

Neglected Double Observations for 2006, No. 2

E. O. Wiley

Remote Astronomical Society Observatory

Mayhill, New Mexico (MPC H06)

Mailing Address: 2503 Atchison Ave., Lawrence, KS 66047

E-mail: edwiley@sunflower.com

Abstract: I report the observational results for 64 “neglected doubles” and 19 additional doubles found between 10.0hr and 16.59 hr RA and $+0^\circ$ and $+40^\circ$ DEC made with the AREO2 robotic telescope located at the RAS Observatory, Mayhill, NM, USA (<http://www.remote-astronomical-society.org/>). In addition to theta and rho values (and standard deviations), I report the UCAC2.0, Tycho 2, 2MASS, or GSC 2.2 catalog numbers of pairs, some of which lack precise positional information.

Introduction

In this paper, I report a total of 83 mean and standard deviations of theta and rho-values of double stars imaged with a Takahashi Mewlon 300 Dall-Kirkham cassegrainian reflector located at the GRAS Observatory in Mayhill, New Mexico. The instrument, with a focal reducer, works at F9.1, with an approximate focal length of 2730mm. It is equipped with a non-antiblooming ST8E CCD camera (9 micron pixels) and the combination has an approximate resolution of 0.6 arcseconds/pixel with a field of view of 11.5×17.3 arcminutes. The OTA is mounted on a Bisque Paramount 1100 GEM.

Methods

Methods largely follow Wiley (2006). Observing lists were requested from the USNO (Mason, 2006). Queries were conducted via VizieR Catalogue Service (Ochsenbein et al., 2000) at the CDS, Strasbourg, and the region visualized using Aladin, based on positional information in the Washington Double Star Catalog (Mason *et al.*, 2001, *et seq.*). A search of the DSS plate was made for the pair by comparing data in the WDS catalog with the plate image. UCAC2.0 catalog numbers were harvested if associated with the pair in question and a hard copy of the region was printed to use as a finding aid. Pairs or components that lacked UCAC2.0 catalog information were then queried in Guide8 (Project Pluto, 2006) and matched with one or

more additional catalogs: Tycho-2 (Schwekendiek and Wicenec, 2000), GSC 2.2 (STScI, 2001), or 2MASS (Skrutskie et al., 2006) via VizieR. Catalog numbers were harvested.

Exposures were carried out with a clear filter and the initial image was checked by downloading a JPEG of the FITS image to insure that the correct field was imaged. Exposures ranged from 12-30 seconds. If the exposure looked acceptable, then a minimum of three additional images were made. If not, then exposure times were adjusted and rechecked. MPO Canopus was used to reduce the images (Warner, 2006). It produces an astrometric solution to the image based on the UCAC 2.0 catalogue (Zacharias et al., 2004). The pair was measured using a convenient double star harvesting subroutine built into MPO Canopus. Figure 1 shows a Sloan Digital Sky Survey image of HJ 489, which is interesting because of its proximity to the spiral galaxy NGC 3344.

Results

Table 1 presents results for 64 neglected doubles not measured in the past 50+ years bounded by 10.0 hr to 16.59 hr RA and $+0^\circ$ to $+40^\circ$ DEC. In addition, Table 1 also contains measures of 19 doubles thought to be neglected, but which have appeared in the WDS Catalog after the observing request was made. Catalog numbers are UCAC2.0 (no prefix), GSC2.2 (N prefix), Tycho-2 (T prefix) and 2MASS unique identifier

(Continued on page 66)

Neglected Double Observations for 2006 No. 2

WDS Cat.	Desc.	Catalogue/p	Catalogue/s	Magnitudes	PA	PASd	SEP	SEPSd	Epoch	No Obs	Notes
10002+2058	CHE 146	39146321	39146322	12.08, 13.54	35.6	0.14	29.51	0.069	2006.217	4	1, 2
10026+2420	POU3070	N23110045	40351827	13.66, 14.92	264.9	NA	9.59	NA	2006.23	1	1
10064+0359	HJ 1175	33043755	33043757	11.79, 13.19	97.3	0.11	19.54	0.047	2006.315	5	1
10077+2255	POU3073	39849067	39849066	12.89, 14.55	347.6	0.78	10.90	0.082	2006.23	4	1
10125+0245	BAL2370	32703057	32703056	11.68, 12.61	352.2	0.14	19.79	0.043	2006.315	4	1
10129+0158	BAL1869	32369081	32369080	9.63, 13.13	256.4	1.93	8.63	0.182	2006.315	4	1, 3
10141+0145	BAL1871	T 245-00683-1	32369118	11.34, 12.48	168.3	0.17	14.50	0.053	2006.315	4	1
10157+1424	HJ 155	36824555	36824558	12.18, 12.52	147.3	0.06	14.30	0.039	2006.315	4	1
10202+2806	HJ 479	41713772	41713771	12.17, 12.96	200.4	0.03	32.62	0.058	2006.217	4	1, 4
10226+2238	POU3079	N203003156	N203003155	12.79, 13.59	29.7	0.4	9.65	0.07	2006.217	4	1
10250+3117	HJ 480	42755610	42755611	12.78, 13.11	71.8	0.35	14.63	0.039	2006.23	4	1
10302+3050	SEI 520	42582878	42582879	11.59, 11.82	2.3	0.33	7.76	0.081	2006.225	5	1
10385+2725	HJ 5481	41370088	N2011311207	10.03, 12.54	113	0.17	15.16	0.056	2006.217	4	1
10436+2455	HJ 489	40518599	40518597	10.0, 11.48	289.4	0.04	43.45	0.011	2006.211	4	1
10509+3143	MLB 846	N20112324069	N20112324070	13.29, 13.85	255.3	0.33	8.31	0.208	2006.291	4	1
11034+2145	ELS 1	39490758	39490757	12.85, 13.64	358.5	0.28	12.65	0.099	2006.225	5	1
11072+3204	SEI 523?	43102166	43102167	12.09, 12.55	77.9	0.06	23.29	0.029	2006.225	4	1, 5
11088+4815	ES 922 AC	T 3447-119-2	47825756	9.46, 12.30	169.1	0.05	45.97	0.08	2006.225	4	1
11390+1001	HJ 184	35399932	35399934	11.78, 12.25	156.7	0.07	21.9	0.069	2006.315	4	1
11412+0950	HJ 187	35216585	35216586	10.60, 11.74	11.4	0.13	9.35	0.061	2006.315	4	1
11448+1230	HJ 1195	N2001223130	N2001223129	11.86, 12.46	328.2	0.39	10.62	0.033	2006.315	5	1
11449+2346	POU3112?	40189882	N201202179	11.40, 13.26	317.7	0.3	22.12	0.072	2006.291	4	1
11485+0046	HJ 1199	32039235	32039237	10.93, 11.67	46.2	0.07	27.76	0.06	2006.315	4	1
11511+0407	HJ 1202	33226055	N2000322100	11.44, 13.18	260.9	0.15	17.02	0.061	2006.315	4	1
11582+0335	HJ 1204	33047912	33047913	11.40, 11.84	59.4	0.49	8.32	0.031	2006.315	5	1
12156+1454	HJ 3337	37006990	N120233316	11.28, 12.83	170.0	0.08	38.68	0.126	2006.324	4	1
12199+1519	LDS 936	37186725	37186729	11.20, 12.49	129.3	0.42	43.15	0.371	2006.324	4	1
12297+2837	HJ 3339	41889462	41889463	11.00, 12.90	157.4	0.12	19.85	0.067	2006.291	4	1
12519+0940	HJ 849	35218657	35218656	11.27, 12.17	257.8	0.15	11.32	0.017	2006.324	4	1

continued on next page.

Neglected Double Observations for 2006 No. 2

WDS Cat.	Desc.	Catalogue/p	Catalogue/s	Magnitudes	PA	PASd	SEP	SEPSd	Epoch	No Obs	Notes
13032+2413	POU3132	40356567	40356565	13.32, 13.61	291.5	0.77	11.08	0.118	2006.291	4	1
13052+0912	GEL 1	Wolf 472	Wolf 473	13.18, 13.52	56.8	0.19	25.33	0.09	2006.324	5	1, 6
13202-0008	BAL1164	31691901	31691900	12.02, 12.38	248.4	0.16	19.41	0.022	2006.326	4	1
13232+4318	ES 1547 AB	46703551	46703550	11.56, 11.73	328.6	0.14	24.88	0.089	2006.291	4	1
13379+2421	POU3146	40357460	40357461	12.04, 12.87	54.7	0.47	12.04	0.054	2006.291	4	1
13422+2307	HJ 2672	40026241	40026240	11.48, 12.58	311.5	0.09	39.56	0.067	2006.291	5	1
13430+4710	HJ 2675	47642564	N130312020	12.13, 12.86*	294.4	0.32	14.24	0.026	2006.291	4	1
13460+1216	HJ 2678	36125543	36125545	11.31, 13.31	120.0	0.05	25.44	0.023	2006.326	4	1
13480-0047	BAL 878	31513824	31513825	11.47, 12.4	60.5	0.25	22.37	0.077	2006.326	4	1
13488+1244	LDS 949	36303769	B 0975- 07296823	11.33, 12.34	29.1	0.18	16.62	0.111	2006.326	4	1
13494+0524	HJ 1242	33580479	33580481	10.70, 11.9	118.5	0.04	10.56	0.043	2006.326	4	1
13497+2328	POU3152	40026421	40026422	12.05, 12.25	0.8	0.16	13.77	0.054	2006.291	4	1
13569+0158	BAL1892	32376973	N 12121223646	11.12, 11.89	26.0	0.10	13.32	0.038	2006.326	4	1
14031+1154	HJ 2699 AB	35943320	N121321073	8.50, 12.07	9.5	0.09	35.02	0.061	2006.326	4	1
14031+1154	HJ 2699 BC	N121321073	N121321071	12.07, 12.29	297.4	0.24	13.94	0.026	2006.326	4	1
14042+2046	J 1128 A-BC	39152673	39152672	9.79, 10.99	190.4	0.22	62.41	0.124	2006.291	5	1
14143+3411	HJ 543	43796090	43796089	12.6, 12.84	241.9	0.31	13.4	0.095	2006.384	4	1, 7
14159+0041	BAL1464	32044654	32044653	10.84, 12.93	229.7	0.38	5.31	0.261	2006.326	4	1
14172-0012	BAL1171	31694116	31694113	10.69, 11.68	217.7	0.06	21.24	0.035	2006.384	4	1
14235+2621	HJ 2715	41030478	N133232180	11.45, 11.98	327.7	0.09	14.02	0.017	2006.384	5	1
14331+2526	HJ 2730	40695708	40695707	11.44, 12.80	303.1	0.06	27.14	0.035	2006.384	4	1
14344+1414	HJ 239	36831721	36831722	11.87, 12.80	100.1	0.22	17.35	0.035	2006.384	4	1
14365+1104	LDS 964	N1310203261	N1310203259	12.48, 12.76	14.2	0.36	11	0.128	2006.384	4	1
14410+0332	HJ 1257	33053658	33053655	10.49, 11.26	242.3	0.06	35.46	0.039	2006.384	4	1
14434+2014	STF3088 AD?	38982375	38982372	10.01, 11.99	297.0	0.15	22.66	0.044	2006.384	4	1, 8
14490+0321	BAL2400	32879432	32879431	11.97, 12.70	302.5	0.53	9.91	0.069	2006.384	4	1
14551+2323	POU3177	N 131300163	N 131300164	12.52, 13.00	174.0	0.08	8.05	0.125	2006.384	4	1
15010+0619	HJ 1265	N 3130322297	N 3130322296	11.96, 13.38	271.5	0.14	9.45	0.127	2006.384	4	1
15031+0421	BAL2866	33233399	N1310033364	11.44, 11.69	127.4	0.34	10.84	0.113	2006.384	5	1

continued on next page.

Neglected Double Observations for 2006 No. 2

WDS Cat.	Desc.	Catalogue/p	Catalogue/s	Magnitudes	PA	PASd	SEP	SEPs	Epoch	No Obs	Notes
15049+1014	WFC 161	35406828	35406831	10.48, 11.78	83.7	0.10	33.61	0.05	2006.428	5	1, 2
15104+2410	POU3180	40360230	40360228	11.03, 12.43	304.0	0.13	18.51	0.086	2006.518	4	1
15127+0326	HJ 3344	32880643	32880644	13.31, 13.94	127.4	0.46	9.54	0.054	2006.428	4	1
15141+0143	HJ 1269	32380812	N102003360	9.11, 12.18	243.4	0.06	26.93	0.067	2006.428	4	1
15299+0552	GAU 14	33765885	33765884	11.66, 12.32	264.1	0.13	9.03	0.064	2006.428	4	1, 9
15413+0007	BAL1177	31878666	31878665	11.57, 12.15	268.3	0.06	22.52	0.069	2006.428	4	1, 10
15413+0007	WLY 7 BC	31878665	2M980061819	12.15, 12.09	33.2	0.57	5.4	0.076	2006.428	4	1, 10
15420+0156	BAL1906	32382668	32382666	11.68, 12.44	254.3	0.06	16.77	0.012	2006.428	4	1
15503+3114	HJ 2792	42764153	42764152	11.58, 13.29	351.4	0.14	26.85	0.014	2006.518	4	1
16045+3226	HJ 581	43110234	43110235	11.65, 11.85	55.9	0.15	21.07	0.08	2006.518	4	1, 11
16087+0210	BAL1913	32553429	32553428	11.09, 12.09	343.1	0.10	12.18	0.027	2006.428	4	1
16104+1720	JRN 3 AB	37908389	37908388	13.05, 12.37	347.7	0.11	13.03	0.055	2006.428	6	1, 12
16104+1720	JRN 3 AC	37908390	37908380	13.05, 10.74	329.0	0.06	148.84	0.235	2006.428	6	1, 12
16106+1722	ROE 139 AB	37908380	37908378	10.74, 14.06	336.1	0.39	15.69	0.063	2006.428	5	1, 12
16106+1722	ROE 139 AC	37908380	37908374	10.74, 15.32	320.8	0.11	69.74	0.192	2006.428	5	1, 12
16177+3914	HJ 584	45514891	45514889	9.95, 12.53	203.4	0.44	15.18	0.131	2006.518	4	1
16269+01131	BAL147	32219465	32219470	11.54, 11.70	263.3	0.20	16.49	0.058	2006.518	4	1
16407+0547	J 447 AB	T 395-647-1	2M1010666347	9.348, 9.394	239.3	3.63	5.16	0.249	2006.518	4	1
16407+0547	J 447 CD	33771792	33771791	12.06, 12.07	226.9	0.21	10.63	0.014	2006.518	4	1, 2
16417+2338	POU3241	2m 1101838743	2M 1101838749	10.198, 10.048	40.9	NA	3.17	NA	2006.518	2	1
16549+0318	BAL2429	32889374	32889380	11.28, 12.48	51.9	0.22	11.4	0.12	2006.518	4	1
16560+0224	BAL1928	32558886	32558885	11.57, 12.06	355.8	4.76	8.05	0.201	2006.518	4	1
16564+0227	BAL1930	32558940	32558941	11.77, 12.07	23.0	0.08	13.22	0.046	2006.518	4	1, 2
16580+0139	BAL1480	32390686	32390683	11.45, 12.26	283.5	0.23	16.04	0.1	2006.518	4	1, 2

Neglected Double Observations for 2006 No. 2

Notes to Table

1. 300mm Cassegrainian reflector, F9.1, CCD camera image analyzed using the astrometric/photometric program MPO Canopus.
2. PA in WDS reversed based on UCAC magnitudes..
3. UCAC 32369081's position in 1910 places it in the correct position relative to UCAC 32369080 (plotted in GUIDE 8). High proper motion of A and low proper motion of B suggest an optical pair. Pair is CCDM J10129+0158AB.
4. This pair is the best candidate for HJ 479 given original PA and Sep.
5. This is a candidate for SEI 523 but identification is uncertain. Precise position via Aladin (J2000) is RA 11h07m25.54s, DEC +32d11m31.4s. See remarks below.
6. blue magnitudes.
7. 1413+3412 ES 2416 is not this pair.
8. The STF 3088 and COU 186 systems need investigation. Identification of the measured pair as STF 3088AD should be treated with caution.
9. WDS notes confusion of GAU 14 and HJ 2782. More study is needed to resolve the identity of this pair
10. The B component of BAL 1177 is a double of unknown quality. It avoid confusion is it named WLY 7BC.
11. HJ 581 appears to be the same double as GYL 14, which is not neglected. Last measure recorded of GYL 14 was 1998; RA= 56°, SEP = 20.9".
12. Apparently JRN3C is ROE139A.

(Continued from page 62)

(2M prefix). Magnitudes follow catalog: UCAC2.0, GSC2.2 Rmag, and Tycho-2 Vmag, 2MASS Jmag. Theta and rho values of recently measured doubles agree closely with measures reported in this study.

Remarks

11072+3204 SEI 523?: The pair reported is most likely a common proper motion pair: RA proper motions for A and B are RA -30.0, and -29.1 ($^{\circ}\cos(\text{Dec})$) and declination proper motions are +7.2, and +7.0 respectively. This seems the only candidate for SEI 523 in the immediate area, but this would require gross errors in the original reporting of this double as the 1894 measures are PA 149°, Sep. 13.8. If the original measures were accurate, then this pair is not SEI 523.

11449+23346POU3112: Identity of the pair is not certain. WDS reports single 1895 observation of a pair of equal magnitude, PA 244°, Sep 7.4". A search of the immediate vicinity with Guide8 and DSS images does not show a reasonable candidate, the best candidate being that reported here for magnitude. Both components have moderate proper motions in the same direction, so this would not explain the discrepancy in

(Continued on page 67)

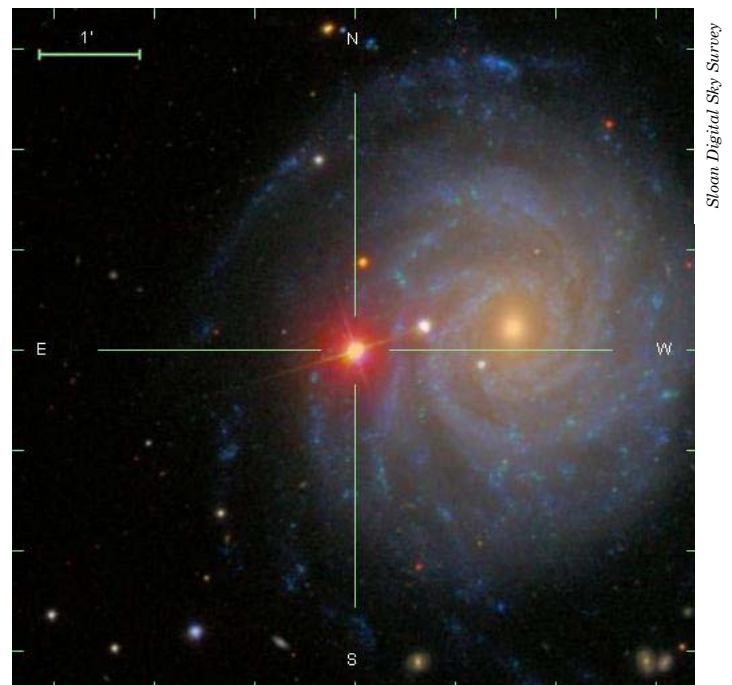


Figure 1: SDSS image of HJ 489 (in cross hairs) and the spiral galaxy NGC 3344.

Neglected Double Observations for 2006 No. 2

(Continued from page 66)

theta and rho. The only other possibility is a faint star (N2012024857, Rmag 15.72) to the SW, but its 1895 position from the primary places it some 15" in separation. So, there are no good matches for this pair.

16002+1411AG 348: I was unable to find a reasonable match for the original measure of this pair near the coordinates reported in the WDS. Correspondence forwarded by Dr. Brian Mason from Dr. Bill Hartkopf, (both USNO) confirms that nothing in the field matches the original measure, which, according to Dr. Hartkopf originates from the IDS catalogue. The 2005 measure reported for AG 348 (RA=172, SEP=41) matches to UCAC2 36835486 and 36835491 and this match is confirmed by Dr. Hartkopf who matched the same stars independently (TYC 956-466-1 and 956-490-1). At any rate, the 2005 measure is not a measure of AG 348, which must be considered lost or bogus. My measures of the 2005 pair (probably an optical) are PA=170.4°±0.07; SEP = 40.91"±0.037", JD 2004.428, with N=5.

Acknowledgements

This research has made use of the SIMBAD database, The VizieR On-Line Catalogue, and the ALADIN Interactive Sky Atlas, all maintained at the Centre de Données Astronomiques de Strasbourg, France, and a number of catalogs cited in the text. Thanks to Drs. Brian Mason, Gary Wycoff, and Bill Hartkopf, U. S. National Observatory for their help with various parts of this research. Thanks to Arnie Rosner, Global Rent-A-Scope and its host, New Mexico Skies (<http://www.global-rent-a-scope.com/>) for their support of research to the Remote Astronomical Society Observatory.

References

- Bonnarel, F., P. Fernique, O. Bienayme, D. Egret., F. Genova., M. Louys, F. Ochsenbein, M. Wenger, and J. G. Bartlett. 2000. The ALADIN interactive sky atlas. A reference tool for identification of astronomical sources. *Astron. Astrophys., Suppl. Ser.*, **143**, 33-40
- Mason, B. D. 2006. Requested double star data from the U. S. Naval Observatory, *J. Double Star Observer*. **2**:21-35.
- Mason, B. D., G. L. Wycoff, W. I. Hartkopf, G. G. Douglas, and C. E. Worley. 2001, *et seq.*, The Washington Double Star Catalog, *Astronom. J.*

122, 3466-3471.

- Ochsenbein F., P. Bauer, and J. Marcout. 2000, The VizieR database of astronomical catalogues *Astron. Astrophys., Suppl. Ser.*, **143**, 23-32.
- Project Pluto. 2006. *Guide8*. Bowdoinham, ME (<http://www.projectpluto.com/>)
- Schwekendiek, P. and A. Wicenec, 2000, "The Tycho-2 Catalog of the 2.5 Million Brightest Stars", *Astron. Astrophys.*, **355**, L27-L30.
- Space Telescope Science Institute (STScI) and Osservatorio Astronomico di Torino. 2001. The Guide Star Catalogue, Version 2.2.01 VizieR On-line Data Catalog: I/271
- Warner, B. D., 2006, MPO Canopus. Bdw Publishing, Palmer Divide Observatory, Colorado Springs, CO. (<http://www.minorplanetobserver.com/MPOSoftware/MPOCanopus.htm>)
- Zacharias N., S. E. Urban, M. I. Zacharias, G. L. Wycoff, D. M. Hall, D. G. Monet, and T. J. Rafferty. 2004. The Second US Naval Observatory CCD Astroglyph Catalog (UCAC2). *Astronom. J.* **127**, 3043-3059.

