Mind the Gap – Jonckheere Double Stars Not Listed in the WDS

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Abstract: We describe our efforts to determine the cross-referenced identifications of a large group of Robert Jonckheere's double stars which failed to turn up in a search of the WDS catalog sorted by discoverer ID.

Report

During a review of the 3350 objects in Robert Jonckheere's 1962 Double Star Catalog (*Catalogue Général de 3350 étoiles doubles de faible éclat observées de 1906 à 1962*), we came across a reference in Amosse 2012 (p. 5) which described J 3319 as misidentified. In the course of determining the identity of that star, we discovered a total of 393 J objects which are not listed in the Washington Double Star Catalog, which results in a large gap in Jonckheere's total catalog of double stars. We soon discovered the WDS Notes Files contains references to most of these objects. Many of them have been cross-referenced with other identifications which have replaced the Jonckheere number in the WDS, primarily because those stars were discovered by other observers prior to the date of Jonckheere's discovery. Consequently, we downloaded the WDS Notes File into an Excel spreadsheet and searched for each of the objects in order to identify them. In the case of those objects for which we couldn't find references in the WDS Notes File, we used the Stelle Doppie web site (http://stelledoppie.goaction.it/) as a back-up source, which resulted in a small number of identifications.

In the course of that search, questions arose on two stars, J 1391, and J 3101. J 1391 is addressed in Table 3 and J 3101 is discussed in the next section of this paper.

At the conclusion of our searches, we were left with a list of 50 Jonckheere objects for which data or designations failed to turn up. To determine the identity of those objects, we turned to the pages of Robert Jonckheere's 1962 Catalog. After locating each entry, we examined it to see what clues were provided, entered his 2000 coordinates into Aladin, overlaid WDS identifications on the image, and confirmed the identities of all but a few of the objects. That information and the supporting data will be presented in a later supplement to this paper. Those objects are identified in the following table with the comment "No data found."

Also included in the list below are 23 objects which are listed in the WDS with no coordinates because they could not be located at or near the coordinates reported by Jonckheere. Bill Hartkopf at the USNO/WDS, who has determined the identities of many of Jonckheere's lost objects, has so far been unable to match up any of the 23 pairs. None of them have been declared bogus objects up to this point. We have an effort underway now to see if we can find at least some of this group.

J 3101

It appears that Robert Jonckheere included J 3101 in his 1962 *Catalogue Général* solely because it's a red star. (He also included two other red stars in his catalog, J 2001 and J 2011). As the excerpt from his catalog in Figure 1 shows, no measurements were made of J 3101. The text in the catalog entry reads: "Red star of

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p. 136 J 3101

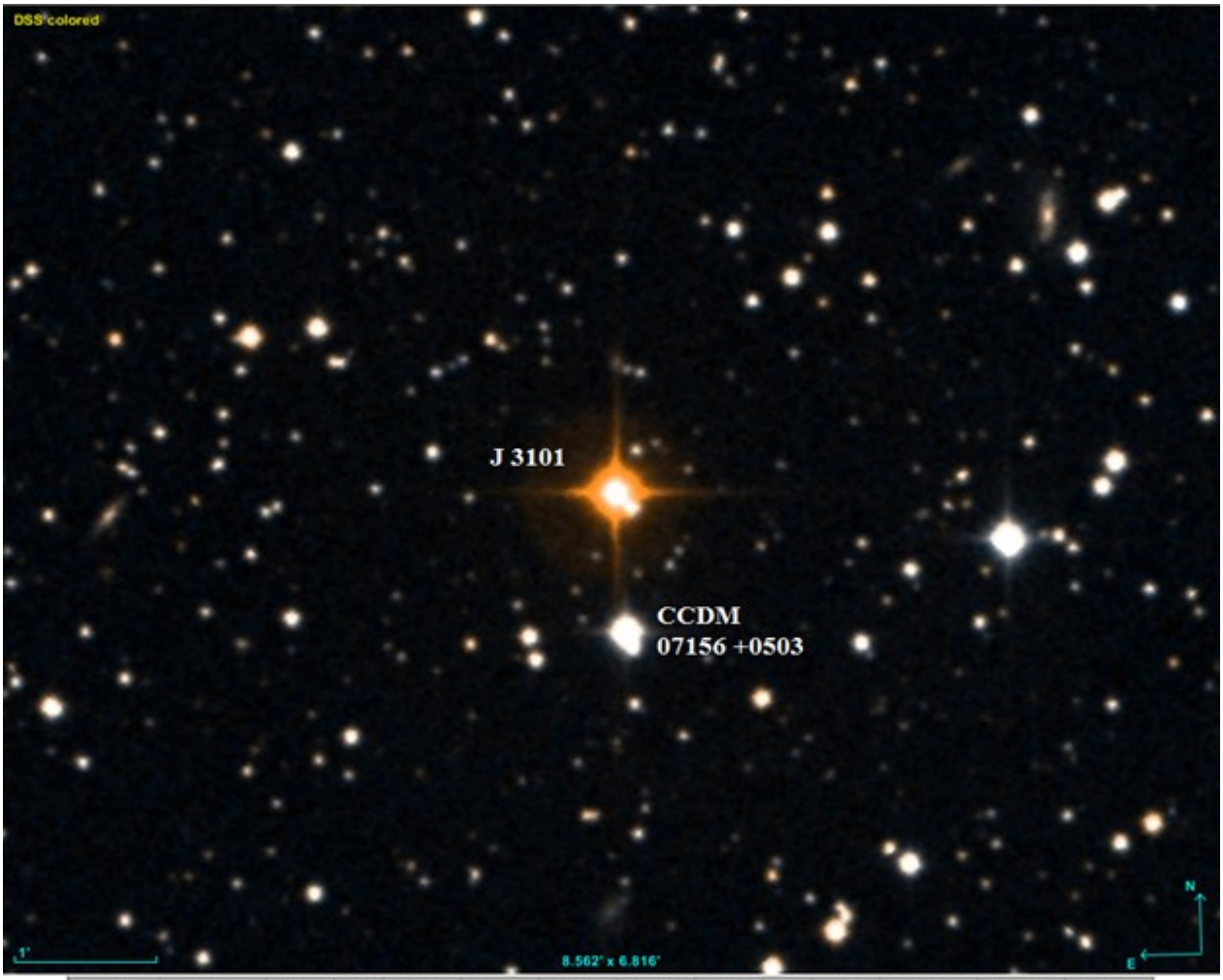
7h15m,7 + 5° 3'
7 13,0 + 5 8
7 10,3 + 5 13

Etoile rouge, de magnitude 9,3 le 16 Février 1945, ne se trouvant pas dans les catalogues de F. Krueger et H. Schneller.
BD + 5°1606 (9,5) A.G. Leipzig II (9,0)
Le 9 Avril 1945, un cliché pris en lumière totale par G. Guigay, ne donna aucune trace de cette étoile malgré une heure de pose. (J.O. Vol. 28 p. 40).
Yale 22 m.p. -s,112 +",009 F8 v. (9,0)

Figure 1. Excerpt from Jonckheere's 1962 catalog.

magnitude 9.3, on February 16th, 1945, which is not included in the catalogues of F. Krueger and H. Schneller. BD +5 1606 (9,5), A.G. Leipzig II 9,0). On April 9, 1945, a photo taken in full light by G. Guigay showed no traces of this star despite a one hour exposure."

As Figure 2 shows, there are actually two stars at the location of J 3101, which raises the question of why Jonckheere didn't refer to the pair as a double star and measure it. Equally puzzling is the reference in his 1962 catalog to the red star not being visible in a 1945 photograph. A search for the 1945 image failed to turn up anything, but in the process we confirmed the red star is designated a variable star by the AAVSO (Figure 3.) However, adding to the mystery is the AAVSO magnitude range of 9.1 to 10.5, which would indicate



V	CCDM	rComp	Comp	Disc	dRAs	dDEs	theta	rho	Vmag	HIC	CooFlag	RAJ2000	DEJ2000
VizieR	07156+0503		A		2.57	-20.4			10.9	35119	0	108.9107	+05.0443
VizieR	07156+0503		B	J 3101					11.4	35119	3	108.9107	+05.0443

Figure 2. Aladin image showing Jonckheere's red star and the double star to the south of it. Neither J 3101 nor the white pair south of it was listed in the WDS when we began this paper. The red star is the one Jonckheere identified as J 3101, while the CCDM catalog refers to the white pair as CCDM 07156+0503 and identifies it as J 3101

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the star should have been visible in the 1945 photo.

Jonckheere also published an account of J 3101 in the March-April, 1945, issue of the Journal des Observateurs (Jonckheere 1945, p. 40) which went into more detail (Figure 4). In that short account, he describes J 3101 as a variable star, having found a magnitude of 9.5 for it in the Bonner Durchmusterung, as well as a magnitude for it of 9.0 in the A.G. Leipzig II catalog. He also refers to a Toulouse Observatory Carte du Ceil photographic plate of January 23rd, 1906, on which the red star is not visible, which we were also unable to locate.

Using the Strasbourg Astronomical Data Centre's CDS Portal, we found images from 1954, 1991, and 1997 showing not only the brighter of the red pair, but the fainter one as well (Figure 5). In addition, Wilfried Knapp imaged the star using a remote telescope (Figure 6), which clearly showed two stars at the location.

In Jonckheere's account of J 3101 in Figure 4, after referring to the Carte du Ciel plate, the next to last sentence reads: "Therefore the red star probably has a color index higher than +4." Bill Hartkopf pointed us toward Simbad's data on the star where we found a B value of 13.55 and a V value of 9.21, resulting in a color index of 4.34, which confirms Jonckheere was on the right track with his +4 CI estimate. Simbad also shows a spectral classification of N for the star. Bill Hartkopf mentioned the plates in use for both 1906 Carte du Ceil and 1945 images were blue sensitive and had very poor response in the red, thus explaining the absence for the red J 3101 from those images.

To some degree, that could explain why Jonckheere

within 10' of 07 15 38.90 +05 03 41.5 » Return » Revise » New Search

Latest Details

Log in to retrieve additional aliases from SIMBAD.

Name	V BK CMi
AAVSO UID	000-BCV-066 (2 observations)
Constellation	Canis Minor » Sequence
J2000.0	07 15 38.89 +05 03 39.7 (108.91204 +5.06103) » Search nearby
B1950.0	07 12 59.51 +05 08 59.0
Galactic coord.	211.161 +7.683
Other names (Internal only)	*Please note that aliases shown in grey link to obsolete records.* 2MASS J07153889+0503394 · AAVSO 0710+05 · ASAS J071539+0503.7 · C* 695 · CGCS 1616 · DHK 17 · DO 2053 · EIC 183 · GSC 00172-02612 · IRAS 07129+0509 · IRC +10158 · Kiso C6-126 · LEE 82 · MSB 30 · RAFGL 1092 · TYC 172-2612-1 (Not logged in) » Add name
Variability type	SR
Spectral type	C5,5
Mag. range	9.1 - 10.5 V
Discoverer	--
Epoch	14 Jan 2003 (HJD 2452654) » Ephemeris
Outburst	--
Period	234 d
Rise/eclipse dur.	--

Remarks

There are currently no remarks on file for this star. (Not logged in) » Add remark

Figure 3. AAVSO designation for the red star referred to by Jonckheere in his 1962 catalog entry for J 3101.

didn't mention or refer to the faint secondary located 9" from the primary. On page three of his 1962 catalog he lists the various telescopes he used during his career, along with the dates he used them. According to that list, when he made his 1945 observation of J 3101 he

Une Nouvelle Etoile Rouge (J 3101)

Par M. Robert Jonckheere

Au cours de nos recherches d'étoiles doubles nouvelles, nous avons trouvé, le 16 février 1945, une étoile rouge, de magnitude 9,3, qui ne figure pas dans le *Neuer Katalog Farbiger Sterne*, de F. Krueger, ni, comme variable, dans le *Katalog Veränderlicher Sterne für 1943*, de H. Schneller.

Les coordonnées de cette étoile, pour 1950, sont :

$$\alpha = 7 \text{ h. } 13 \text{ m. } 0 \text{ s.} \qquad \delta = +5^\circ 9'1$$

Contrairement à la Rouge J 2001, qui ne se trouve dans aucun catalogue, malgré sa magnitude qui peut atteindre 8,3, cette nouvelle rouge est une étoile de la *Bonner Durchmusterung*. C'est la B.D. +5° 1606, pour laquelle Argelander donne la magnitude 9,5. Elle a, de plus, été notée, malgré le faible éclat indiqué dans le B.D., sous le n° 3661 de A.G. Leipzig II, qui lui assigne la magnitude 9,0. Cette étoile est donc variable.

Aucun de ces catalogues ne fait état de sa coloration. Son indice de couleur est cependan ttrès grand. Une pose d'une heure en lumière totale, faite le 9 avril 1945 par M. G. Guigay, avec l'objectif Dogmar Goerzde 18 cm. de l'Observatoire de Marseille, ne donne aucune trace de cette étoile sur la plaque. Elle n'est pas visible non plus sur le cliché + 5° n° 54, du 23 janvier 1906, de la Carte photographique du Ciel de l'Observatoire de Toulouse. Cette étoile rouge a par conséquent un indice de couleur probablement supérieur à +4. C'est pour cette raison que nous nous y sommes arrêté.

(*Observatoire de Marseille*).

Figure 4. Jonckheere's 1945 Journal des Observateurs account of J 3101.

Figure 5. 1954, 1991, and 1997 images of J 3101 and the white pair to the south of it.

was using the 80cm (31.5 inch) telescope at Marseille, which Thorel (2005, p. 30) estimates has a 15.8 magnitude limit. Our research shows the secondary with a magnitude of 15.0 (see Table 1), which would seem to put it within visual reach despite the five magnitudes of difference between the two stars. Also contributing to the mystery is Jonckheere's acute vision, which is also well documented by Thorel (2001, pp 3-4 and 5) and was mentioned by Jonckheere himself on page 5 of his 1962 catalog.

At any rate, we found ourselves with a situation in which two historically significant pairs were not listed in the WDS catalog: J 3101 and the white pair to its south. Bill Hartkopf confirmed our guess that J 3101 was left out of the WDS because Jonckheere didn't provide measures for it. Adding somewhat to the confusion is the CCDM catalog's reference to the pair of white stars to the south of the red pair as J 3101 (see the data box below Figure 2).

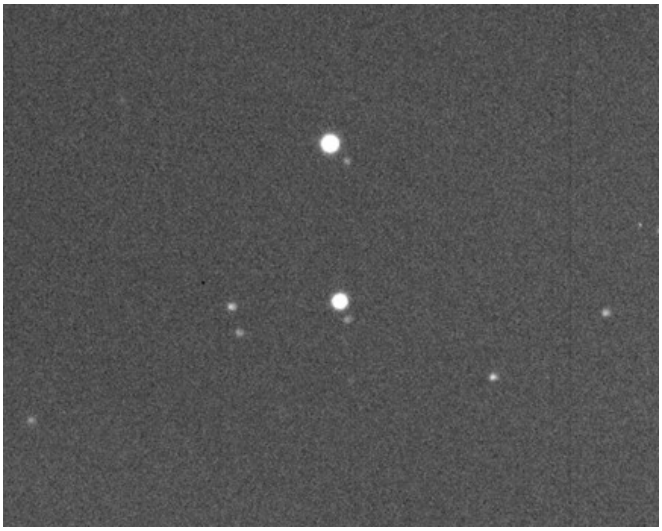

Figure 6. iT27 Image by Wilfried Knapp (stack of 10 images with 2s exposure time). J3101 is the northernmost pair in the image, DOM 2 is south of it. North is at the top, east at the left.

We asked Bill about the possibility of having both the red and the white pair added to the WDS because of their historical significance. After reviewing all the data, he added the white pair to the WDS with a designation of DOM 2 (DOM refers to Dommanget, the lead author of the CCDM). The red pair was added to the WDS with the designation J 3101. DOM 2 is now WDS 07156+0503 and J 3101 is 07156+0504.

With regard to the WDS data, initial coarse measurements for J 3101, based on a GSC2.3 image in Aladin, resulted in a separation of 9.3" and a PA of 227° and magnitudes of 9.90 and 15.5. For DOM 2, initial measures are 7.3" and 204.1° with magnitudes of 10.62 and 14.69, which are based on 1995 POSS plates. Our measures, which are shown in Tables 1 and 2, differ somewhat. It should be pointed out that we found the faint magnitudes of both secondaries made measures rather difficult.

Gaps in the Jonckheere Double Star Catalog

Searches have been run in the WDS Notes Files and Stelle Doppie on all the J Catalog numbers in Table 3. Those catalog numbers for which no data was found in those two sources are identified in the table with the comment "No data found"; those stars will appear in a later report once we've determined their identities. All of the stars in Table 3 which include the comment "Listed in WDS with no coordinates" are shown in Jonckheere's 1962 General Catalog. A search is under way now to locate these.

Acknowledgements:

Special thanks to Bill Hartkopf at the USNO/WDS

Table 1. Measurements of J3101 with Astrometrica

	RA	Dec	Sep	Err Sep	PA	Err PA	Vmag	Err Vmag	Date
A	07 15 38.877	05 03 39.700	9.212	± 0.22	224.830	± 1.4	9.973	0.096	2016.049
B	07 15 38.442	05 03 33.167					15.000	0.113	

Table 2. Measurements of DOM 2 with Astrometrica

	RA	Dec	Sep	Err Sep	PA	Err PA	Vmag	Err Vmag	Date
A	07 15 38.644	05 02 40.910	7.435	± 0.22	204.666	± 1.7	10.732	0.096	2016.049
B	07 15 38.437	05 02 34.153					15.026	0.115	

As a countercheck for the quality of our measures, we used the URAT1 coordinates for DOM 2 (the secondary of J 3101 is not identified in URAT1), resulting in very similar values of 7.387" for separation and 204.88° for position angle.

for his invaluable assistance and insight which kept us from straying too far into nebulous territory.

We also want to thank Chris Thuemen for making a copy of Robert Jonckheere's 1962 *Catalogue Général de 3350 étoiles doubles de faible éclatobservées de 1906 à 1962* available to us, without which we would have been stumbling around in the dark.

The following tools and resources have been used for this research:

- Aladin Sky Atlas v8.0
- Astrometrica v4.8.2.405
- AstroPlanner v2.2
- CDS Portal
- iTelescope: iT27 - 700mm CDK with 4531mm focal length. CCD: FLI PL09000. Resolution 0.53 arcsec/pixel. V-filter. Located in Siding Spring, Australia. Elevation 1122m
- SIMBAD, VizieR
- Sky Tools 3
- Stelle Doppie Web Site (http://stelledoppie.goaction.it/)
- Washington Double Star Catalog

References:

Amossé, André; Razemon, Stéphane; Grase, Francis; Caille, Sébastien; Rouselle, Jean-Paul; Berthe, Michel – 2012, Mesures d'étoiles doubles visuelles du "Catalogue Jonckheere" à l'Observatoire de Lille Campagne 2007-2012, Observations et Travaux, Vol. 81 No. 2, pp.2-8.

Buchheim, Robert – 2008, CCD Double-Star Measurements at Altimira Observatory in 2007, Journal of Double Star Observations, Vol. 4 No. 1 Page 28: Formulas for calculating separation and position angle from RA and Dec coordinates

Jonckheere, Robert, 1945. Journal des Observateurs, Vol 28 No. 3-4 (Mar-Apr 1945), p. 40.

Jonckheere, Robert, 1962. Catalogue Général de 3350 étoiles doubles de faible éclat observées de 1906 à 1962, Observatoire de Marseille and Journal des Observateurs, Place le Verrier, Marseille.

Thorel, Jean-Claude, 2001. Robert Jonckheere: Une vie de passion pour les étoiles doubles, Ceil et Terre: Bulletin de la Société belge d'astronomie, de météorologie et de physique de globe, Vol 117, No. 1 (2001), pp. 2-9

Thorel, Jean-Claude, 2005. Robert Jonckheere et les Étoiles Doubles: Qu'en est-il des mesures?, Observations & Travaux, Vol. 61 (2005), pp. 26-33

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Table 3. Comparison of Jonckheere Catalog with the WDS.

Jonck-heere Catalog Number	Designation for the J Num-ber in the WDS Catalog	Notes and Comments	WDS Designations
61	STF 1043		STF 1043 is WDS 07126-0041
94	AG 358	AB is J 94	AG 358 is WDS 18067+1359
109	HJ 1352		HJ 1352 is WDS 18501+2949
123	BU 55		BU 55 is WDS 19463+1035
126	STF 2590 CD	WDS Note: "Also called J 126 ab, renamed STF 2590 CD by USNO 6/29/99."	STF 2590 is WDS 19523+1021
127	SEI 988		SEI 988 is WDS 20119+3510
128	ES 205	WDS Notes File: "SEI 1042. J 128."	ES 205 is WDS 20150+3500
132	BU 659		BU 659 is WDS 19547+0708
139	BU1471		BU 1471 is WDS 19385+1715
149	HU 341		HU 341 is WDS 19335+1814
175	J 135	WDS Notes file also states: "J 2190. OL 193"	J 135 is WDS 20157+1003
176	J 549		J 549 is WDS 20130+1029
177	BU 1051		BU 1051 is WDS 21131+1028
184		No data found	
219	A 2301		A 2301 is WDS 00254+2036
264	BRT 2120		BRT 2120 is WDS 06348+0819
320		Planetary Nebula which carries the J 320 designation.	
357	A 516		A 516 is WDS 07008-0656
477	AG 371		AG 371 is WDS 19041+1106
489		**Listed in WDS with no coordinates.**	J 489 is WDS 19437+0239
504	BRT 3354		BRT 3354 is WDS 20047+2443
533	BU 973 AD = J 533 AB; STF 2435 AC = J 533 AC; Howe 45 DC = J 533 BC. WDS Note: "Here AB is BU 973, STF 2435 = AC of J 533. AD = AB of J 533. DC = Howe 45 is BC of J 533.AB is the C component of 19022+0845STF2436."		BU 973/STF 2435/HWE 45 is WDS 19020+0846
571		**Listed in WDS with no coordinates. Coded "X", Dubious Double**	J 571 is WDS 20422+0724
585	A 2303		A 2303 is WDS 00419+1751
810		No data found	
866		BU 1338 CD	BU 1338 CD is WDS 00066+2901
880		BAR 23 AB and BC = J 880 AB and BC	BAR 23 is WDS 02065+5703
917		BU 844 BC	BU 844 is WDS 22296+0538
937		**Listed in WDS with no coordinates.**	J 937 is WDS 05403+3116
1012		STF 1518 AB and BC = J 1012 AB and BC	STF 1518 is 11145+0516
1028		CD pair of J 1027 is J 1028	J 1027 is 15086+0052
1060		**Listed in WDS with no coordinates.**	J 1060 is WDS 07212+0921

Table 3 continues on the next page.

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Table 3 (continued). Comparison of Jonckheere Catalog with the WDS.

Jonck-heere Catalog Number	Designation for the J Num-ber in the WDS Catalog	Notes and Comments	WDS Designations
1075	SEI 1300		SEI 1300 is WDS 20538+3702
1079	SEI 1406		SEI 1406 is WDS 21067+3715
1089	SEI 194		SEI 194 is WDS 05201+3236
1098		**Listed in WDS with no coordinates.**	J 1098 is WDS 06514+1929
1113		**Listed in WDS with no coordinates.**	J 1113 is WDS 20312+3332
1141	ROE 16	ROE 16 AB = J 1141	ROE 16 is WDS 20507+1959
1146	SEI 1531		SEI 1531 is WDS 21402+3703
1147	SEI 1073		SEI 1073 is WDS 20180+3613
1148	SEI 1046		SEI 1046 is WDS 20156+3910
1151	SEI 1355		SEI 1355 is WDS 20596+3558
1152	SEI 1484		SEI 1484 is WDS 21165+3959
1153	SEI 1392		SEI 1392 is WDS 21048+3545
1155	SEI 1521		SEI 1521 is WDS 21305+3701
1157	SEI 602		SEI 602 is WDS 19266+3934
1162	SEI 908		SEI 908 is WDS 20079+3605
1164		No data found	
1166	SEI 998		SEI 998 is WDS 20122+3810
1167	SEI 1038	WDS Note: "J 1230. Probably J 1167. See ADS."	SEI 1038 is WDS 20144+3822
1169		No data found	
1181		**Listed in WDS with no coordinates.**	J 1181 is WDS 19307+0751
1188		**Listed in WDS with no coordinates.**	J 1188 is WDS 18538+1334
1217	J 151		J 151 is WDS 19527+1848
1218		**Listed in WDS with no coordinates.**	J 1218 is WDS 18051+3819
1230	SEI 1038	WDS Note: "J 1230. Probably J 1167. See ADS."	SEI 1038 is WDS 20144+3822
1244		No data found	
1255		**Listed in WDS with no coordinates.**	J 1255 is WDS 05296+0227
1258		**Listed in WDS with no coordinates.**	J 1258 is WDS 07366+0309
1290		**Listed in WDS with no coordinates. Coded "X", Dubious Double**	J 1290 is WDS 19432+0448
1298	HJ 2966		HJ 2966 is WDS 20277+0803
1299	BRT 2186		BRT 2186 is WDS 20284+0746
1311		**Listed in WDS with no coordinates.**	J 1311 is WDS 19359+0727
1314		**Listed in WDS with no coordinates.**	J 1314 is WDS 19461+0728

Table 3 continues on the next page.

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Table 3 (continued). Comparison of Jonckheere Catalog with the WDS.

Jonck-heere Catalog Number	Designation for the J Num-ber in the WDS Catalog	Notes and Comments	WDS Designations
1323	MLL 10	WDS Note: "Probably identical with ADS 4627, J 1323."	MLL 10 is WDS 06030+0945
1329	SEI 1455		SEI 1455 is 21137+3602
1341		**Listed in WDS with no coordinates.**	J 1341 is WDS 20214-0407
1353	ES 1914	WDS Note: "Position corrected by Heintz, who also notes that the pair J 1353 is identical."	ES 1914 is WDS 19057+6502
1355	J 1346		J 1346 is WDS 20560+0837
1359	ES 1483		ES 1483 is WDS 00190+4301
1370	J 1340	WDS Note: "Published in JO XXIV, 21 as J 1370. Jonck-heere calls it 1340 in his 1962 catalogue. Thorel (private comm.) says J 1370 is a novae, however."	J 1340 is WDS 20177+1755
1371	BAL 1192		BAL 1192 is WDS 18032+0047
1373	BAL 585		BAL 585 is 18488-0120
1382		No data found	
1384	HJ 5124		HJ 5124 is WDS 19293-1742
1387	BAL 2019		BAL 2019 is WDS 20122+0255
1391		The note in the WDS Notes File referring HJ 918 AC has been corrected to read "HJ 918 J 1391" with AC dropped since there is no "C" component to HJ 918.	HJ 918 is WDS 20289-0652
1393	DOO 85		DOO 85 is WDS 20296-0650
1405	ARA 502	WDS Notes File: "aka J 1405. Jonckheere gives the lo-cation as "+40s, -1' de la BD-19 6082." If you take a sign error in the RA offset (i.e. 40s west of the BD star rather than east), you land dead on WDS 21216-1825 = ARA 502 with which it matches."	ARA 502 is WDS 21216-1825
1407	RST 4091		RST 4091 is 21399-0842
1412	HJ 3075		HJ 3075 is WDS 21589-1115
1415	RST 4710		RST 4170 is WDS 22432-0326
1418	HJ 3151		HJ 3151 is WDS 22541-1152
1425	BHA 55		BHA 55 is WDS 23392-1831
1426	FOX 276		FOX 276 is WDS 23432-0837
1433	HJ 1961		HJ 1961 is WDS 00234-0121
1435	HJ 1979		HJ 1979 is WDS 00307-1545
1437	CHE 28		CHE 28 is WDS 00353-0942
1440	RST 4158		RST 4158 is WDS 00500-0401
1442	RST 4162		RST 4162 is WDS 01035-0535
1445		No data found	
1452	GAL 323	WDS Notes File: "Object #71 in Gallo's original list. Aka J 1452."	GAL 323 is WDS 02351-1046
1454	BRT 2627		BRT 2627 is WDS 03002-1110
1462	BRT 379		BRT 379 is WDS 06332-0724
1464	RST 4331		RST 4331 is WDS 07028-0716
1468		No data found	

Table 3 continues on the next page.

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Table 3 (continued). Comparison of Jonckheere Catalog with the WDS.

Jonck-heere Catalog Number	Designation for the J Num-ber in the WDS Catalog	Notes and Comments	WDS Designations
1469		No data found	
1471	HJ 387		HJ 387 is WDS 06225-0259
1476	BAL 75		BAL 75 is WDS 06458-0225
1477	BAL 77		BAL 77 is WDS 06461-0233
1478	BAL 78		BAL 78 is WDS 06466-0231
1494	BAL 177		BAL 177 is WDS 07328-0230
1499	BAL 484		BAL 484 is WDS 07360-0147
1502	GCB 21	WDS Notes File: "J 1502. BAL 491."	GCB 21 is WDS 07502-0214
1503		No data found	
1511		No data found	
1513	BRT 2708		BRT 2708 is WDS 08174-1125
1517		No data found	
1528	RST 4413		RST 4413 is WDS 08364-0306
1544	DON 1080	WDS Notes File: "J 1544. ARA1764."	DON 1080 is WDS 09188-2250
1546	FOX 161	WDS Notes File: "J 1546. Bal 859."	FOX 161 is WDS 09210-0100
1554	B 779		B 779 is WDS 09389-2016
1574	WHC 9		WHC 9 is WDS 11225-1028
1580	HJ 843		HJ 843 is WDS 11520-0824
1599		No data found	
1600		No data found	
1602	B 2536		B 2536 is WDS 12029-1908
1612	BRT 551		BRT 551 is WDS 14509-0810
1625	HJ 2826	WDS Notes File: "Also known as J 1625 or WHC 16."	HJ 2826 is WDS 18165-1652
1626	B 2862		B 2862 is WDS 18170-1933
1628		No data found	
1635	B 2461	WDS Notes File: "J 1635, J 1750."	B 2461 is WDS 18483-1935
1644	BRT 3058		BRT 3058 is 18042-2846
1652	BRT 2754		BRT 2754 is WDS 18308-1309
1655		WDS Note:" Probably identical to J 2522"	J 2522 is WDS 18422-1022
1659	RST 4602		RST 4602 is WDS 18511-1421
1667	HJ 2856		HJ 2856 is WDS 19135-1632
1669		**Listed in WDS with no coordinates.**	J 1669 is WDS 19147-0245

Table 3 continues on the next page.

Mind the Gap – Jonckheere Double Stars Not Listed in the WDS

Table 3 (continued). Comparison of Jonckheere Catalog with the WDS.

Jonck-heere Catalog Number	Designation for the J Num-ber in the WDS Catalog	Notes and Comments	WDS Designations
1674	LEO 44	WDS NOTE on LEO 44: "J 1674. J 1757"	LEO 44 is WDS 19244-1400
1679	LV 21 BC		LV 21 is WDS 19377-0958
1683	BAL 605		BAL 605 is WDS 19413-0128
1685	BRT 2766		BRT 2766 is WDS 19455-1133
1689	BAL 1533		BAL 1533 is WDS 19518+0204
1693	J 154		J 154 is WDS 20018-0354
1697	FEN 36	WDS Notes File: "LEO 47. J 1697."	FEN 36 is WDS 0058-1703
1698	BAL 1544		BAL 1544 is WDS 20090+0127
1708	BAL 613		BAL 613 is WDS 20342-0045
1712	BAL 927		BAL 927 is WDS 20523-0030
1722	RST 5161		RST 5161 is WDS 21209-0136
1728	J 291		J 291 is WDS 22332-0046
1730	BRT 2195		BRT 2195 is WDS 23370+0630
1731	J 294		J 294 is WDS 23021+1026
1733	B 415		B 415 is WDS 18591-2609
1734	HJ 1297		HJ 1297 is WDS 17017-2542
1736	ARA 1507		ARA 1507 is WDS 18059-2134
1737	VAT2		VAT 2 is WDS 18125-1852
1739		No data found	
1747	ARA 1544		ARA 1544 is WDS 18354-2118
1749	J 1656		J 1656 is WDS 18457-1624
1750	B 2461	WDS Notes File: "J 1635, J 1750."	B 2461 is WDS 18483-1935
1752	OL 80	WDS Notes File: "DON 934. J 1752".	OL 80 is WDS 18547-1946
1757	LEO 44	WDS Notes File on LEO 44: "J 1757. J 1674"	LEO 44 is WDS 19244-1400
1763	BHA 31		BHA 31 is WDS 19369-2003
1768	POU 4262		POU 4262 is WDS 20119+2351
1769	POU 4263		POU 4263 is WDS 20120+2350
1771	J 1389		J 1771 is WDS 20202-1046
1774	BAL 1560		BAL 1560 is WDS 20281+0140
1777	BAL 2543		BAL 2543 is WDS 20412+0338
1778	HDO 160		HDO 160 is WDS 20456-0853
1780	J 1717		J 1717 is WDS 21037-0258

Table 3 continues on the next page.

Mind the Gap – Jonckheere Double Stars Not Listed in the WDS

Table 3 (continued). Comparison of Jonckheere Catalog with the WDS.

Jonck-heere Catalog Number	Designation for the J Num-ber in the WDS Catalog	Notes and Comments	WDS Designations
1783	HJ 1612		HJ 1612 is WDS 21096-1622
1787	BRT 1356		BRT 1356 is WDS 21236+1030
1792	HJ 3090	WDS Notes File: "J 1792. Not found by Heintz at IDS position."	HJ 3090 is WDS 2077+0913
1796	KU 64 CD		KU 64 is WDS 22227+2849
1799	POU 5863		POU 5863 is WDS 23515+2501
1800	POU 5865	WDS Note File: "J 1800. Same as POU 5866."	PUR 5865 is WDS 23516+2502
1805	POU 107		POU 107 is WDS 01102+2447
1811	BAL 2603		BAL 2603 is WDS 02596+0508
1814	BAL 2119		BAL 2119 is WDS 04171+0409
1822	POU 1237		POU 1237 is WDS 06206+2327
1826		**Listed in WDS with no coordinates. Coded "X", Dubious Double**	J 1826 is WDS 06392+0149
1827	J 1365		J 1365 is WDS 06402+1335
1829	BAL 1957		BAL 1957 is WDS 18121+0207
1844	HJ 885	WDS Notes File also states: "J 2694. BAL1983. J1844".	HJ 885 is WDS 19243+0305
1849	BAL 1998		BAL 1998 is WDS 19334+0227
1855	GCB 45		GCB 45 is WDS 19408+0913
1857	HJ 894		HJ 894 is WDS19398+1945
1866	A 2994 A,BC		A 2994 is WDS 19503+0713
1872	BRT 554		BRT 554 is WDS 20006-0911
1881	HJ 2959		HJ 2959 is WDS 20245+0916
1886	POU 3427		POU 3427 is WDS 18330+2420
1891	BRT 1956		BRT 1956 is WDS 20520+1422
1898	POU 5775		POU 5775 is WDS 23047+2355
1915	HJ 33 AB	WDS Notes File: "HJ 33 also known as J 1915 AC. J 1915 AB also known as AOT 24 AC. J 1915 BC also known as AOT 24BC." Note found on p. 70 of Jonckheere's 1962 catalog: "BC = J 3228."	HJ 33 and AOT 24 also WDS 05569-0700
1916		No data found	
1927	J 1925		J 1925 is WDS 06122+0640
1931	BAL 992		BAL 992 is WDS 06144+0052
1932	BAL 993		BAL 993 is WDS 06146+0051
1936	POU 1187		POU 1187 is WDS 06169+2414
1938	KRU 1		KRU 1 is WDS 06180+2152
1941	L 59		L 59 is WDS 06221+2203
1943	BAL 1313		BAL 1313 is WDS 06239+0111

Table 3 continues on the next page.

Mind the Gap – Jonckheere Double Stars Not Listed in the WDS

Table 3 (continued). Comparison of Jonckheere Catalog with the WDS.

Jonck-heere Catalog Number	Designation for the J Num-ber in the WDS Catalog	Notes and Comments	WDS Designations
1946	BAL 1694		BAL 1694 is WDS 06274+0211
1947	BAL 2169		BAL 2169 is WDS 06274+0354
1948	BAL 1009	WDS Notes Files: "J 1948. J 1996."	BAL 1009 is WDS 06277+0034
1952	BAL 1697		BAL 1697 is WDS 06315+0212
1955	J 2022	WDS Notes File: "RST 5235. BAL 1316. J 1955 has been abandoned."	J 2022 is WDS 06324+0110
1957	J 661		J 661 is WDS 06323+0543
1961	BAL 1318		BAL 1318 is WDS 06352+0100
1968	POU 1891		POU 1891 is WDS 06415+2436
1983	GAU 4894	WDS Notes File: "J 1983. BAL 1061."	GAU 4894 is WDS 06591+0044
1984	GAU 4919	WDS Notes File: "J 1984. BAL 1065."	GAU 4919 is WDS 06598+0037
1992	STF 1063	WDS Notes File: "J 1992. BAL 2753. BAZ 3."	STF 1063 is WDS 07181+0421
1996	BAL 1009	WDS Notes Files: "J 1948. J 1996."	BAL 1009 is WDS 06277+0034
1997	BAL 1098		BAL 1098 is WDS 07282+0035
2000	BAL 2784	WDS Notes File: "J 2486. J 2000."	BAL 2784 is WDS 07449+0349
2001		No data found	
2004	STT 142	WDS Notes File: "The primary is a spectroscopic bina-ry. The pair formerly listed as J 2004 appears to be identical, with distance doubled."	STT 142 is WDS 06299+0707
2007	J 596		J 596 is WDS 06410+0215
2011		No data found	
2015	A 3021	WDS Notes File:" Evidently, the same as J 2015."	A 3021 is WDS 06100-0420
2018	HO 229		HO 229 is WDS 06181+1423
2023		No data found	
2026	J 268		J 268 is WDS 06463+0811
2033	J 274		J 274 is WDS 06553+0816
2047	BAL 1825		BAL 1825 is WDS 07507+0242
2066			
2069		**Listed in WDS with no coordinates. Coded "X", Dubious Double**	J 2069 is WDS 09314-0215
2099	BRT 1513		BRT 1513 is WDS 18060-2238
2105	BAL 555		BAL 555 is WDS 14278-0140
2111	BAL 1481		BAL 1481 is WDS 16599+0121
2114	BAL 891		BAL 891 is WDS 17349-0044
2119	BAL 2462		BAL 2462 is WDS 17590+0259
2120	BAL 2464		BAL 2464 is WDS 17592+0304

Table 3 continues on the next page.

Mind the Gap – Jonckheere Double Stars Not Listed in the WDS

Table 3 (continued). Comparison of Jonckheere Catalog with the WDS.

Jonck-heere Catalog Number	Designation for the J Num-ber in the WDS Catalog	Notes and Comments	WDS Designations
2126	BRT 1534		BRT 1534 is WDS 18237-2209
2134	BRT 1945	WDS Note: "J 2134; also J 2137. Jonckheere noted BRT1945 = J 2134; suspected J 2137 at 18356+1007 was probably the same star as well. Identity concluded af-ter search of region, despite fair amt. of discrepancy in some measures.	BRT 1945 is WDS 18355+1005
2139	BRT 2755		BRT 2755 is WDS 18379-1111
2142	HJ 1334	WDS Notes File: "Probably same as J 2142. Jonckheere gives BD as +12@3414; perhaps a misprint for BD+12@3614."	HJ 1334 is WDS 18408+1214
2147	BRT 2757	WDS Notes File: "Possibly BD-12@5164. J 2147."	BRT 2757 is WDS 18469-1222
2162	A 42 CD		A 42 is WDS 19026-0621
2164	BRT 3224		BRT 3224 is WDS 19056+1005
2165	J 1646		J 1646 is WDS 19075-1456
2169	BAL 1511		BAL 1511 is WDS 19133+0153
2190	J 135	WDS Notes File: "J 175. J 2190. OL 193."	J 135 is WDS 20157+1003
2195	ARA 1513		ARA 1513 is WDS 18079-2141
2251	HO 94		HO 94 is WDS 19043-1128
2257	BAL 1515		BAL 1515 is WDS 19168+0141
2281	J 1865		J 1865 is WDS 19485+1958
2299	HO 119		HO 119 is WDS 20111-1252
2301		No data found	
2304	BRT 2771		BRT 2771 is WDS 20131-1111
2323	MLB 534		MLB 534 is WDS 20497+2825
2331		**Listed in WDS with no coordinates.**	J 2331 is WDS 20563+2709
2335	BRT 2487	WDS Notes File: "J 2335. J notes that these are two different pairs."	BRT 2487 is WDS 20589+1741
2338	BAL 620		BAL 620 is WDS 21104-0042
2357	MLB 1050		MLB 1050 is WDS 21456+2709
2362	LEO 51		LEO 51 is WDS 21594-1012
2364		No data found	
2371		No data found	
2372	MLB 582		MLB 582 is WDS 22318+2953
2381	SMA 188		SMA 188 is WDS 23193+4343
2401		No data found	
2402	J 548		J 548 is WDS 20120-0039
2405	ALI 460		ALI 460 is WDS 22435+3645
2407	ES 2540	WDS Notes File: "J 2407, ALI 469."	ES 2540 is WDS 23215+3730
2408	BRT 3372		BRT 3372 is WDS 23355+0850

Table 3 continues on the next page.

Mind the Gap – Jonckheere Double Stars Not Listed in the WDS

Table 3 (continued). Comparison of Jonckheere Catalog with the WDS.

Jonck-heere Catalog Number	Designation for the J Num-ber in the WDS Catalog	Notes and Comments	WDS Designations
2419	OPI 9	WDS Notes File: "J 2419. KRU 2."	OPI 9 is WDS 06179+0919
2424	J 1942	WDS Notes File: "J 2424 is identical"	J 1942 is WDS 06241+2505
2425	J 2815		J 2815 is WDS 07242-0859
2436		No data found	
2437		No data found	
2439	GAU 4375	WDS Notes File: "BAL 725. J 2439."	GAU 4375 is WDS 06485-0018
2442	J 2444		J 2444 is WDS 06530+1441
2455	BAL 3006		BAL 3006 is WDS 07101+0454
2463	RST 4347		RST 4347 is WDS 07183-0317
2466	BRT 1230		BRT 1230 is WDS 07190+1314
2484	BAL 2781		BAL 2781 is WDS 07389+0421
2486	BAL 2784	WDS Notes File: "J 2486. J 2000."	BAL 2784 is WDS 07449+0349
2497	BAL 2361		BAL 2361 is WDS 09214+0248
2501		No data found	
2519	BAL 1503		BAL 1503 is WDS 18394+0111
2529		**Listed in WDS with no coordinates.**	J 2529 is WDS 18470+1126
2544	J 2265	WDS Notes File: "J 2544 is identical."	J 2265 is WDS 19215-0807
2550	BRT 1319		BRT 1319 is WDS 19323+1212
2552	BAL 1206		BAL 1206 is WDS 19345+0037
2557		No data found	
2559	BAL 915		BAL 915 is WDS 19465-0028
2560	BAL 254		BAL 254 is WDS 19514-0215
2562	BRT 1329		BRT 1329 is WDS 19524+1246
2566	BRT 1331		BRT 1331 is WDS 19591+1758
2569	J 1337	WDS Notes File: "J 2569 identical. Corrected position by Heintz."	J 1337 is WDS 20063+0639
2579	BAL 1965		BAL 1965 is WDS 18251+0258
2582	SMA 83		SMA 83 is WDS 19047+0756
2585		No data found	
2586	BRT 2296		BRT 2296 is WDS 00248+1925
2588	BRT 2336		BRT 2336 is WDS 05586+2133
2589		No data found	
2591	BRT 2347		BRT 2347 is WDS 06141+2129

Table 3 continues on the next page.

Mind the Gap – Jonckheere Double Stars Not Listed in the WDS

Table 3 (continued). Comparison of Jonckheere Catalog with the WDS.

Jonck-heere Catalog Number	Designation for the J Num-ber in the WDS Catalog	Notes and Comments	WDS Designations
2595	J 1350	WDS Notes File: "BAL 513. J 2595."	J 1350 is WDS 08503-0156
2596	BRT 1321		BRT 1321 is WDS 19377+1422
2597	BRT 2478		BRT 2478 is WDS 20306+2158
2598	BRT 58		BRT 58 is WDS 21461+2855
2606	A 2434	WDS Notes File: "HIP 26018. See Allen et al. (2000) for information on metallicity,age, galactic orbital parameters, etc. Aka J 2606."	A 2434 is WDS 05331+2002
2608	J 2452		J 2452 is WDS 07062+0425
2609	BAL 64		BAL 64 is WDS 06353-0250
2615		**Listed in WDS with no coordinates. Coded "X", Dubious Double**	J 2615 is WDS 06539+0546
2620	DOO 41	WDS Notes File: "J 2620. One-degree error in WDS des-ignation."	DOO 41 is WDS 06599+0701
2626	BRT 400		BRT 400 is WDS 07138-0502
2628	J 396		J 396 is WDS 07242+1428
2629	BAL 807		BAL 807 is WDS 07251-0050
2630	BAL 1095		BAL 1095 is WDS 07257+0022
2631	J 1064		J 1064 is WDS 07265+0923
2640	FEN 14		FEN 14 is WDS 08267-1910
2646	BRT 1471		BRT 1471 is WDS 08563-1908
2654	FEN 16		FEN 16 is WDS 09549-1750
2655	B 2248	WDS Notes File: "J 2655. BHA 13."	B 2248 is WDS 10320-2021
2656		No data found	
2658	BRT 548		BRT 548 is WDS 11022-0335
2662	FEN 20		FEN 20 is WDS 14279-1806
2684	J 111		J 111 is WDS 18588-0648
2690	J 535		J 535 is WDS 19136-0824
2693	J 1672		J 1672 is WDS 19212-1250
2705	POU 5671		POU 5671 is WDS 22138+2445
2708	BRT 122		BRT 122 is WDS 01060+2456
2709	BRT 2196	WDS Notes File: "ALI 718, J 2709."	BRT 2196 is WDSD 00134+3859
2712		**Listed in WDS with no coordinates.** WDS Note: "Not found by Heintz at IDS position."	J 2712 is WDS 00439+0946
2722	STF 541/ STFA 9	WDS Notes File: "CD : J 2722. This faint pair is be-tween kap 1 and kap 2 Tau."	STF 541/STFA 9 is WDS 04254+2218
2725	BAL 2121		BAL 2121 is WDS 04296+0350
2740	CXT 2		CXT 2 is WDS 06155+1902
2741	BAL 319		BAL 319 is WDS 06220-0202

Table 3 continues on the next page.

Mind the Gap – Jonckheere Double Stars Not Listed in the WDS

Table 3 (continued). Comparison of Jonckheere Catalog with the WDS.

Jonck-heere Catalog Number	Designation for the J Num-ber in the WDS Catalog	Notes and Comments	WDS Designations
2743	BAL 1693		BAL 1693 is WDSD 06253+0256
2746	J 2610	WDS Notes File: "BC: Also known as J 2746."	J 2610 is WDS 06375+0134
2752	BAL 1712		BAL 1712 is WDS 06448+0241
2760	BAL 1355		BAL 1355 is WDS 06534+0132
2767	POU 2185		POU 2185 is WDSD 06586+2339
2771	GAL 287	WDS Notes File: "Object #287 in Gallo's original list. GAL 420. J 2771."	GAL 287 is WDSD 07017-1100
2775	RST 4836		RST 4836 is WDS 07041-0038
2779		No data found	
2787		**Listed in WDS with no coordinates. Coded "X", Dubious Double** WDS Notes File: "Not found by Heintz."	J 2787 is WDS 07104+0535
2794		No data found	
2800	J 2459		J 2459 is WDS 07155-1106
2806	BAL 167		BAL 167 is WDS 07176-0221
2808	BAL 168		BAL 168 is WDS 07179-0221
2819	RST 4362		RST 4362 is WDS 07269-0932
2827	J 1490		J 1490 is WDS 07300-0446
2832	BAL 176		BAL 176 is WDS 07326-0250
2856	BAL 492		BAL 492 is WDS 07520-0202
2887	BRT 2713		BRT 2713 is WDS 08464-1413
2898	GCB 24		GCB 24 is WDS 09203-0817
2905	BAL 573		BAL 573 is WDS 17145-0202
2918	J 1748		J 1748 is WDS 18413-0727
2920	J 2919		J 2919 is WDS 18440-0654
2935	POU 3668		POU 3668 is WDS 19029+2429
2955	BRT 2180		BRT 2180 is WDS 19138+0632
2956	BRT 190		BRT 190 is WDS 19137+2905
2957	BRT 2453		BRT 2453 is WDS 19144+2026
2968	KRU 8 CD	WDS Notes: "J 2968. Probable light and velocity varia-tions."	KRU 8 is WDS 19268+2110
2974	GCB 41	WDS Notes File: "Also known as J 2974, TOR 14, PAN 11."	GCB 41 is WDS 19301+1117
2978	POU 3911		POU 3911 is WDS 19336+2414
3001		No data found	
3006	J 2279		J 2279 is WDS 19480+0423
3007	POU 4082 AC		POU 4082 is WDS 19478+2334

Table 3 continues on the next page.

Mind the Gap – Jonckheere Double Stars Not Listed in the WDS

Table 3 (continued). Comparison of Jonckheere Catalog with the WDS.

Jonck-heere Catalog Number	Designation for the J Num-ber in the WDS Catalog	Notes and Comments	WDS Designations
3026	BRT 2184		BRT 2184 is WDS 19541+0733
3069	GCB 52	WDS Notes File: "Heintz confirm J 3069 as identical, and corrects both positions."	GCB 52 is WDS 20167+1925
3090	GCB 55		GCB 55 is WDS 20310+2054
3100	BRT 2187		BRT 2187 is WDS 0386+1000
3101		See figures 1 through 6 above	
3123	CXT 1	WDS Notes File: "ROE 53 or J 3123."	CXT 1 is WDS 21046+3345
3176	J 2706	WDS Notes File: "ALI 457. J 3176."	J 2706 is WDS 22370+3716
3177	ES 1997		ES 1997 is WDS 22436+3811
3189	ES 2537		ES 2537 is WDS 23164+3739
3207	BAL 1214		BAL 1214 is WDS 20179+0040
3208	GCB 60		GCB 60 is WDS 20529+0529
3209	BAL 930		BAL 930 is WDS 21073-0021
3212	GCB 29	WDS Notes File: "J 3212. Also known as BRT2222."	GCB 29 is WDS 18017+3714
3214	BRT 2452		BRT 2452 is WDS 19107+2114
3216		No data found	
3219	J 2191		J 2191 is WDS 20185+0626
3222	GCB 58		GCB 58 is WDS 20317+2055
3224	ALD 5		ALD 5 is WDS 21115+3033
3225	BRT 287		BRT 287 is WDS 21149+3037
3228		No data found	
3229	FEN 5		FEN 5 is WDS 06007-1838
3232	BRT 547		BRT 547 is WDS 09424-0750
3233	BRT 435		BRT 435 is WDS 11432-0330
3236	J 3268		J 3268 is WDS 17584+1812
3239	BRT 2792		BRT 2792 is WDS 22143-1109
3247	BRT 2126		BRT 2126 is WDS 06559+0612
3248	GCB 22	WDS Notes File: "BRT 427. J 3248."	GCB 22 is WDS 09151-0825
3259	DOO 30		DOO 30 is WDS 05074+2715
3274	J 2951	WDS Notes File: "J 3274 is probably identical"	J 2951 is WDS 19129+1528
3278	BAL 624		BAL 624 is WDS 21388-0121
3281	RST 5182		RST 5182 is WDS 00351+0209
3284		No data found	

Table 3 concludes on the next page.

Mind the Gap – Jonckheere Double Stars Not Listed in the WDS

Table 3 (conclusion). Comparison of Jonckheere Catalog with the WDS.

Jonck-heere Catalog Number	Designation for the J Num-ber in the WDS Catalog	Notes and Comments	WDS Designations
3285	BAL 845		BAL 845 is WDS 08021-0049
3292	BAL 1151		BAL 1151 is WDS 09292+0024
3295	BAL 1925	WDS Notes File: "J 3295 is identical"	BAL 1925 is WDS 16469+0210
3297	BAL 1936		BAL 1936 is WDS 17238+0219
3298	BAL 2443		BAL 2443 is WDS 17345+0335
3300	BRT 37	WDS Notes File: "19129+2957 J 3300."	BRT 37 is WDS 19128+2957
3302	RST 4696		RST 4696 is WDS 21370-0617
3306		No data found	
3311	BRT 1909		BRT 1909 is WDS 09371-1350
3315	POU 4563		POU 4563 is WDS 20314+2421
3317	ES 214	WDS Notes File: "Also known as J 3317."	ES 214 is WDSD 22155+3450
3318	ES 2389		ES 2389 is WDS 22211+3544
3319	ES 2070		ES 2070 is WDS 22233+3642
3326	BRT 1315		BRT 1315 is WDS 19064+1153
3330	STF 3060 AC		STF 3060 is WDS 00059+1805
3333		No data found	
3334		No data found	
3337		No data found	
3339		No data found	
3341		No data found	
3342	J 2964		J 2964 is WDS 19240+1507
3343		No data found	
3345		No data found	
3347		No data found	
3348		No data found	
3349		No data found	
3350		No data found	
3351		No data found	
3352		No data found	