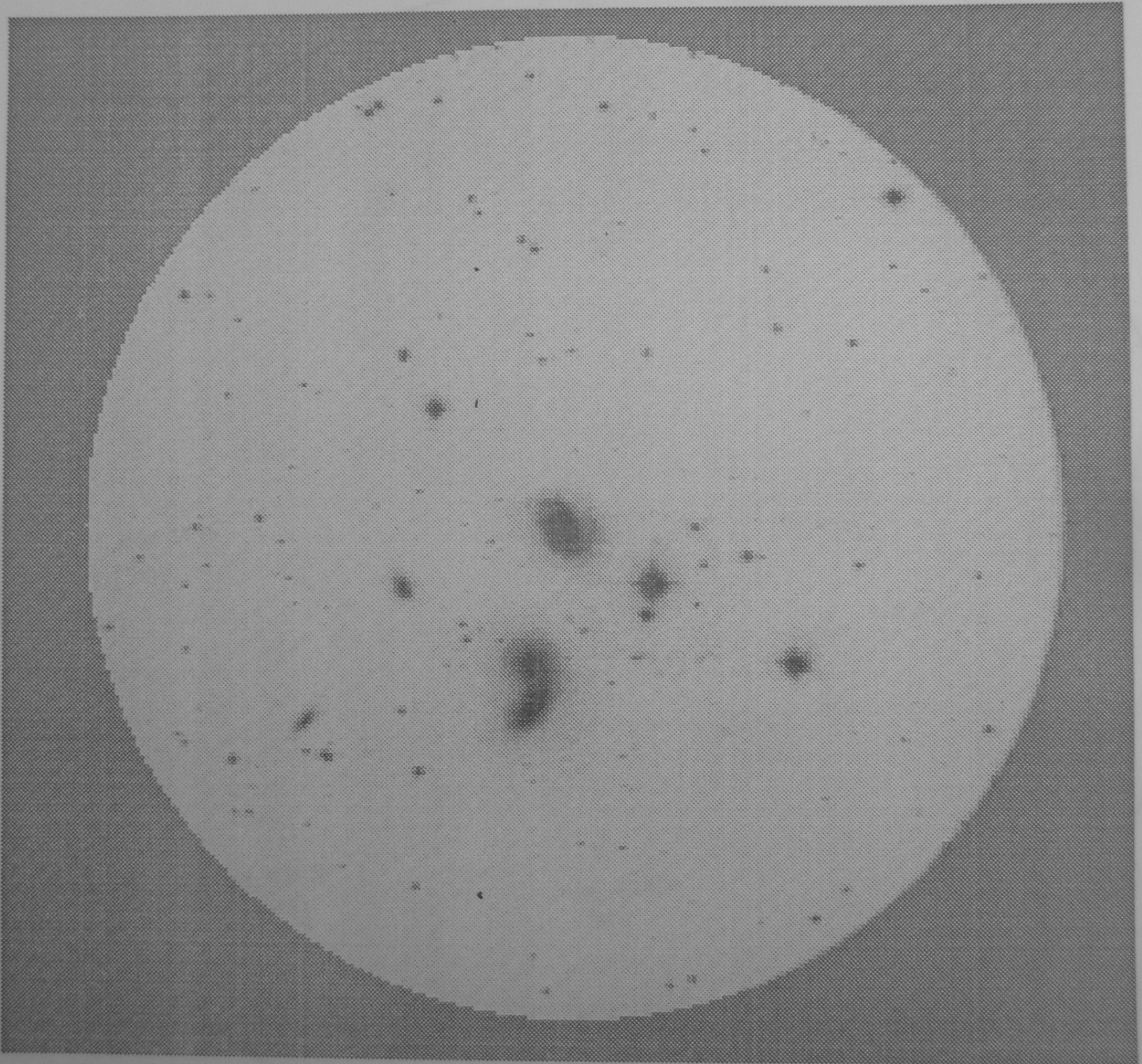
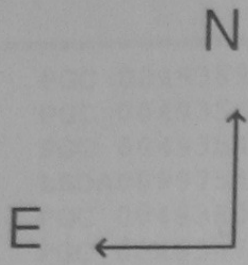


TA VII

# LYON MEUDON EXTRAGALACTIC DATABASE

Center on: PGC 49347

radius: 14.0 arcmin



TA VIII

PSS 221 X=30.2 CM Y=12.5 CM

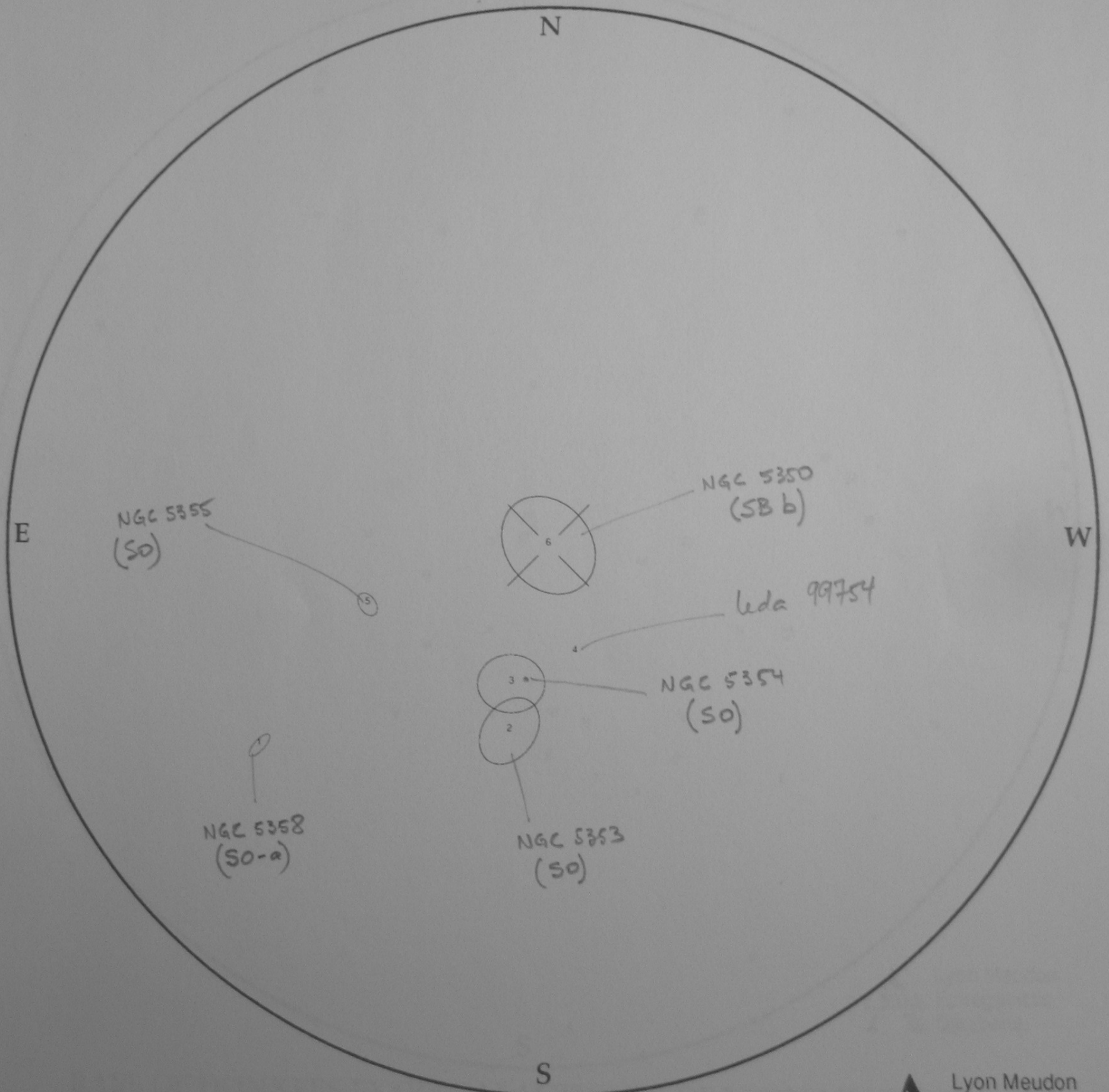
- 1 NGC 5358 #PGC 49389
- 2 NGC 5353 #PGC 49356
- 3 NGC 5354 #PGC 49354
- 4 LEDA 99754
- 5 NGC 5355 #PGC 49380
- 6 NGC 5350 #PGC 49347

R.A. (1950) : 13 h 51 mn 14.6 s

DEC (1950) : 40° 36' 32"

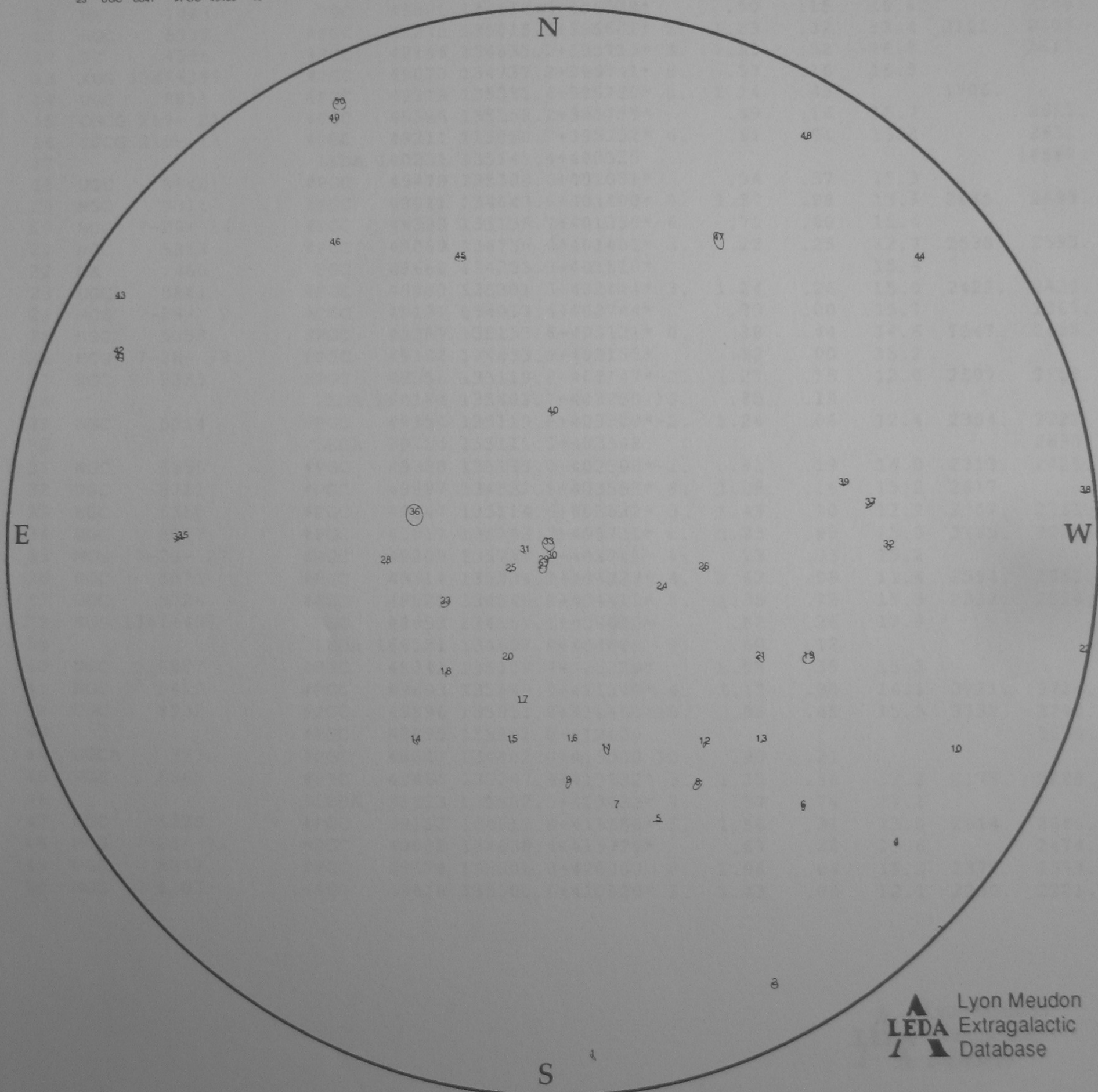
RADIUS : 14.0'

NUM	PGC/LEDA	Name	R.A. 1950 h m s	DEC. d ' ''	Type	logD25 log(0.1')	logR25	BT	Vhelio km/s
1	PGC 0049389	NGC 5358	135153.6	+403121	SO-a	.88	.44	14.58	1564
2	PGC 0049356	NGC 5353	135119.8	+403147	SO	1.27	.15	11.97	2305
3	PGC 0049354	NGC 5354	135119.6	+403300	SO	1.24	.06	12.41	2305
4	LEDA0099754		135111.0	+403348					2690
5	PGC 0049380	NGC 5355	135139.0	+403500	SO	.81	.19	13.98	2318
6	PGC 0049347	NGC 5350	135114.6	+403632	SBb	1.43	.10	12.23	2308



1	UGC 8793	#PGC 49294	MCG 7-29-2	#PGC 49157					
2	UGC 8742	#PGC 49062	NGC 5358	#PGC 49389	48	MCG 7-28-71	#PGC 49002		
3	KUG 1344.393	PGC 48845	26	MCG 7-28-78	#PGC 49142	49	UGC 8877	#PGC 49624	
4		LEDA 166177	27	NGC 5353	#PGC 49356	50	NGC 5383	#PGC 49618	
5		LEDA 101501	28					LEDA 166184	
6	UGC 8736	#PGC 49024	29	NGC 5354	#PGC 49354				
7	KUG 1350.397	#PGC 49252	30					LEDA 99754	
8	NGC 5326	#PGC 49157	31	NGC 5355	#PGC 49380				
9	NGC 5346	#PGC 49322	32	UGC 8721	#PGC 48897				
10	MK 1483	PGC 48821	33	NGC 5350	#PGC 49347				
11	NGC 5337	#PGC 49275	34	UGC 8917	#PGC 49817				
12	IC 4336	#PGC 49146	35	MCG 7-29-27	#PGC 49809				
13	KUG 1347.399	#PGC 49070	36	NGC 5371	#PGC 49514				
14	UGC 8851	#PGC 49519	37	UGC 8726	#PGC 48925				
15	CGCG 219-21	#PGC 49386	38	KUG 1341.407	PGC 48658				
16	CGCG 219-13	#PGC 49311	39					LEDA 166181	
17		LEDA 140231	40	UGC 8807	#PGC 49341				
18	UGC 8840	#PGC 49479	41	NGC 5410	#PGC 49893				
19	NGC 5311	#PGC 49011	42	UGC 8932	#PGC 49896				
20	MCG 7-29-14	#PGC 49393	43		#PGC 49895				
21	NGC 5313	#PGC 49069	44	UGCA 373	#PGC 48847				
22	MK 460	PGC 48668	45	NGC 5362	#PGC 49464				
23	UGC 8841	#PGC 49480	46		#LEDA 91323				

R.A. (1950) : 13 h 51 mn 14.6 s  
 DEC (1950) : 40° 36' 32"  
 RADIUS : 108.0'



**LEDA** Lyon Meudon  
 Extragalactic  
 Database


BASE DE DONNEES EXTRAGALACTIQUES DE LYON MEUDON

TA VIII

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ALPHA CENTRE 13h 51mn 14.6s  
 DELTA CENTRE 40deg. 36' 32''  
 RAYON 108.0'

Num	Identif	PGC ou LEDA	al	de	T	logD25	logR25	m	V21	Vopt
1	UGC 8793	#PGC	49294	135030.0+385600	7.	1.22	.58		2433.	
2	UGC 8742	#PGC	49062	134727.0+391000*10.		1.16	.05		2264.	
3	KUG 1344+393	PGC	48845	134439.6+391958*	6.	.62	.26	16.0		18530.
4		LEDA	166177	134521.9+393726	7.	.85	.24			
5		LEDA	101501	134922.9+394203*				16.7		1619.
6	UGC 8736	#PGC	49024	134655.2+394448*	6.	1.11	.38	14.2		2404.
7	KUG 1350+397	#PGC	49252	135005.1+394452*		.51	.01	16.3		
8	NGC 5326	#PGC	49157	134842.5+394918*	1.	1.35	.27	12.9	2520.	2545.
9	NGC 5346	#PGC	49322	135054.1+394936*	6.	1.30	.39	14.7	2514.	2509.
10	MK 1483	PGC	48821	134418.7+395539*		.50	.15	16.6		3266.
11	NGC 5337	#PGC	49275	135015.3+395601*	5.	1.23	.32	13.4	2111.	2204.
12	IC 4336	#PGC	49146	134835.2+395713*	3.	1.13	.52	14.8		2517.
13	KUG 1347+399	#PGC	49070	134737.2+395741*	6.	.53	.16	16.5		
14	UGC 8851	#PGC	49519	135331.6+395730*	8.	1.14	.43		1706.	
15	CGCG 219- 21	#PGC	49386	135152.2+395739*		.89	.16	15.7		2613.
16	CGCG 219- 13	#PGC	49311	135050.7+395752*	6.	.51	.01	15.8		2631.
17		LEDA	140231	135141.4+400525						18587.
18	UGC 8840	#PGC	49479	135300.6+401051*		.94	.37	15.3		
19	NGC 5311	#PGC	49011	134647.6+401400*	0.	1.37	.08	13.6	2645.	2699.
20	MCG 7-29- 14	#PGC	49393	135156.7+401350*	6.	.71	.00	15.4		
21	NGC 5313	#PGC	49069	134736.6+401401*	3.	1.23	.25	12.7	2538.	2593.
22	MK 460	PGC	48668	134203.3+401510*				15.4		
23	UGC 8841	#PGC	49480	135301.3+402444*	3.	1.24	.26	15.0	2422.	2430.
24	MCG 7-29- 2	#PGC	49191	134917.4+402744*		.73	.00	15.7		2369.
25	NGC 5358	#PGC	49389	135153.6+403121*	0.	.88	.44	14.6	1547.	2455.
26	MCG 7-28- 78	#PGC	49142	134833.9+403135*		.82	.00	15.2		
27	NGC 5353	#PGC	49356	135119.8+403147*-2.		1.27	.15	12.0	2307.	2159.
28		LEDA	166184	135403.7+403250	10.	.85	.19			
29	NGC 5354	#PGC	49354	135119.6+403300*-2.		1.24	.06	12.4	2304.	2722.
30		LEDA	99754	135111.0+403348						2690.
31	NGC 5355	#PGC	49380	135139.0+403500*-2.		.81	.19	14.0	2313.	2425.
32	UGC 8721	#PGC	48897	134522.8+403553*	8.	1.06	.16	15.2	2617.	
33	NGC 5350	#PGC	49347	135114.6+403632*	3.	1.43	.10	12.2	2307.	2311.
34	UGC 8917	#PGC	49817	135743.2+403721*	6.	1.23	.95	15.0	3765.	3734.
35	MCG 7-29- 27	#PGC	49809	135737.7+403742*	4.	.73	.05	15.2		
36	NGC 5371	#PGC	49514	135334.2+404223*	4.	1.62	.09	11.4	2554.	2582.
37	UGC 8726	#PGC	48925	134540.8+404411*	7.	1.35	.72	15.3	2332.	2334.
38	KUG 1341+407	PGC	48658	134157.1+404626*		.62	.26	17.0		
39		LEDA	166181	134607.8+404808	7.	.60	.12			
40	UGC 8807	#PGC	49341	135109.7+410229*		1.05	.39	15.3		
41	NGC 5410	#PGC	49893	135849.9+411340*	6.	1.17	.30	14.1	3721.	3726.
42	UGC 8932	#PGC	49896	135851.8+411450*10.		.88	.45	15.5	3732.	3790.
43		#PGC	49895	135852.0+412600						3600.
44	UGCA 373	#PGC	48847	134442.0+413300	10.	.90	.21			
45	NGC 5362	#PGC	49464	135247.9+413332*	3.	1.35	.36	13.2	2173.	2228.
46		#LEDA	91323	135502.5+413632*	7.	.77	.74	17.1		
47	NGC 5320	#PGC	49112	134813.8+413656*	5.	1.56	.31	13.0	2614.	2646.
48	MCG 7-28- 71	#PGC	49002	134638.4+415729*		.67	.22	15.6		2474.
49	UGC 8877	#PGC	49624	135506.0+420200	8.	1.06	.04	15.2	2379.	2379.
50	NGC 5383	#PGC	49618	135500.6+420520*	3.	1.43	.09	12.1	2250.	2221.

 Lyon Meudon  
 Extragalactic  
 Database

BASE DE DONNEES EXTRAGALACTIQUES DE LYON MEUDON

TA VIII

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NGC 752

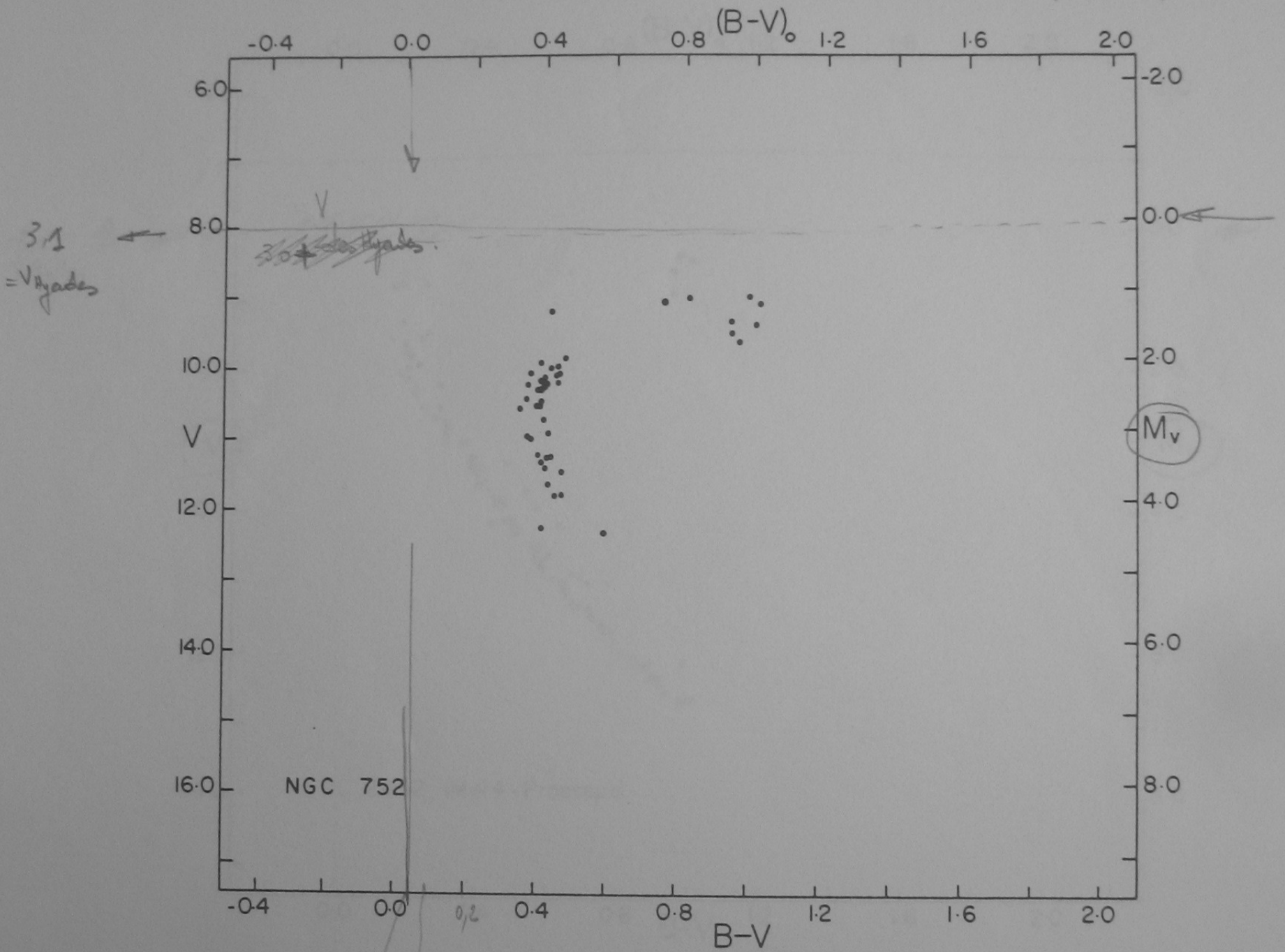
decalage

$V = 3,0 \rightarrow$  NGC 752  
 $M_V = 0,0 \rightarrow$  Hyades

$V - M_V = 8,0 - 0,0 = 8$

= module de distance

Question I.5 page 15 Tome 2  
 réponse page 30



$0,03$   
 $E(B-V)$

TA IX

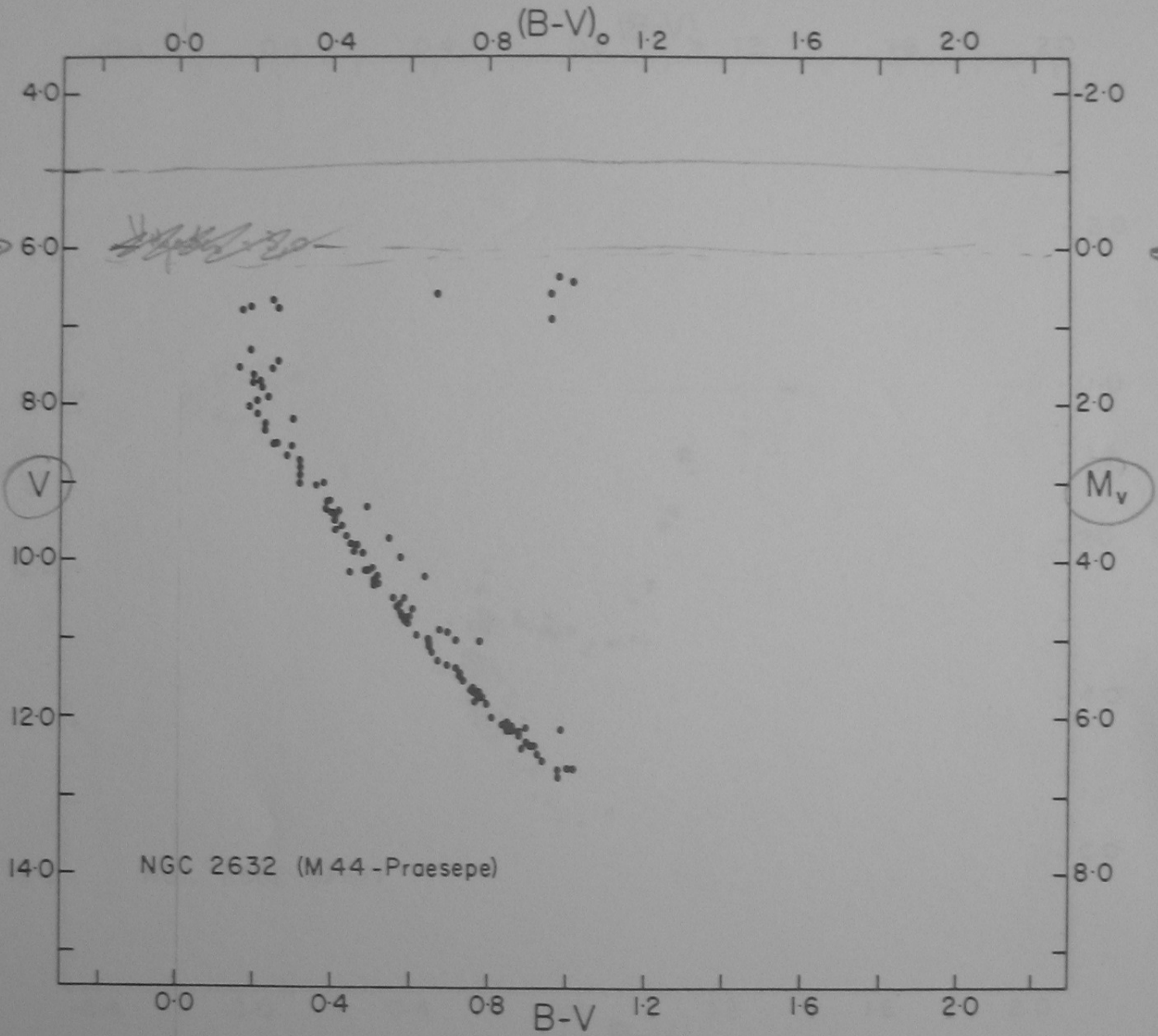
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donc NGC 752  $\Rightarrow 8 - 3,1 \times 0,03 = \underline{\underline{1,9}}$

NGC 2532 (M44)

module de distance

$$V - M_v = 6,0 - 0,0 = 6,0$$



TA X

90  
E(B-V)

K 9807 TA 03

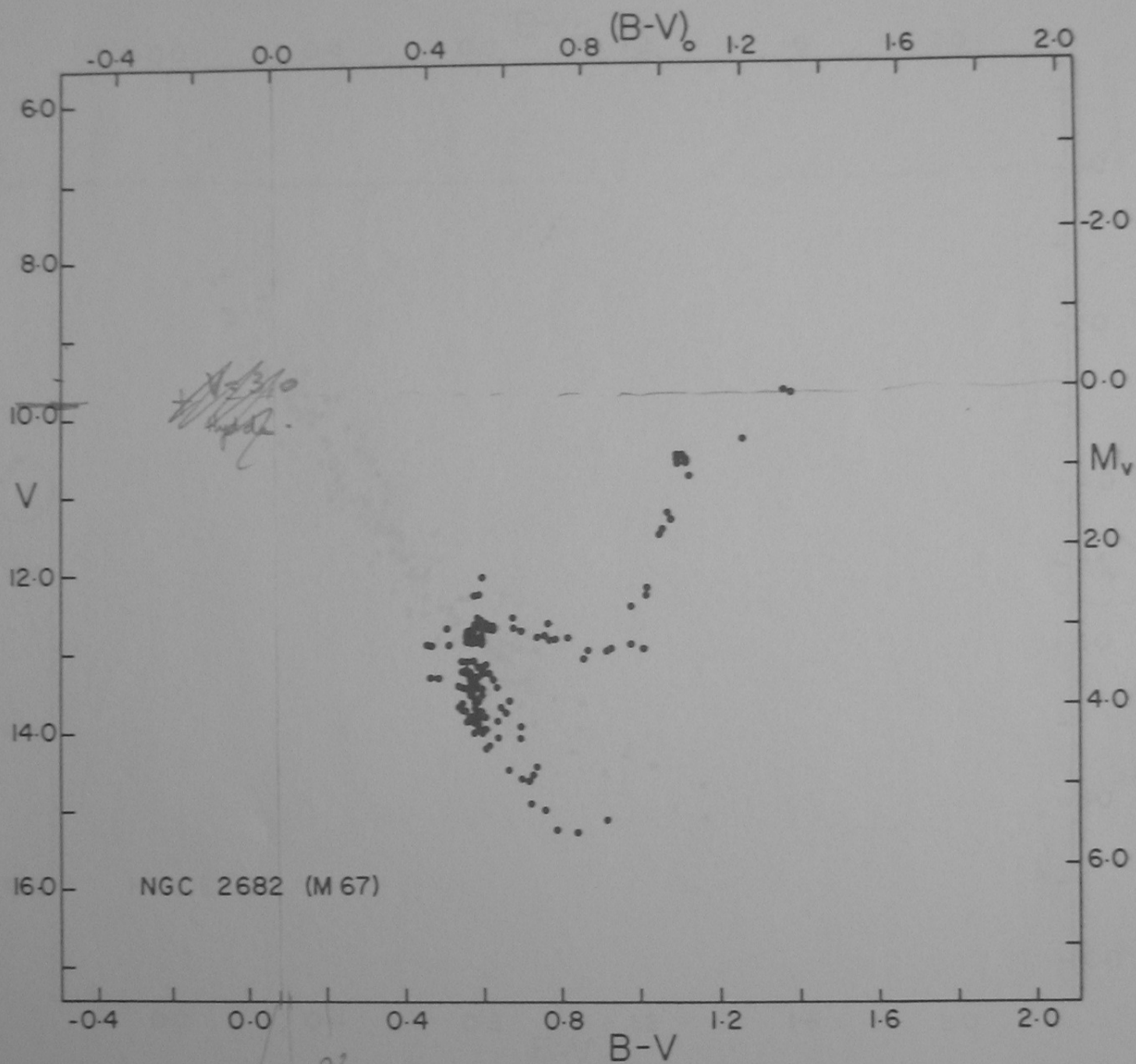
$$\text{done NGC 2632} \Rightarrow 6,0 - 3,1(90) = 6,0$$

NGC 2682 (M67)

module de distance

$V - M_V = \cancel{3.1} \approx 3$   
 $9.7 - 9.0 = 9.7$

= 3,1  
 Virgals



NGC 2682 (M 67)

TA XI

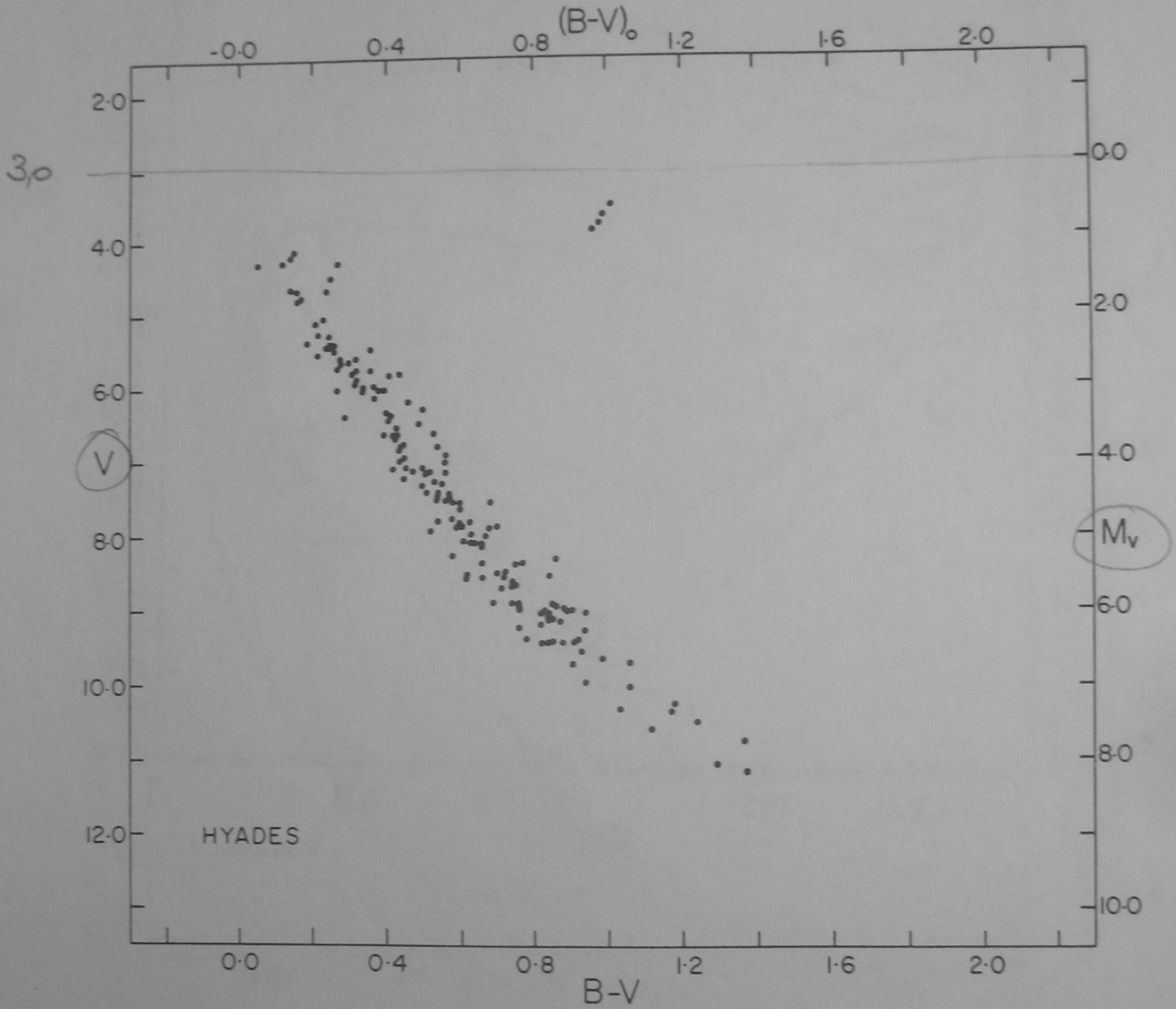
K 9807 TA 03

0,06  
 0,1  
 = E(B-V)

donc pour NGC 2682  $\Rightarrow 9.7 - 3.1(0.06) = \underline{9.5}$

module de distance des Hyades  
 $V - M_V = 3,0 - 0,0 = \underline{\underline{3,0}}$

amas des Hyades



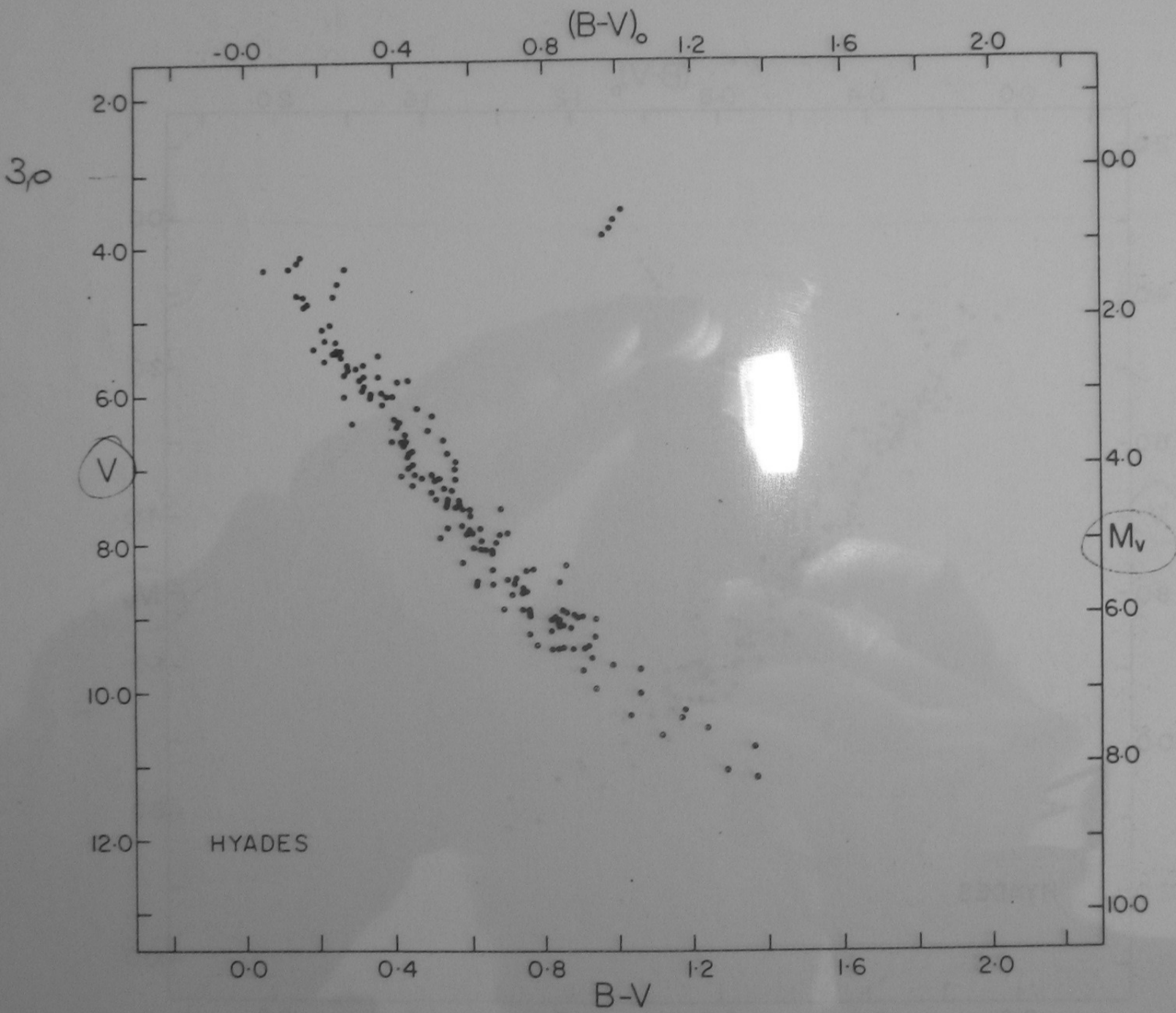
TA XII

K 9807 TA 03

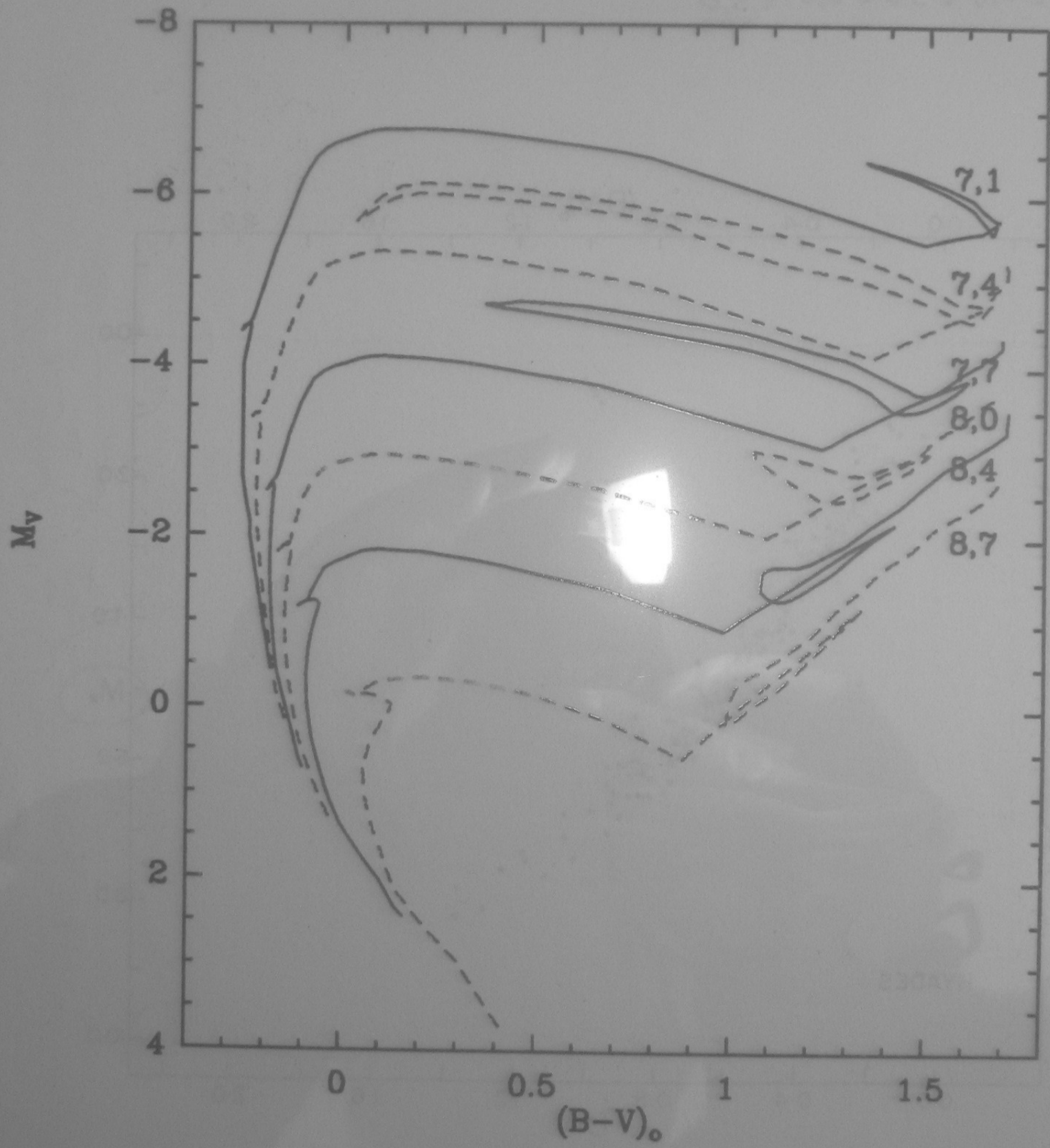
module de distance des Hyades

$$V - M_V = 3,0 - 0,0 = \underline{\underline{3,0}}$$

amas des Hyades

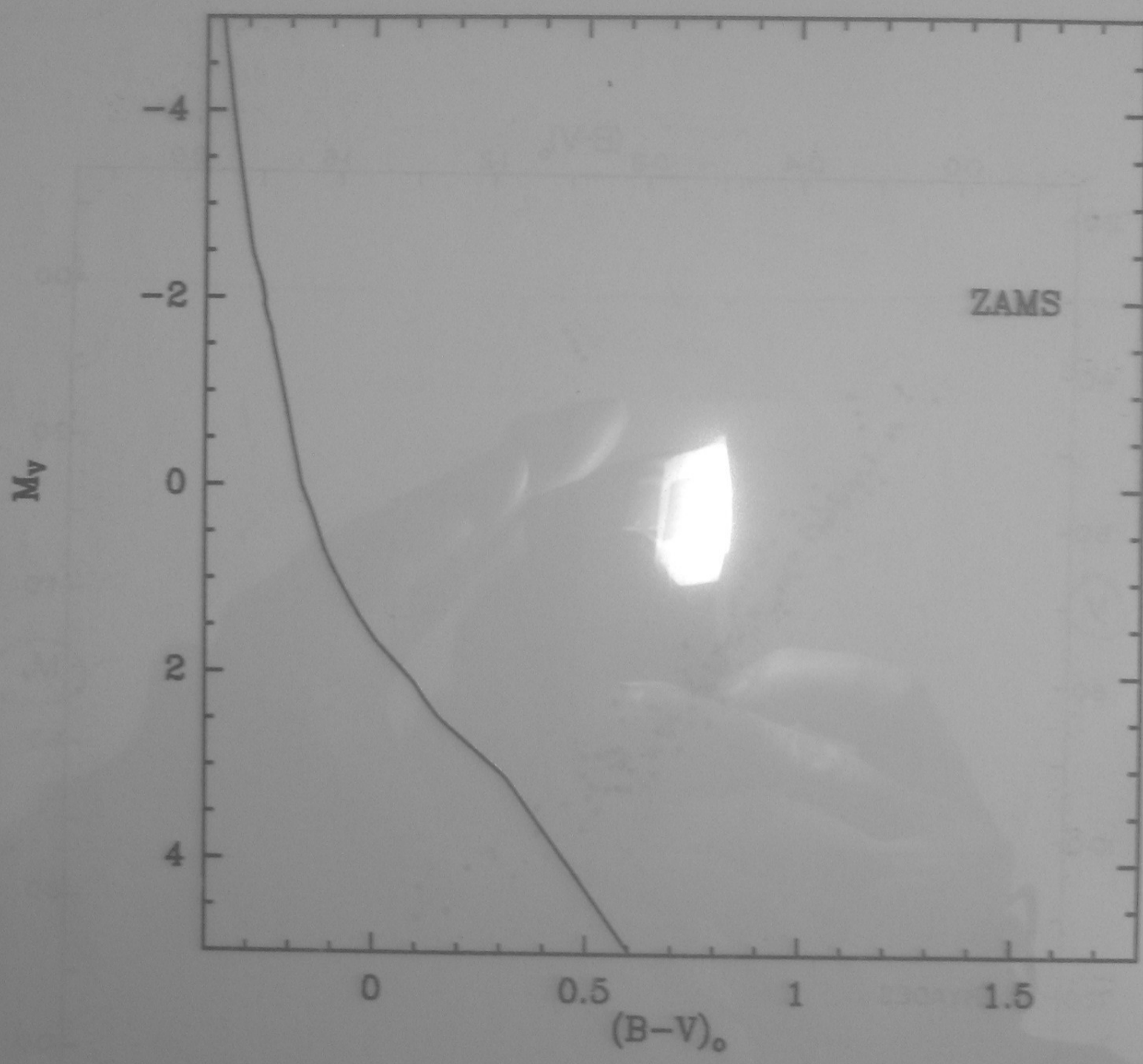


TA XII



TA XIV

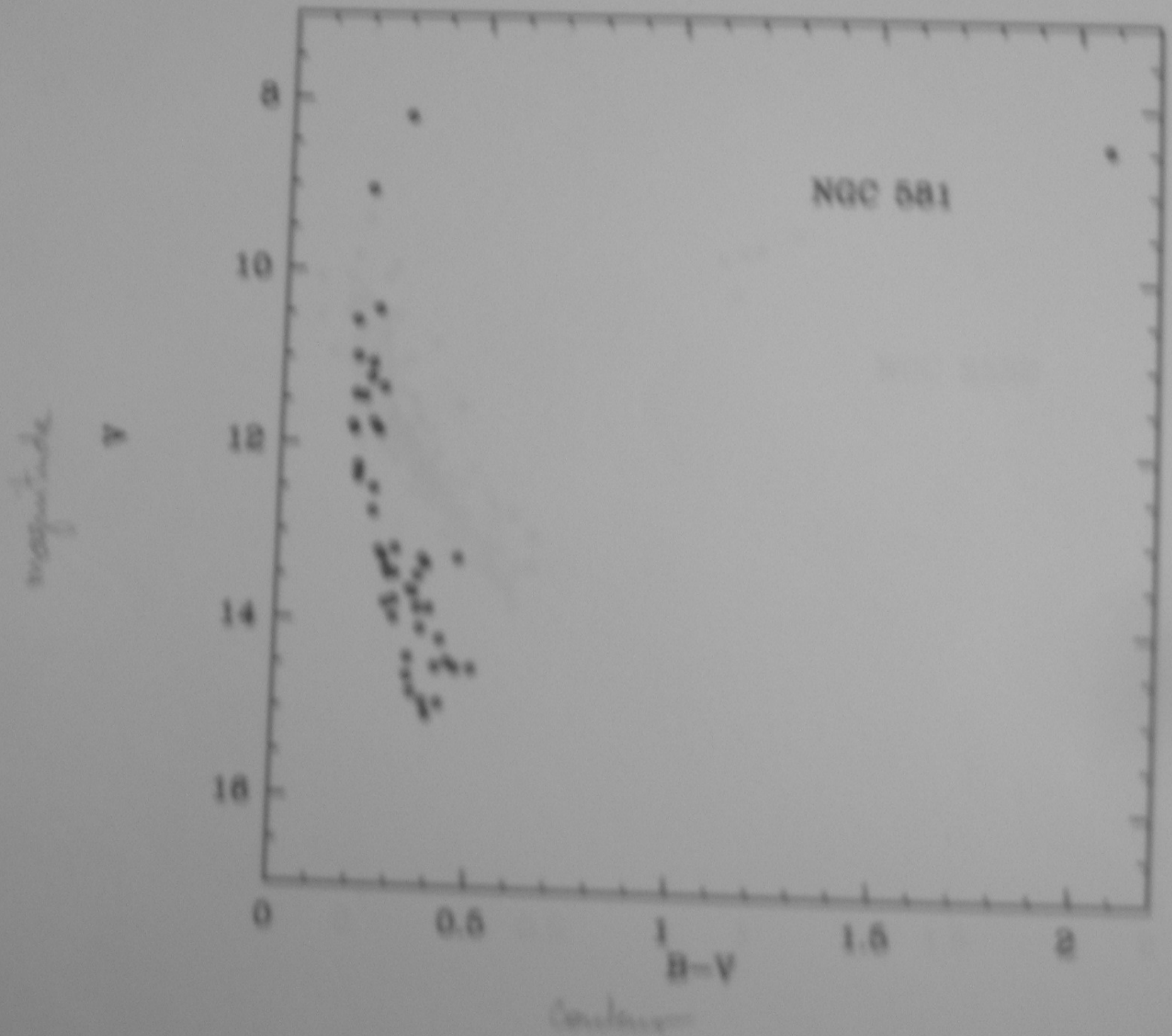
K 9807 TA 03



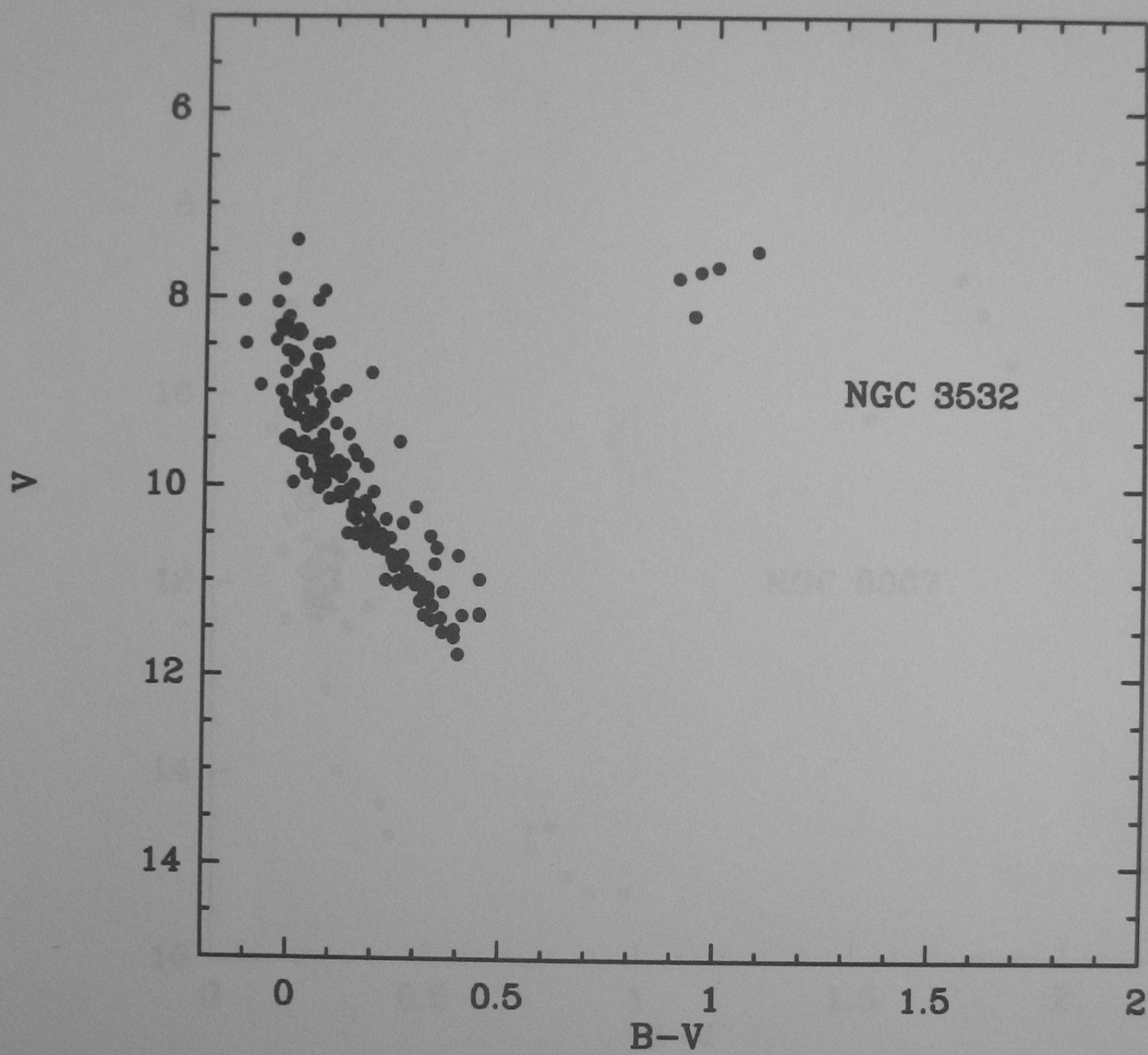
TA XIII

Seperti bintang-bintang di Aya Peru (E409) = A1.  
 dan ada perbedaan magnitude & warna  
 pada da abundansi di populasi I  
 $Y = 0.30, Z = 0.02$

Amas NGC 581

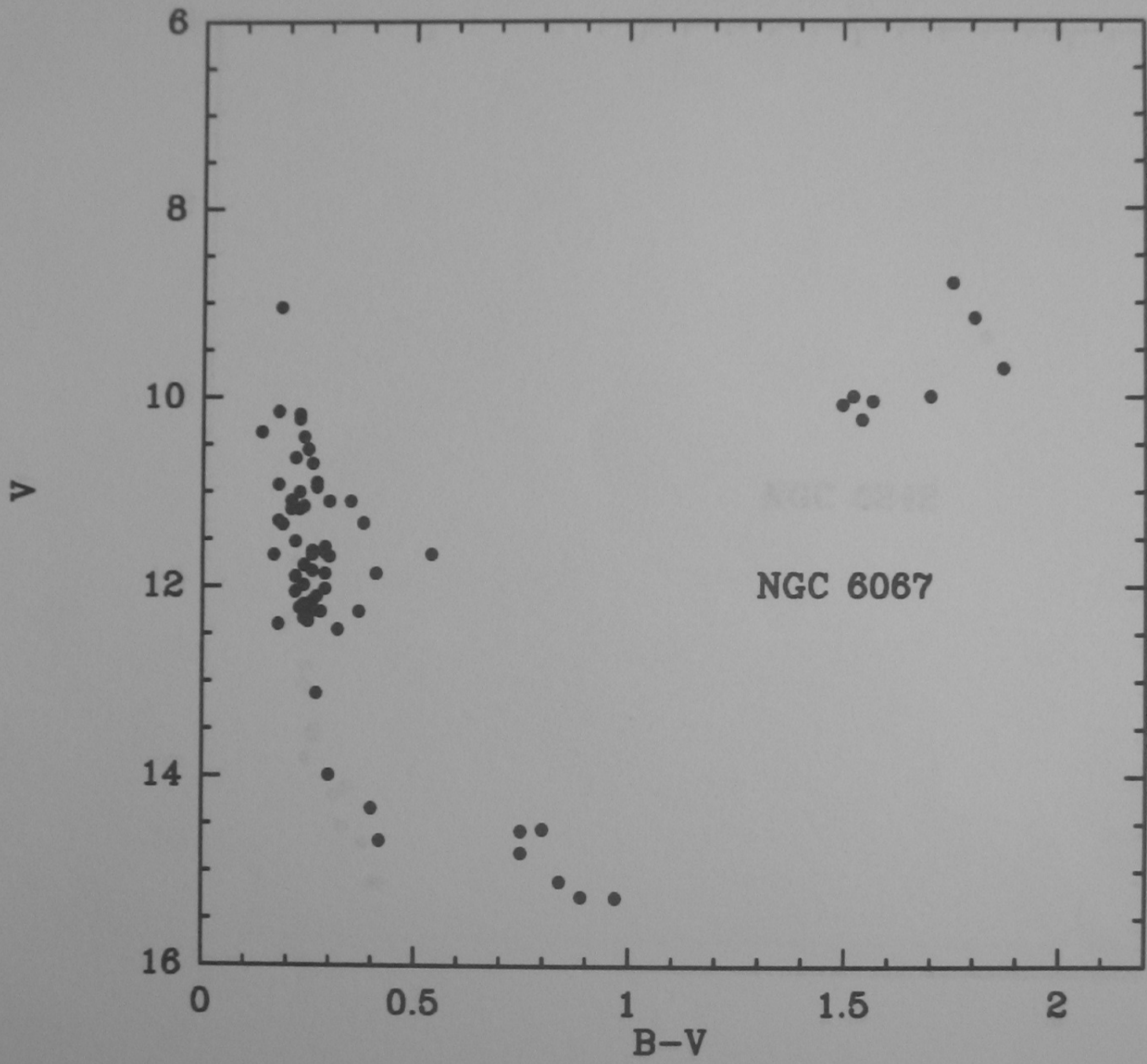


TA XV



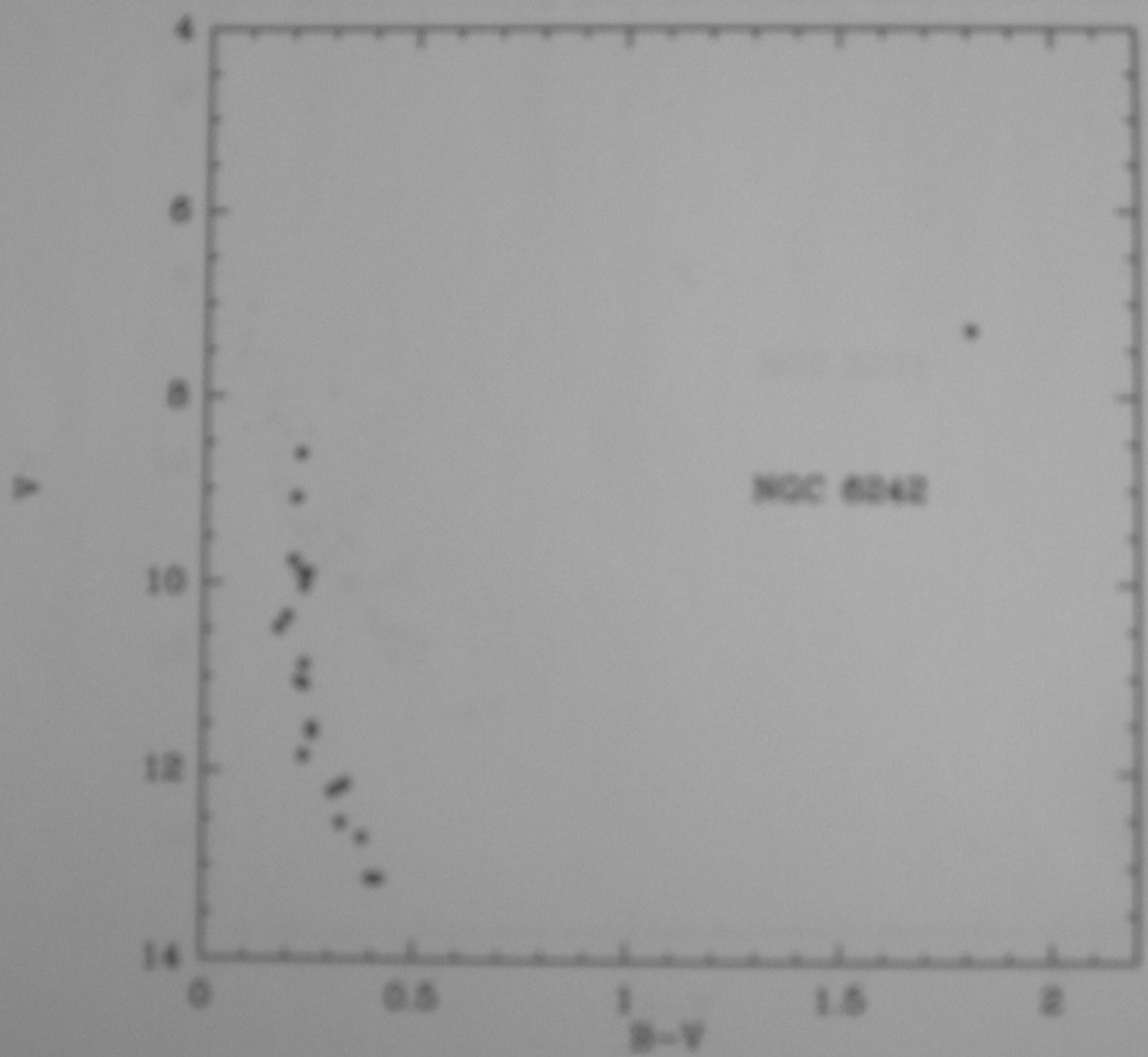
TA XVI

K 9807 TA 03

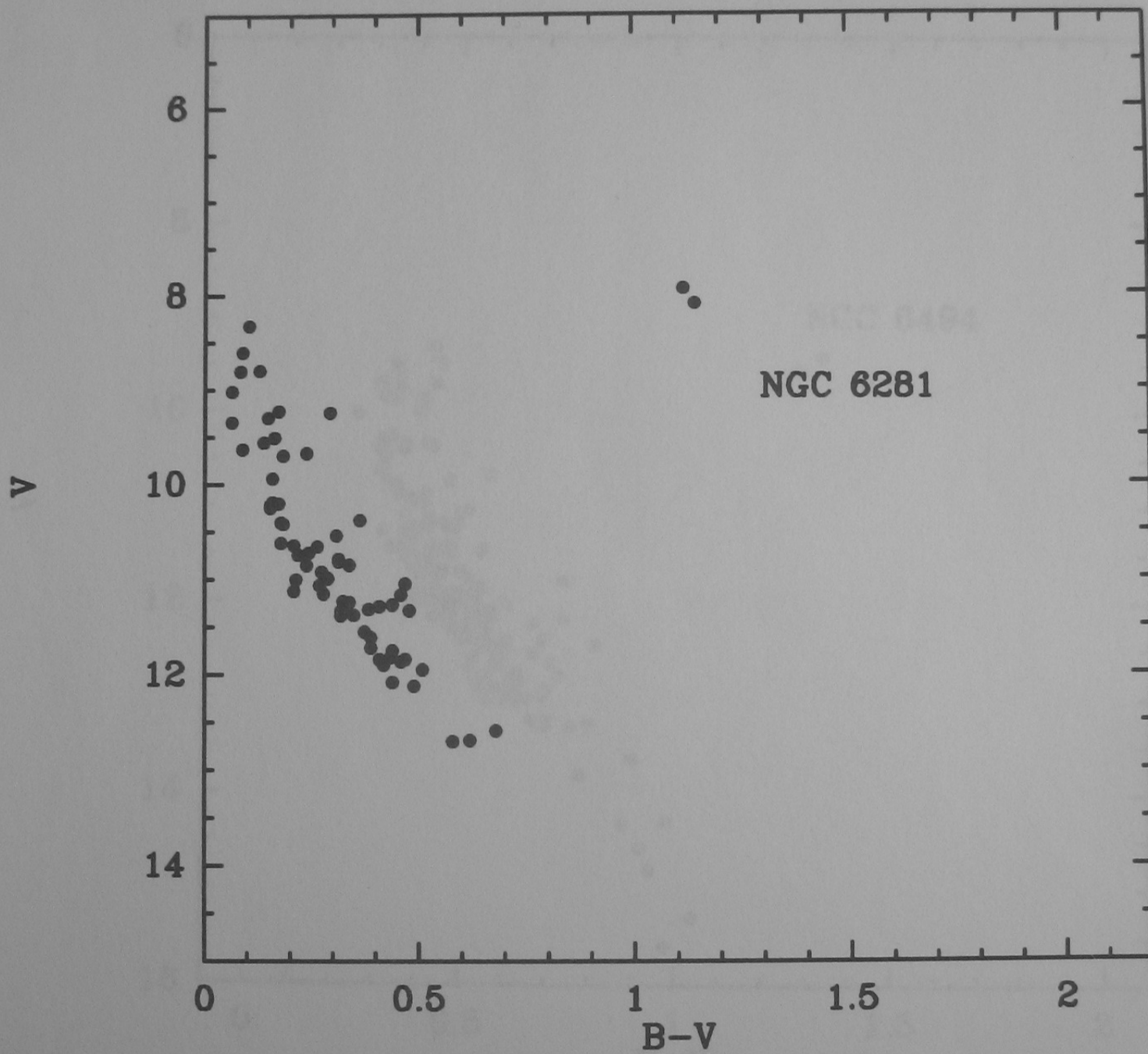


TA XVII

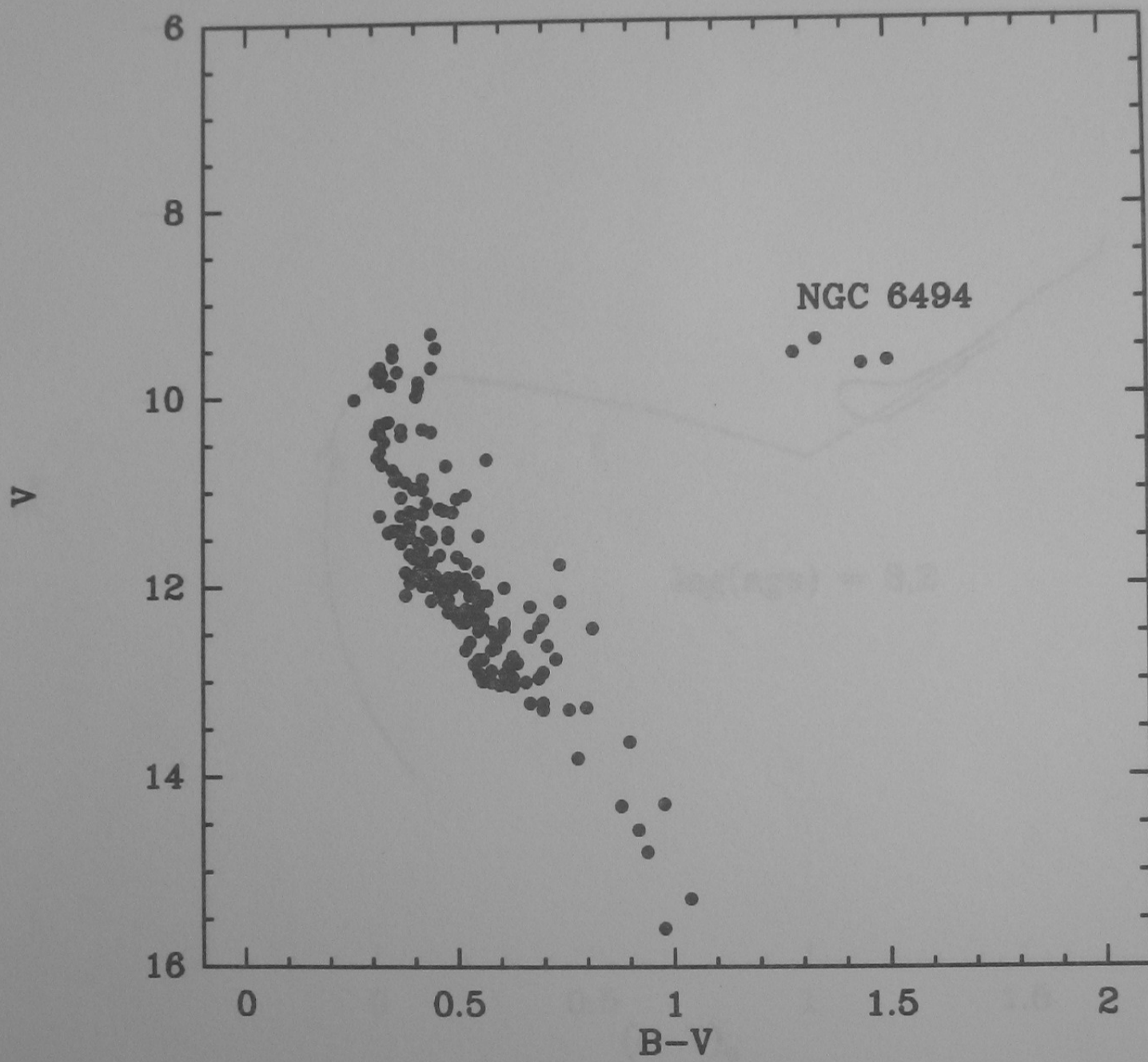
K 9807 TA 03



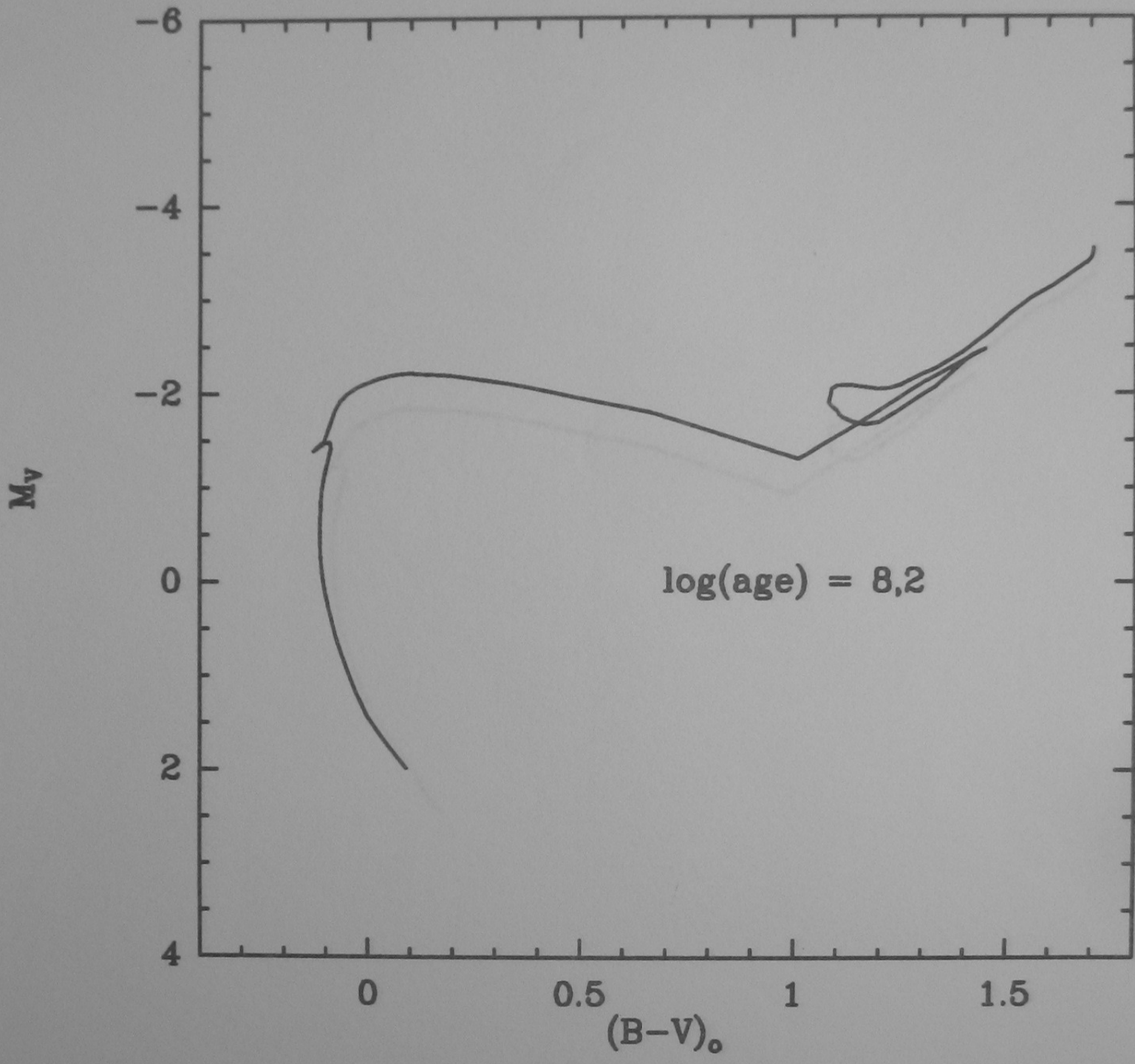
TA XVIII



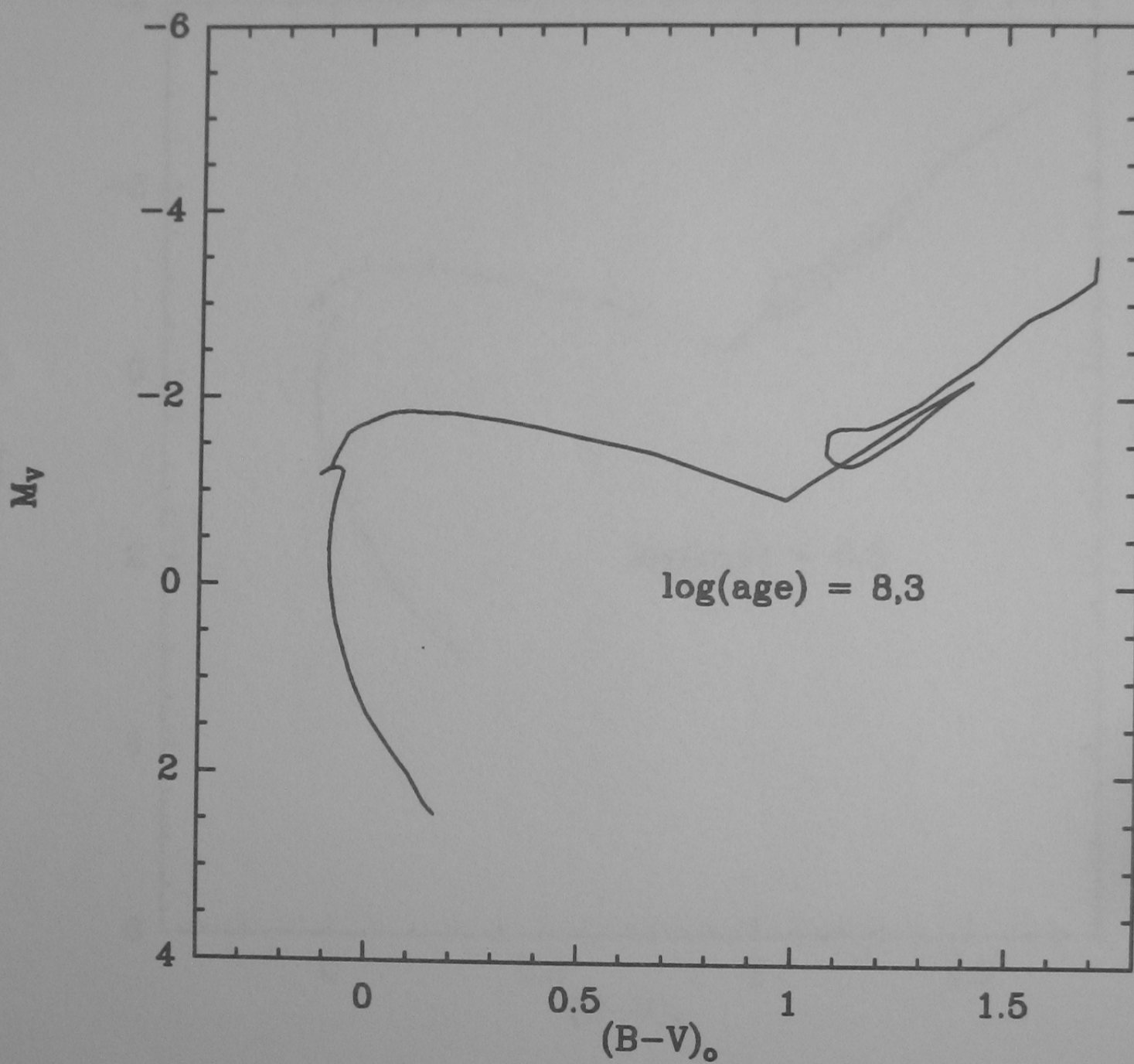
TA XIX



TA XX

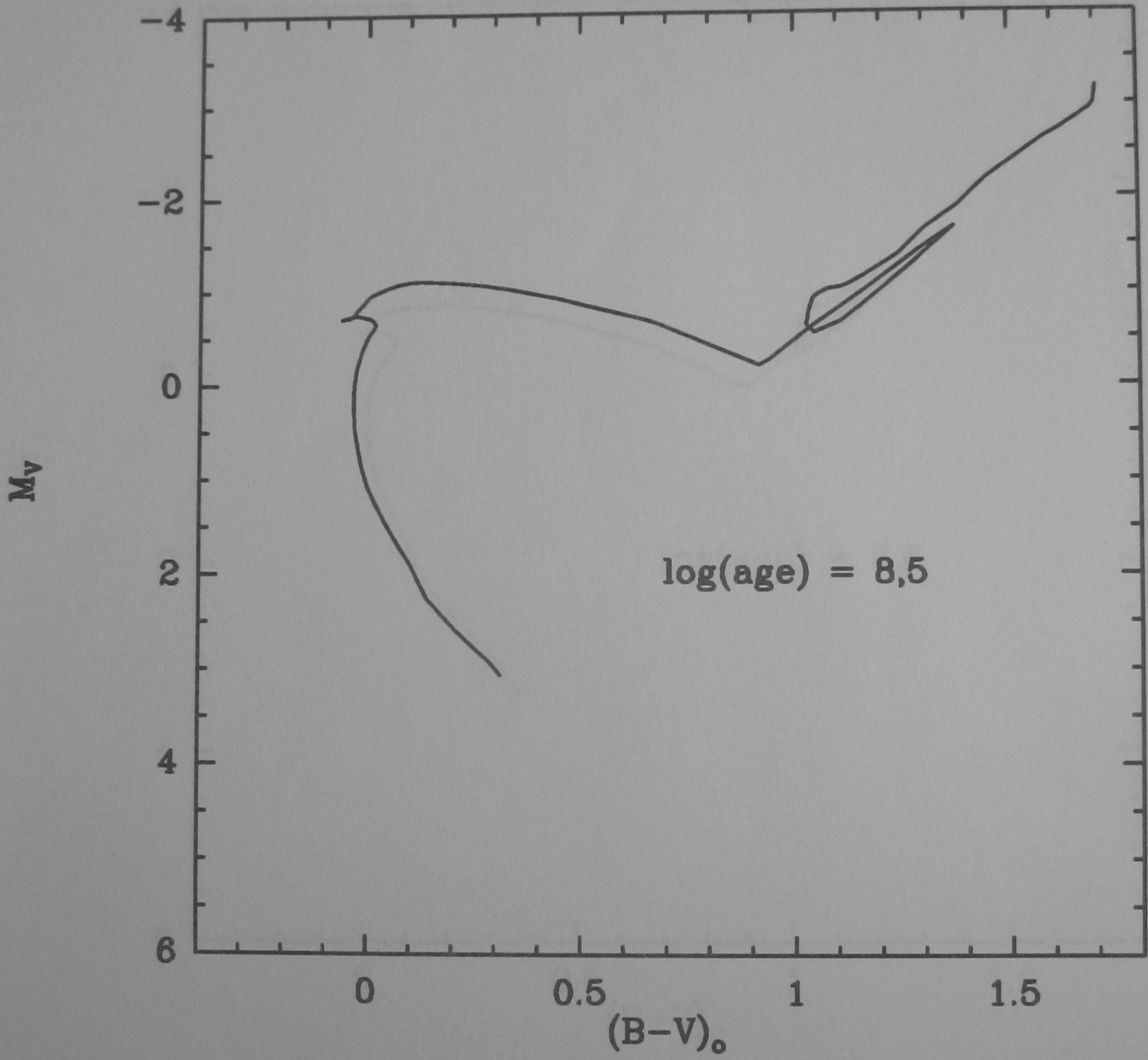


TA XXI



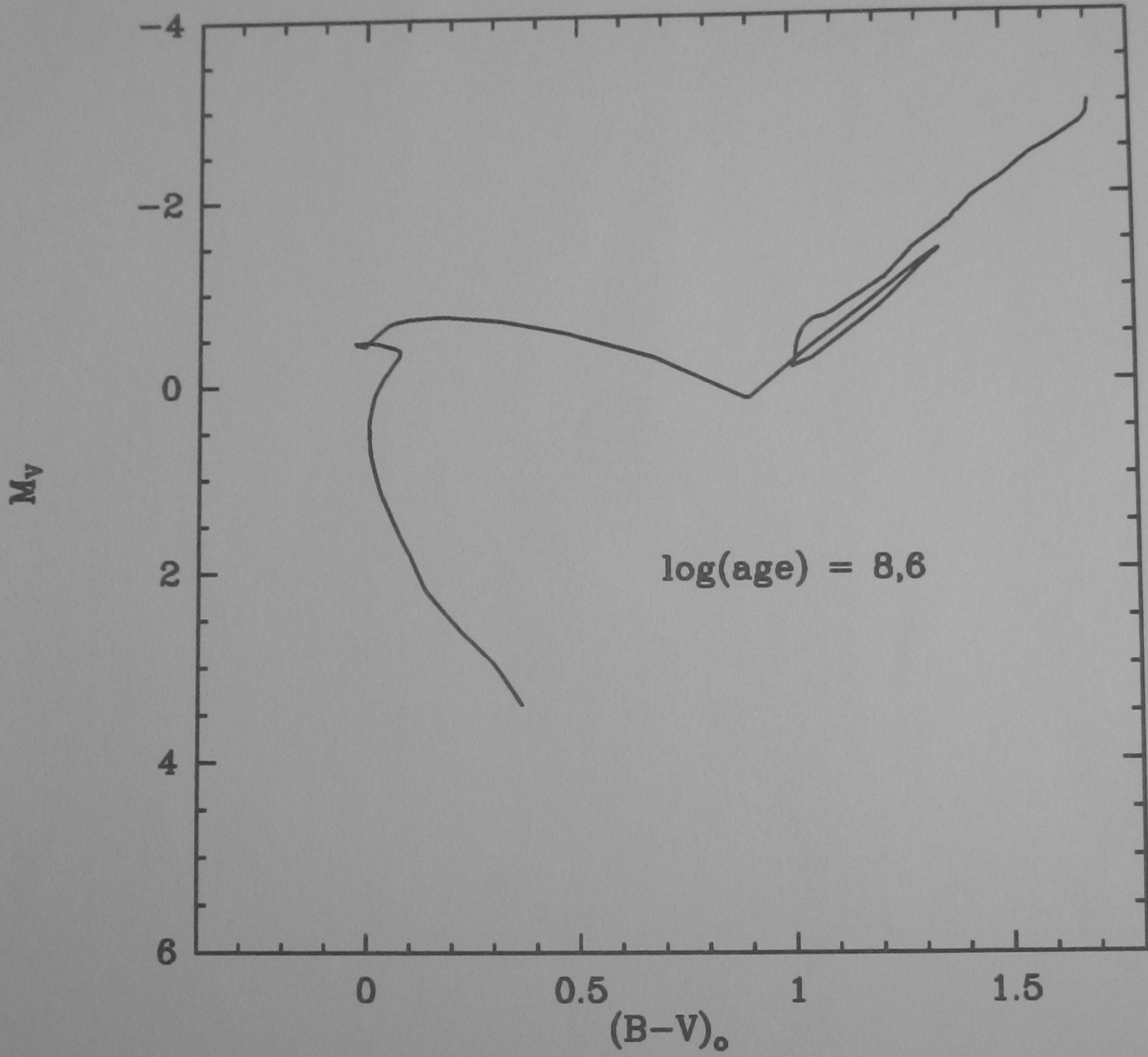
TA XXII

K 9807 TA 03



TA XXIII

K 9807 TA 03



TA XXIV

K 9807 TA 03