

VARIABLE STAR BULLETIN

No. 12

July 1990

LATE PROF. M. HURUHATA'S PHOTOGRAPHIC OBSERVATION OF VARIABLE STARS.

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Prof. Masaaki Huruata (1912-1988), former editorial adviser of our Bulletin, past director of Tokyo Astronomical Observatory, continued observation of variable stars as an "amateur" astronomer after his retirement. The outline of his observation is described here.

His photographic observation has been carried out between 1974 and 1988 using various focal length cameras with mainly Tri-X 35 mm roll film and yellow-green filter in order to get visual magnitude.

Table 1 shows number of the day observed month by month. It is worthy of special mention that more than half observations were carried out in the morning.

Table 2 shows type of camera, type of film and number of film roll.

The outline of observation is given in Table 3, showing center of field, focal length of camera and number of shot. Table 3 shows the selected 4 cases of Table 2, i. e. No. 2, 4, 9 and 11 as the most important and typical one.

The time of each focal of exposure is usually 3 minutes (with many exceptions). The longer side of frame corresponds to the east-west direction (with a few exception). The data of each focal length are shown as follows:

F. L.	LIMIT MAG.	FIELD	
		EAST-WEST	NORTH-SOUTH
300mm	14 m	6° 50'	4° 30'
500	14.5	4° 10'	2° 50'
850	15	2° 20'	1° 35'
1200	16	1° 40'	1° 5'

He has been found many suspected variable stars on his film and gave H numbers. Some of H number stars were registered and named as follows:

H1:BP CMi, H2:DK Cnc, H4:DV Cnc, H6:NY Gem, H7:QT Vul, H8:QW Aur,
H9:V1766 Cyg, H11:EG Cnc, H12:V1767 Cyg, H14:DL Leo.

The magnitudes of variable stars which were estimated and inspected by Prof. Huruata and by members of VSOLJ will be input to the computer readable archive.

Reference: 1989. Variable Star Bull., Japan, No. 9.

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1976	13	9	9	7	8	0	4	0	4	10	17	17	98
77	15	11	8	10	10	1	4	1	5	9	13	18	105
78	17	14	11	7	6	3	5	10	12	14	17	20	136
79	20	10	11	10	9	4	1	0	2	11	19	19	111
1980	18	13	14	11	12	6	3	4	8	15	20	29	154
81	21	17	13	15	11	2	2	8	7	18	13	27	154
82	19	16	15	13	7	5	5	6	6	13	8	17	140
83	19	13	13	6	8	6	1	2	5	6	18	23	120
84	18	12	16	4	2	1	2	8	6	9	15	17	110
85	16	17	3	13	6	6	6	12	4	13	18	15	129
86	15	11	13	8	4	7	4	14	4	7	7	4	98
87	8	14	6	8	5	6	3	0	2	3	3	6	64
1988	6	3											9

TABLE 1 Number of Observed Day

No.	Film	Focal Length of Camera, mm	No. of Film Roll	Obs. Period
1	Tri X etc	200	69	1974. 2. 22 - 1981. 6. 6
2	Tri X	300	170	1976. 2. 11 - 1988. 2. 22
3	Various Type	135	15	1977. 9. 16 - 1980. 3. 8
4	Tri X	500	198	1977. 10. 13 - 1987. 4. 16
5	Tri X	1000, 1280	35	1978. 2. 13 - 1980. 12. 15
6	103a-D	135	40	1978. 10. 23 - 1987. 12. 16
7	Color	135-850	15	1979. 1. 27 - 1986. 7. 31
8	103a-E	135	9	1979. 2. 28 - 1986. 1. 8
9	Tri X	850	177	1981. 12. 24 - 1988. 2. 22
10	Kodak IR	850	3	1982. 1. 25 - 1986. 8. 9
11	Tri X	1200	64	1984. 6. 2 - 1988. 2. 19
			Total	805

TABLE 2 Type of Film and Camera

TABLE 3-(1)

CENTER OF FIELD	APPROX. α δ	300 m/m	500 m/m	850 m/m	1200 m/m
R AND	0018+38			1	
V	0133+38	1			
Z	2328+48	5		2	
RX	0058+40			31	8
AR	0138+37				2
8	2313+48	412	2		
39	0057+40		3		
NOVA 1986	2307+46	1	3	3	
S ANT	0827-28		1		
U AQR	2157-17	3	7	2	1
VY	2106-09			50	
VZ	2125-03			1	1
AE	2034-01		1	4	
CV	2116-14			1	
W AQL	1910-07			1	
RS	1953-08				1
UU	1951-08		3	2	3
WZ	2009+04			1	
DH	1920-10				1
FO	1911-00				2
KY	1929+11	1	86	88	6
V794	2012-03		2		
T ARI	0242+17	6			
TT	0201+14				2
α, β	0155+21	4			
π	0243+17	189	2		
RR AUR	0604+43		1		
RV	0501+30		1		
SV	0558+46				3
AE	0509+34	2			
KR	0811+28	2	80	210	15
α	0509+45		1	1	
β	0552+42		2		
ϵ	0454+43	73	2		
ζ	0450+31	1	48		
η	0450+35		1		
κ	0609+17	1	1		
49	0628+28	10		230	1
63	0704+39			1	
TT B00	1454+41			1	3
UZ	1439+22				3
α	1411+19	20	2		
τ	1428+38	1			
Z CAM	0814+73	3			
XX	0400+53	7		1	
AF	0324+58				2

TABLE 3-(2)

CENTER OF FIELD	APPROX. α δ	300 m/m	500 m/m	850 m/m	1200 m/m
RS CNC	0904+31	3			
SY	0855+18	5	3	187	1
YZ	0804+28			20	3
AA	0831+26	3	4	105	5
AK	0849+11			1	4
AT	0822+25		5	118	155
CC	0830+21	1		71	41
α	0853+12	3		70	
ζ	0840+29		281		
ζ E	0845+29		1	31	
ζ NE	0845+33		1		
ζ NW	0835+33		1		
ζ SW	0835+26	2	50	182	6
κ S	0902+08	303	2	1	
Praesepe	0850+20	30	172		
Praesepe N	0850+23	31	38	15	
TX CVN	1239+53	38		1	
β W	1220+41		1		
6	1220+39		8		
EH CMA	0613-30	14		1	
GP	0650-12	2	30	1	
ν W	0628-18			12	
SV CMI	0725+06			2	4
α CMI	0734+05	23		3	1
α E	0738+05	25	23		
α W	0722+05	143	37		
α S	0738+03	15			
RU CAS	0105+64	1	1		
VX	0025+61		1	87	3
AM	0217+70				1
HT	0103+59	5		46	9
KU	0124+57				2
V382 CEP		1		10	9
WU CET	0006-12			9	6
WX	0111-18			1	3
ζ N	0146-07	51	1	4	
ϕ	0214-03				1
R CRB	1544+28	39	3	3	8
T	1555+32	270			
U, V CYG	2022+47	102		1	1
BF	1919+29				2
CH	1921+50	475	4		
CI	1946+35	3	268	300	20
CZ	2108+28			1	
EH	1934+30	1		5	9

TABLE 3-(3)

CENTER OF FIELD	APPROX. α δ	300 m/m	500 m/m	850 m/m	1200 m/m
V1016 CYG	1953+39		1	28	12
V1051	2028+56	1			2
V1057	2055+43	4			
V1329	2047+35		1	25	12
V1331	2057+49		58	60	3
V1426	2130+38		1	24	5
V1515	2020+41		148	89	4
V1554					1
V1760					1
V1807				3	
V1825	2011+49	2		31	1
α	2038+44			10	
β	1926+27	5	4		
β S	1926+22	106		7	
γ	2018+39	2	2	7	
δ	1941+44	5	388	299	1
δ SE	1949+42		55	18	
η V	1952+34		46	1	
π^1	2138+50	117	43		1
NOVA 1986	1950+35			2	3
X-3	2030+40				2
Z DEL	2028+17			1	
RY DRA	1252+66	2	1		
VY	1538+64			1	
WZ	1857+52	4		6	2
VY	1137+72			67	18
AG	1601+87	105		1	
DR				1	
AH ERI	0418-13	1	1		3
AQ	0501-04			1	4
BV	0347-10	3		1	4
R GEM	0701+22		1		
U	0749+22		1		3
AW	0716+28				1
BP	0753+20			2	
GH	0658+12	2		4	1
IR	0641+28			1	4
α	0728+32			1	7
β	0739+28			1	
γ	0831+16		2	64	129
ϵ S	0837+22	381	4		
ϵ W	0630+25	55	10		
ϵ SW	0630+22			1	
ζ S	0658+17	1			
η	0608+22		4		
θ	0646+34		240		
θ S	0646+31	5			
θ SW	0644+33			30	
ι GEM	0719+27	1	78	158	
μ	0616+22		49	59	
ξ	0830+55		62	127	
ξ	0721+21		2		
VY HER	1702+17				2
VY	1810+20			3	2
AH	1640+25			2	6
AM	1813+49		117	100	7
CH	1830+24			1	3
HZ	1654+35			1	5
V433	1736+25			3	2
NOVA 1987	1839+15	10	2	8	2
δ	1710+24	1			
U,FF NYA	1032-12	14			
AG	0945-23				2
AK	0835-16	8			
BL LAC	2158+41		9	17	18
T LEO	1133+03	1	1	26	18
T S	1133+01			2	
X	0945+12				7
RZ	1132+02				13
TU	0924+21			2	3
β S	1143+15	87	113		
β E	1151+15	87	22		1
ϵ	0940+24	2	51		
ϵ S	0940+21	3	270	20	
ι	1118+11		1		1

TABLE 3-(4)

CENTER OF FIELD	APPROX. α δ	300 m/m	500 m/m	850 m/m	1200 m/m
λ LEO S	0926+20		1		
ρ	0935+10		230	145	
ϵ LEP	0501-22		38		
AY LYR	1841+37				35
CY	1848+26			1	4
DM	1854+30				4
LL	1831+38			19	40
MV	1904+43			20	29
V344	1841+43			3	1
α	1833+38			5	
R MON	0633+08	1	5	41	
CW	0631+00				2
EQ	0652-09			1	2
RS OPH	1744-06	5	1		1
V699	1819-04			5	
V841	1853-12				2
V1121	1843-14		2	2	
V2051	1702-25				2
ν SI	1753-12	3		8	
T ORI	0530-05	1			
U	0549+20	24		1	
V	0500+03		3		
AF	0530-05	2			
BI	0518+00			1	5
CN	0547-05			7	3
CT	0604+09	1		1	
CZ	0610+15			1	1
FU	0539+09	116	70	2	
HN	0525-05		18	20	44
V380	0531-06		21	1	
V528	0554+20	2	40	101	4
V534	0515-05		18	4	
α	0549+07	19			
α^1	0548+20	2		1	
NEBULA	0533-05	37	36	42	114
NEBULA S	0533-07	4	40	105	59
NEBULA N	0533-03		40	118	63
NEBULA V	0528-05	2			
NEBULA NE	0536-03				18
NEBULA NW	0530-03				1
RU PEG	2209+12			1	
AG	2146+12	35		2	
ϵ	2139+09	5			
ζ SW	2200+22	3			
TZ PER	0206+57	1		38	2
UV,UW	0204+56				3
AX	0129+53	1			2
FO	0401+50			1	2
KT	0130+50			2	2
MR	0343+47				7
V466	0335+51	241	3		
α	0317+49	1			
α V	0330+31	2			
X,h	0217+56	298	3		
RZ PSC	0104+27			21	1
TY	0120+31				4
XV					2
UY PUP	0741-12			1	1
BV	0744-23				2
BX	0750-24				2
T PYX	0900-31				1
UU SGE	1937+16			8	9
WZ	2003+17		1	7	6
FG	2007+20	1		10	8
9	1947+18		1		
RR SGR	1949-29				3
V1017	1825-29				2
LW SER	1746-14			1	
NOVA 1983	1750-14		1	14	
RR TAU	0533+26		5		1
RY	0415+26	4	4	2	
SU	0543+19	1		7	4
UV	0350+27			1	
UZ	0426+25			58	3
VY	0433+22	2	10	63	18

TABLE 3-(5)

CENTER OF FIELD	APPROX. α δ	300 m/m	500 m/m	850 m/m	1200 m/m
XY TAU	0421+06				1
BW	0427+05	3	1	14	57
C1	0427+22			1	
DG	0420+25		14	2	
DL	0427+25			1	
DH	0428+17	15	22	68	183
DQ, DR	0441+16		52	80	206
DT	0522+16		25		1
HW	0457+26		13		3
IQ	0423+25		14		
IR	0425+20		1		
OV	0340+29			1	4
β	0519+28		3		
ϵ	0422+18			1	
ζ	0531+21	4	241		
ζ	0531+20			25	
ζ	0527+21			20	
62	0417+24		3		
PLEIADES	0344+23	26	31	26	22
RW TRI	0219+27			1	2
SU UMA	0803+62			7	3
SW	0829+53			8	8
UX	1332+52			2	1
AN	1043+47		1		
BC	1147+49			15	8
BZ	0846+58			3	3
CH	0859+68				
CW			2		
DI	0905+51			8	6
E	1249+56		1		
SS UMI	1550+71			4	5
RV VIR	1302-12		1	1	
TW	1140-03			1	2
α	1319-10		1		
7	1158+06		1		
54	1308-18		65	58	6
PU YUL	2018+21				1
NOVA 1984#2	2022+27	92			
31	2047+26	231			
31	2047+22	75	6		
31	2052+26	1			
31	2042+26	31			
STPN 10 CAS	0043+63	123	83	31	1
123 AUR	0556+35		121	66	
135 AUR			1	5	
137 CAS			1		
223 MON	0718-07	1			
519 OPH		1	18	8	26
687 CEP	2129+61	2	144	121	1
727 LAC	2313+50	1	23		
BD 31* 597		3			
BD 37* 443		82	2		
NTKV80=64CNC	0852+33	36			

TABLE 3-(6)

CENTER OF FIELD	APPROX. α δ	300 m/m	500 m/m	850 m/m	1200 m/m
Obj HONDA '84				2	
Obj KUWANO				12	3
Obj Hd. Kw '78		18			
Obj MORITA					4
Obj KENDERAT					1
Obj 287 CNC	0849+20		1		
Obj CYG NO.1	1953+28		37		
NO.2,3	1935+37		36		
NO.4	2008+36		32		
NO.5	2007+51		85		
NO.6	2034+52		113		
NO.7	1939+31		36		
WAKUDA V82	0842+11		18		
V83	0635+25		9	1	
V84	0723-03		3	6	
V85	0647+29		10	9	1
V86	1921+24		3	65	46
V87					3
V813					9
V815					3
NSV 2910	0612-01		4	1	2
12873	2010+16			1	
NGC 246				1	1
1275			61	103	
1514		3			2
2264			4		
2335				1	1
2337				9	
2346			4	127	170
3067			7	75	
4151		1	95	147	
5548			1	43	
7293				2	
7469			43		
M 37			1		
51			2		
53			1		
Mark 509	2039-10		14	27	1
3C273	1224+02	1	115	24	2
SS433			3		7
GD552 CEP	2246+63			5	5
G141-29 HER			1		
AFGL 2881	2214+43			2	7
HSR B3			1		
B6		2			
C7		2			
C10		1			
D5		1			
TOTAL		4902	5237	5434	1864
GR.TOTAL			17437		

STPN: Bruce Stephenson, General Catalogues of S Stars.
 NTKV: Nippon Tenmon Kenkyukai Suspected Variables.

VARIABLE STAR OBSERVERS LEAGUE
 IN JAPAN

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