A REVISED LIST OF T-ASSOCIATIONS AND THEIR MEMBERS

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A list of 29 real and 12 possible T-associations and their members are given as well as the coordinates, diameters, distances and population of these groups. A new classification of the objects belonging to them is proposed.

The term "T-association" was first introduced by V. A. Ambartsumyan [1] to designate two open groups of variable stars of the type T Tauri which had been studied by A. Joy [2]. Variables of this type are one of the varieties of the broader class of variable stars of type RW Aurigae [3]. For this reason T-associations have also been called groupings of RW Aur-type variables. In 1950 we published the first list of these groupings, containing data on 13 T-associations [4]. In 1955 this list was supplemented [3]. The number of known T-associations had grown to 23.

At the present time the number of known RW Aur-type variables has so greatly increased in comparison with the number known in 1950 and our knowledge of their properties has so broadened that the necessity has arisen of revising the data of our first work [4] devoted to these objects. Because of the existence of various interpretations of the term "RW Aur-type variables," and also because of a real diversity in the physical characteristics and properties of variables of this type, it also seems necessary to create a more definite and detailed classification of the variables attributed to this type by various investigators. The principles of such a classification, proposed by G. Herbig, G. Haro and the author of the present work at the Byurakan Conference on Nonstable Stars, are set forth in a collection of the papers of that conference ([5], p. 183).

In essence, this classification is a classification of irregular variable stars connected with nebulae or showing rapid changes in brightness. The general property of these variables is their characteristic of being encountered in groups, T-associations, and occupying on the Hertzsprung-Russell diagrama completely special region, called by us the T-belt [6], localized in the region of the main sequence and the zone of subgiants. In this they are definitely distinguished from the red irregular variable giants, the majority of which apparently belong in reality to the semiregular variables.

In connection with the difficulty of selecting a sufficiently short term to designate this entire specific category of irregular variables, we consider it possible to agree with the proposal of K. Hoffmeister ([7], p. 25) to retain for their general designation the term "RW Aur-type variables" with a designation for each concrete variable of its known characteristics in accordance with the above-mentioned new classification of these objects.

According to this classification, each RW Aur-type irregular variable may be characterized by a combination of the following symbols:

In) an irregular variable connected with a diffuse nebula;

Is) a rapid irregular variable (the designation proposed for all RW Aur-type stars in Hoffmeister's sense [8], i.e., belonging to this type up to this time only by photometric criteria).

These symbols are supplemented by the following: e) the presence of emission lines in the spectrum; α) the presence of only one bright H_α line in the spectrum; T) the presence of a characteristic emission spectrum

of the type of T Tauri ([5], p. 95): K) the presence of a connection with a comet-shaped nebula; f) change of brightness takes place basically in the form of outbreaks, similar to the outbreaks of UV Cet-type variables; A) change of brightness is characterized basically by the presence of Algol-like weakenings.

Furthermore, we consider it absolutely necessary to include in the characteristic of the type of a given irregular variable its spectral class, which is given in parentheses to prevent confusion with the other symbols.

Thus, for example, the variable RY Tau, spectral class dGOe, assigned by A. Joy to type T Tauri, but by K. Hoffmeister to type RW Aur, observed in the region of a dark diffuse nebula and situated at the head of a bright comet-shaped nebula, is characterized by the symbol InsTK(G).

In the second edition of the "General Calalog of Variable Stars" [9] irregular stars are divided into RW Aur-type variables, red irregular giants — Ib, red irregular supergiants — Ic and irregulars of early spectral classes — Ia. The symbolism proposed above excludes the possibility of mixing the RW Aur-type variables in the new classification with variables of types Ib and Ic. But Ia-type variables are considered by us together with RW Aur-type variables. It is not excluded that among Ib-type variables are contained a certain number of RW Aur-type variables possessing slow light fluctuations at the present time.

Besides RW Aur-type variables, there are usually contained in T-associations connected with diffuse nebulae a considerable number of stars of more or less constant brightness with emission spectra whose characteristic feature is the obligatory presence of an H_α emission line. The variability in intensity of H_α emission noted in a number of such stars permits the assumption that many of them are actually variable in brightness too. The presence in typical RW Aur-class variables of long periods of almost complete constancy of brightness, together with the presence in their spectra of an H_α emission line, binds them extremely closely to the emission objects coexisting with them in T-associations. In the case where it is possible to construct a Russell diagram for a system of stars forming a T-association, emission stars of constant brightness are situated on this diagram in the same belt in which RW Aur-type variables are situated.

In all cases where we are dealing with a group of stars possessing a bright H_α line in their spectrum and situated in a region of diffuse nebulosity, many members of this group, upon due examination, prove to be irregular RW Aur-type variables, and thus the group itself a T-association.

For this reason, in revising the data on the population of T-associations, which we undertook in connection with the appearance of the new classification of RW Aur-type variables, we considered it necessary also to include in the objects considered emission stars of constant brightness observed in regions of dark nebulosity. In the future we will designate these stars by the symbol nα.

All the variables of types In, Is and Ia known to us at the present time, together with nα-stars, were plotted on a map of the heavens in Sanson's projection designed for equatorial coordinates (Fig. 1), similarly to the way in which this was done in [4]. The position of the galactic equator is indicated by the solid line. Objects whose classification is uncertain are plotted with crosses. The circles correspond to very compact T-associations. The dashed lines in Fig. 1 surround well studied portions of the Sonneberg Observatory field plan [10], in which a considerable completeness of discovery and uniformity of investigation of all variable stars up to 16^m_{pg} has been achieved. Figure 1 gives only the most general representation of the distribution of objects under consideration, showing the existence of a number of groupings, many of which were known long ago.

In Table 1 a list of actually existing T-associations known to us is presented. A list of 12 possible T-associations, designated by asterisks, is also presented.

To name the associations we accepted a system of designations analogous to the existing systems of O-association designations, introducing only the letter T between the name of the constellation and the serial number of the given assocation in this constellation. Galactic coordinates (l and b) correspond to the system with a standard galactic pole.

In column d the apparent diameter of the association is indicated. In the following columns the numbers of stars of types In, Ine, Is, Ise and nα are presented. In this case Ins-type stars are joined with In-type stars, Ia-type stars with Is-type stars. In column N the total number of stars in associations is given. The numbers of stars with uncertain classification is shown in parentheses. In column s/N the relative number of members of type Is in the association is shown in percentages (Ins-type stars are not included in this number). The ratio s/N is an important characteristic of the association, since it gives an idea of its population.

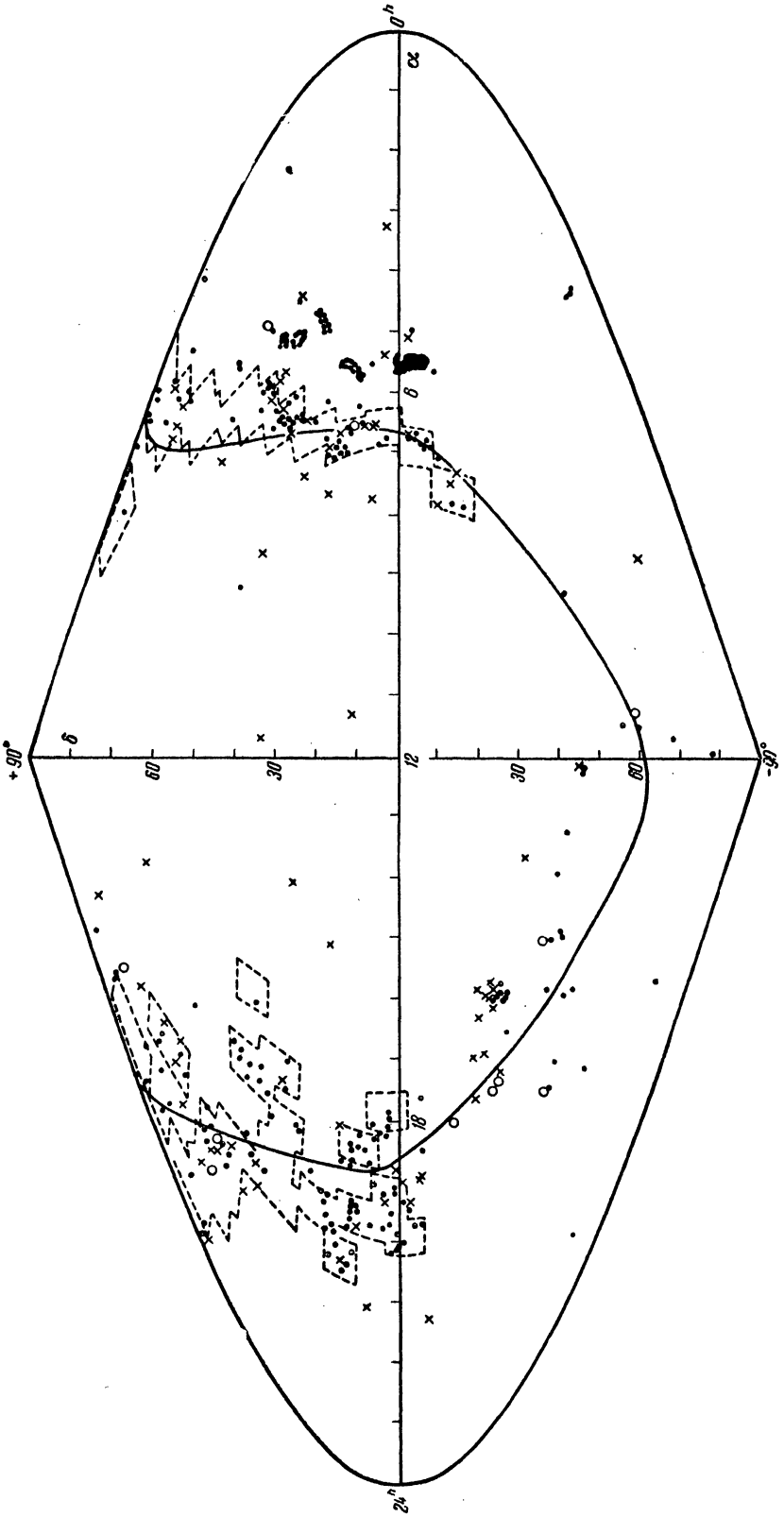

Fig. 1.

1959SvA.....3..291K

TABLE 1

№	Name	α_{1900} δ_{1900}	l b	d	In	Ine	Is	Ise	nα	N	s/N	$m-M$	r	D	
1	Cas T1	0h15m +61.°0	87.°0— 0.°9	6°	2	—	3	(1)	—	5 (1)	50	10m5±1m	750	78	VX Cas
2	Per T1	2 18 +54.3	104.0— 5.0	7×12°	—	—	5 (3)	1	—	6 (3)	89	10 .5±1.5	700	85×146	EO Per
3	Per T2	3 38.1+31.8	128.5—16.7	26′	—	4 (1)	—	—	11	15 (1)	0	—	380	2.8	IC 348
4	Tau T1	4 12 +28.0	136.7—14.4	3°	—	9 (3)	—	—	3	12 (3)	0	7	200	10	RY Tau
5	Tau T2	4 26 +18.0	146.8—18.8	1×6°	—	9 (1)	—	—	2	11 (1)	0	7	170	3×18	T Tau
6	Tau T3	4 27 +25.0	141.3—13.9	5°	3 (1)	19 (2)	—	—	24	46 (3)	0	7	170	15	UZ Tau
7	Aur T1	4 52 +31.0	140.2— 5.8	5×9°	1	6	1 (1)	(1)	5	13 (2)	13	7	170	15×27	RW Aur
8	Ori T1	5 26 +11.5	160.9—10.4	4°	1	13 (7)	—	—	28	42 (7)	0	—	400	28	CO Ori
9	Ori T2	5 30 — 5.5	176.6—18.0	4°	166 (18)	188 (33)	—	—	45	399 (51)	0	—	400	28	T Ori
10	Ori T3	5 34 — 1.8	173.7—15.4	4°	2 (2)	65 (7)	—	—	26	93 (9)	0	—	400	28	σ Ori
11	Ori T4	5 38.5+ 9.1	164.5— 9.1	3°	(1)	1	—	—	26	27 (1)	0	8	400	20	FU Ori
12	Tau T4	5 44 +26.3	150.5+ 0.9	7×9°	5 (1)	1	6 (2)	—	—	12 (3)	53	7	200	24×31	RR Tau
13	Mon T1	6 35.5+ 9.8	170.8+ 3.6	3°	22 (52)	82 (5)	1	—	36	141 (57)	0	—	800	42	NGC 2264, S Mon
14	Gem T1	6 45 +13.8	168.3+ 7.5	8°	—	—	9 (2)	—	—	9 (2)	100	7:	200	28	FY Gem
15	Lup T1	15 48 —37.5	306.2+11.1	1×7°	1	1	—	1	5 (1)	8 (1)	0	6.5±1.5	150	3×18	RU Lup, Barn. 228
16	Sco T1	16 19.5—23.2	321.6+16.4	9°	4 (7)	3	—	—	19	26 (7)	0	—	210	33	α Sco
17	Sgr T1	17 56.3—23.0	334.7— 1.7	0.°5	(3)	—	—	—	4	4 (3)	0	—	1400	12	NGC 6514 (M20)
18	Sgr T2	17 57.6—24.4	333.6— 2.6	0.°5×1°	31 (17)	6 (18)	—	—	13	50 (35)	0	—	1300	11×23	NGC 6530 (M8)
19	Sgr T3	18 3.7—23.7	334.9— 3.5	0.°5	(1)	—	—	—	6	6 (1)	0	—	1300	11	S 188, IC 1274b
20	Ser T1	18 13.2—13.8	344.7— 0.7	0.1×0.°2	(13)	—	—	—	—	(13)	0	—	2300	4×8	NGC 6611 (M16)
21	Lyr T1	18 18 +33.0	28.0+19.1	17°	—	—	13	—	—	13	100	8.5±2	400	110	LT Lyr
22	Oph T1	18 26 + 8.0	5.5+ 6.8	10×15°	4	—	15 (1)	1	—	20 (1)	76	8 ±1	300	50×75	V 426 Oph
23	CrA T1	18 55.0—37.2	327.3—19.3	0.°5	1 (1)	5	—	—	—	6 (1)	0		115	1	R CrA
24	Aql T1	19 25 — 1.0	4.4—10.4	13×20°	(2)	—	17 (3)	1	—	18 (5)	88	7 ±1	200	43×66	V 374 Aql
25	Del T1	20 0 +15.0	22.9— 9.8	11×18°	2	1	21 (3)	1	—	25 (3)	86	7 ±1	200	38×62	V 536 Aql
26	Cyg T1	20 47.4+44.0	52.3— 0.5	1°	—	1	—	—	20	21	0	10.5±1.5	600	10	IC 5070
27	Cyg T2	20 55 +45.0	54.0— 0.8	10°	5	—	3 (3)	(1)	1	9 (4)	46	6.5	150	30	CE Cyg
28	Cep T1	21 0.0+67.8	71.4+14.1	1°?	? (1)	—	—	—	—	? (1)	0				NGC 7023
29	Cyg T3	21 49.6+46.8	62.2— 5.9	0.°2	(19)	—	—	—	—	(19)	0	11 ±2	1200	4	IC 5146
30	Phe T1*	1 33 —43.0	237.8—71.6	2×5°	—	—	3	—	—	3	100	5 ±2	100	4×9	SY Phe
31	Per T3*	4 23.7+35.1	133.2— 7.7	—	—	—	—	—	1	1	0	6 ±1	150	—	NGC 1579
32	Mon T2*	6 47 — 3.4	183.8 0.0	3×12°	—	1	7 (3)	1	—	9 (3)	83	12 ±1	1150	60×240	WZ Mon
33	Pup T1*	7 34 —14.0	198.7+ 5.0	10°	—	—	2 (3)	—	—	2 (3)	100	12 ±1	1400	244	UY Pup
34	Car T1*	10 40 —59.4	255.3— 0.8	2°	(19)	—	—	—	—	(19)	0	12.5±1.5	900	30	η Car
35	Cen T1*	12 15 —46.0	265.5+15.8	1.°5	—	—	2 (1)	—	—	2 (1)	100	8 ±2	300	8	V 654 Cen
36	Cyg T4*	20 0 +35.0	39.6+ 1.3	3×6°	—	—	3 (1)	—	—	3 (1)	100	7 ±1	200	10×20	NO Cyg
37	Cyg T5*	20 20 +58	60.6+11.6	12°	—	—	4 (4)	—	—	4 (4)	100	7 ±0.5	200	40	V 561 Cyg
38	Cep T2*	22 10 +72	78.8+13.3	4°	1	—	2	—	—	3	66	8 ±2	300	20	BO Cep
39	Cep T3*	22 20 +59	72.8+ 1.7	10°	—	—	2 (1)	1	—	3 (1)	75	8 ±1	300	50	DI Cep
40	Cas T2*	23 16.3+60.7	79.9+ 0.3	⩾1′	2	—	—	—	—	2	0	7.6	300	⩾0.1	NGC 7635
41	And T1*	23 30 +48.0	78.1—12.4	3×12°	—	1	3 (1)	—	—	4 (1)	80	6 ±1.5	150	8×30	BM And

TABLE 2

I

Aql T1

Aql
FG In?
FH Ins?
V347 Is (M)
V348 Is
V354 Is (M)
V367 Is?
V374 Ise (N)
V378 Is
V394 Is
V520 Is
V527 Is
V557 IsA
V576 Is
V589 IsA
V682 Is
V686 Is
V689 Is
V752 Is
V789 Is
V856 Is
V882 Is?
Sct
XX Is
K3II
4525 Is?

Aur T1

Aur
RW IsT (G)
(satellite) ne (M)
SU Inse (G)
UY InsT (G)
AB IneA (B)
DG InsA
DY Is
GM Ine (K)
GS Ins?A
GZ I?α
Tau
DS Inse (K)
+4nα [14]

Cas T1

Cas
VX IsA (A)
BE InsA (F)
NO Is
V339 InsA
V362 IsA
BD + 62°
2363 Ia?e (O)

Cep T1

No data [15]

CrA T1

CrA
R InsTK (A)
S InsT (G)
T Inse (F)
TY Ins (B)
VV InT
DG Insα
Knox - Show
15 In? [16]

Cyg T1

Cyg
V751 Inα
+20 nα [17]

Cyg T2

Cyg
CE Is? (K)
V507 Is
V516 Ins
V517 InsA (A)
V519 IsA (A)
V521 Ins
V522 Ins
V530 InsA
V576 Is
V752 Is?
K3II
5214 Isα?
5370 Is?
LkHα — [17]
—120 nα

Cyg T3

19 In? [18]

Del T1

Aql
V536 InT (K)
V622 Is
V640 Is
V702 Is
V733 Is? (G)
V771 Is
V827 In
Del
BN IsA
BO IsA?
BZ Is
CM Is
DN Is
DP IsA
DZ Is
Sge
RS IsA
XX Ins
XY Is
AE Is
BI Is
BP Is
CC Is
CL IsA
CM Is
Vul
RZ IsA
WW IsαA (A)
CT IsA
K3II
4901 IsA?
BD + 11°
3953 Is (K)

Gem T1

Gem
EU IsA
EZ Is
FL Is
FN Is? (M)
FP Is
FT Is
FY Is
GH Is
Mon
HK IsA
KK Is
K3II
856 Is?

Lup T1

Lup
RU InsT (G)
RY Ins (G)
EX IsT
LHα 450 — [19]
—5 nα?
—6, —8 nα
CoD—33°
10685 nα
CoD — 35°
10525 nα

Lyr T1

Lyr
GN Is
HZ Is
IR Is
KS Is
LT Is
MO Is
Her
BR Is
CS IsA
MR Is
NR Is
PQ Is
PY Is
QT Is

Mon T1

Mon
R InTK (A)
S In? (O)
SS Inα (K)
GP Insα
GQ Inα
GR Ins
IO InsαA (K)
IP Insα (K)
IQ Insα
IR Is
KU Insα
KV Insα
KW Inα
KX Insα
KY Insα
KZ Inα
LL Inse (G)
LM, LO Inα
LP Ine
LQ Ine (K)
LR Ine (K)
LS Inα
LT Insα
LU Ine
LV Insα
LW Inα
LX Inα
LY Ine
LZ Inα
MM Ine
MN Inα
MO Ine (K)
MP Inα
MQ Inα
NT Insα
NU Insα
NV Inα
NW Inα
NX InsT (K)
NY Inα
NZ Inα
OO Insα
OP Inf?
OQ Inαf?
OR Insα
OS Inf?
OT In
OU In?
OV Inα
OW Ine (K)
OX Inα
OY InT (G)
OZ Insα
PP In?α
PQ Inα
PT Inse
PU Ins
PV, PX Inα
PY Inα? (G)
K3II
805 Insα
814 Inα
821 Ine
829 Ine
WVar [20]
101, 104 In?
106 In?
107 In?
110 In?
111 In?
113 In?
114 In?
117 In?
119 In?
122, 125 In?
129 In?
130 In?
139 In?
141, 143 In?
145 In?
149 In?
151, 153 In?
Walker [20]
48 In?
149 In?
150 In?
166 In?
169 In?
191 In?
LkHα [21]
1 Inα
7 Insα
8 Inα
13 Inα
15 Inα
25 In?e (A)
31 Insα
33 Inα
35 Ine
36 Inα
39 Inα
40 Inα
42 Inα?
44 Inα
53 Inα (G)
55 Inα
63 Insα
64 Inα
67 Insα
68 Ine
71 Inα
RGM [22]
1 Inf
2 Ins
3 Inα
4 Inf
5 Ins
6 In?
7 Inf
8 Inf
9 Inα
10 In?
11 Inf
12 In
13 Ins
15 In?
16 Inf
17, 20 In
21 In?
22 Inf
23 In?
24 In?
25 Insα
26 Inf?
27 Ins
28 Ine
30 Inf
31 Inα
32 In
33 Inf?
CH3
1184 In?
1186 Inα
1193 In?
1195 In?

TABLE 2 (Continued)

1196 In?
1198 In
1199, 1201 In?
No.405 ne [23]
+10 nα [21]
+25 nα [24]

Oph T1

Oph
V392 Is
V415 IsA
V426 Ise
V575 IsA
V637 Is
V641 Is
V643 Is
V645 Is
V881 Is
V886 Is
V916 Is
V956 Is
Ser
BK Ins
BQ Ins (F)
Her
KW Ins
V341 Is? (G)
Aql
V476 Is
V480 Ins
V489 Is
V490 Is
V800 Is

Ori T1

Ori
CO Inse (F)
GW Ine (K)
GX Ine (K)
GY In?α
HI Inse (K)
HK InseK (A)
HM InA
V370 Inα
K3II
587 Inαf?
HIC [14]
42 Inα
43 Inα
48 Inα
50 Inα
54 Inα
65 Inα
70 Inα
72 Inα?
MHα 265 [25]
—3 Ine?
—5 Ine?
—9 Ine?
—12 Ine?
+22 nα [14]
+6 nα [12]

Ori T2

Ori
T Inse (A)
RX In
RZ, SU Insα
SV, SX Ins
SY Insα
SZ Ins
TT In
TU Ins (G)
TV Insα (K)
TW Insα
UZ Insα
VW, WX Insα
WY Ins
WZ, XZ Insα
YY Inse (K)
YZ Inse
ZZ Insα
AA Insα (K)
AB Insα
AC In
AD Ins
AE Ins
AF In
AG Inse
AH Ins (K)
AI Insα
AK Ins (G)
AL Insα
AM Inse
AN Inse (K)
AO Insα
AP Ins
AQ In (K)
AR Ine
AS Inα
AT Insα
AU Ine
AV Inα
AW In
AX Inα
AY In
AZ Inse (K)
BB Inα
BC Inse
BD In
BE Inα
BF Inα (A)
BH In
BO Insα
BP Ins
BS Insα
BT Insα
BU Inf?
BV Insα
BW Insα
BX, BZ Inα
CC In
CD, CF Inα
CG In
CH Inα
EZ Inse (G)
GZ In
HH InsA?
HL InA?
HN In
HO In
HP Inf?
HQ In
HR In
HS InT
HT, HV In
HW Inf?
HX Inα
HY Inα
HZ Inf?
II Ins
IK In
IL In
IM Insα
IN In
IO Ins
IP In
IQ, IS Inα
IT Inf?
IV Inα
IW In
IX Ine (G)
IY In
IZ Insα
KK Inα
KL In
KM In
KN Inα
KO In
KP Inα
KQ In
KR Inse (K)
KS In (A)
KT Inα
KU In
KV In
KW Ins
KX In (B)
KY Inf?
KZ In
LL In
LM Insα
LN Inse
LO Inα
LP Ins (B)
LQ, LV In
LW Insα
LX Inα
LY Inα
LZ In (A)
MM Ins
MN In
MO Ins
MP In
MQ In
MR In (A)
MS, MW In
MX In? (G)
MY Ins
MZ In
NN In
NO Inα
NP, NR In
NS Insα
NT Inα
NU In (B)
NV Ins (F)
NW In
NX Ins
NY Inse
NZ In
OO In
OP Inα
OQ In
OR In
OT Inαf
OU In
OV In
OW Inα
OX Inf
OY Inα
OZ In
PP In
PR In
PS Ins
PT In (G)
PV In
PW Insα
PY, QQ In
V347, V349 In
V353 In
V354 Ins
V355 In
V356 Ine (K)
V357 In
V358 In
V359 In (B)
V360 Ine
V361 In (B)
V362 Ins
V363 In
V364 Insα
V365 In
V366 In
V367 Inα
V368 Inα
V369 In
V372 In (B)
V373 Ins
V374 Ins
V375, V377 In
V378 Inf?
V379 Inf
V380 IneK (A)
V381 Inα
V383 Inf
V384 Inαf (K)
V385 Inf
V386 Inf (K)
V387 In
V388 In
V389 Inef (K)
V390 Inαf (K)
V391 Inαf (K)
V393 Inα (K)
V394 Inf
V395 In
V396 Inα
V397 Ins
V398 Inα
V399 Inf?
V400 Inα
V401, V407 In
V408 Inf
V409 In
V410 In
V411 Inα
V412 Inα
V413 In
V414 Inα
V415 Insα
V416 Insα
V417 In
V418 In
V419 Inαf?
V420 In
V421 In
V422 Inα
V423 Inα
V424 Insα
V425 In
V426 In
V427 Inf
V428 Inαf?
K3II
570 In? (F)
100518 Inα
100565 Inα
100576 Inα
100625 Inα
100635 Inα
Haro [26]
1, 4 In?α
7 In?α
7a In
8 In?α
8a In
9, 14 In?α
17 In?α
20 Inα
21, 23 In?α
25 In?α
27 In?α
28 In?α
35 Inα
39 In?α
40 In?α
48 In?α
53 In?α
54 In?α
59 In?α
62, 64 In?α
69 In?α
70 In?α
80, 83 Inα
85 Inα
86 Inα
95 Inα
96 Inα
98 Inα
101 Inα
102 Inα
105 Inα

TABLE 2 (Continued)

106 Inα
108 Inα
109 Inα
112 Inα
121 Inα
125 Inα
132 Inα
134 Inα
136 Inα
140, 142 Inα
145 Inα
147 Inα
151, 153 Inα
158 Inα
162 Inα
164 Inα
165 Inα
167 Inα
170 Inα
171 Inα
175 Inα
178 Inα
183, 185 Inα
190, 192 Inα
195 Inα
199 Inα
204, 208 Inα
213 Inα
216 Inα
218 Inα
221, 224 Inα
231 Inα
233 Inα
234 Inα
237 Inα
242 Inα
245, 248 Inα
250 Inα
253 Inα
254 Inα

Rosino [27]
8 In
10 In
19 In
20 In
21, 23 Ins
25 In
26 Ins
29 In
31 In
34, 36 In
37 In?α
38 In
39 In
41 Ins
42 In
46 Ins
58 In

II [28]
1396 In
1547 In
1563 Inα
1733 In
1864 In?
1892 In?
2472 In?

Ton. [29]
11 Inαf

HM [30]
86 Inα
+45 nα [26]
+7 objects of Herbig – Haro

Ori T3

Ori
RU, RW Inα
RY Inse (F)
TX Inα
TY In?
TZ In?
BG Inα
PQ Ins
PU Insα
V351 InsA (A)

КЗП
645 Inα
652 Inα

HM [30]
4 Inα
5 Inα
6 In?α
8 Inα
13 Inα
14 Inα
16 In?α
17, 22 Inα
24 Inα
25 Inα
28 Inα
30 Inα
31 Inα
34 Inα
36 In?α
38, 43 Inα
44 In?α
46 Inα
48, 57 Inα
60 Inα
64 In?α
65 Inα
66 Inα
69, 74 Inα
76 Inα
77 In?α
79 Inα
81 Inα
85 In?α
89, 97 Inα
+26 nα [30]

Ori T4

Ori
FU In?K (F)
QR Insα
+26 nα [12]

Per T1

Per
CF Is
CU Is
DN IsA
EG Is?
EM Is?
EN IsA
EO IsαA (OB)
IS Is

Cas
PS Is?

Per T2

LkHα [31]
85 Inα
88 Inα
89 Inα
90 In?α
96 Inα
+11 nα [31]

Sgr T1

L [32] In?
D1 [32] In?
D2 [32] In?
+4 nα [32]

Sgr,T2

Sgr
SV Ine [G]

WVar [33]
1 In
2 Inα?
3 In
4 In
5 In?
6, 8 In
9 In?
10 In?
11 In?α
12 In?
13 Inα
14 Inα?
15 In
16 In
17 In?
18 Inα?
19 In
20 In
22 In?
23, 25 Inα?
26, 29 In
30 In?
31 Inα?
32 In?
33, 35 Inα?
36 In
37 In
38 In?
39 Inα
40 Inα?
41 In
42 In?
43 In?
44 Inα?
45 Inα?
46, 48 In
49 Inα?
50 In
51 In
52 In?
53 Inα?
54 Inα?
55 In
56 In
57 In?
58 In (K)
59 Inα
60 Inα?
61, 64 In
65 In?
66 In
67 In
68 Inα
69 In?

Petit [34]
An. 1 In?
An. 2 In?
+13 nα [32]

Sgr T3

Sgr
SY InsA? (F)
+6 nα [32]

Sco T1

Sco
UW In?
UZ In
AN InsA?
AQ In?
AT In
AU In
BP Insα
V725 In

Oph
V852 Ine (A)
V853 Ine (K)

КЗН
2642 In?
2695 In?
2748 In?
2782 In?
+16 nα [35]
+4 nα [36]

Ser T1

13 In? [18]

Tau T1

Tau
RY InsTK (G)
BP InsT (K)
CW InT (K)
CX Ine (M)
CY Inse (M)
CZ IneK (M)
DD InTK (K)
DE InsT (M)
MHα 259—[25]
—4 In?α
—23 In?e (M)

СП3
1098 In?α
HIC [14]
5 Inα
+3 nα [14]

Tau T2

Tau
T InsT (G)
UX InsT (G)
(satellite) ne (M)
XZ InsT (G)
DM InT (K)
DQ InT (M)
DR InT (K)
MHα 257—[25]
—3 In?e (N)
—2 InT (K)
HIC [14]
24 Inα
37 Inα
14 nα

Tau T3

Tau
UZ InsT (G)
(satellite) ne (M)
ZZ Ins?
AA InsT (M)
CI InT (G)
DF InsT (M)
DG InsTK (G)
DH, DK Inse (M)
DL InsT (G)
DN InsT (K)
DO InT (G)
DP Ine (M)
EY Inef (M)
EZ Inef (M)
FF Inf (M)
FG Inf (M)
FH Inef (M)
FI Inf (M)
FK Inef (M)

HIC [14]
21 Inα
22 Inα
31 Inα

BD + 26°
722 Ine? (K)

MHα 259—[25]
—14 In?e (A)
—16 ne (K)

TABLE 2 (Continued)

−24	nα
+21	nα [14]
Tau T4	
Tau	
RR	Insα (A)
BT	Ins
CN	Is
CQ	InsA (F)
CT	Is (B)
EN	InA
EO	InsA
Aur	
BL	Is
FS	Is
FX	Is
HH	Ins (G)
Gem	
DP	Is
DS	Ins?
КЗП	
662	Is?
СП3	
1100	Is? (K)
II	
And T1	
And	
BM	Inse (F)
BY	Is?
DI	Is
Cas	
V338	Is (M)
Lac	
FO	Is
Car T1	
Car	
VV	In?
AY	In?
BD, BH	In?
BK	In?
BM	In?
BN	In?
BQ	In?
BR	In?
BU	In?
BV	In?
BY	In?
КЗП	
1622	In?
1643	In?
1646	In?
1648	In?
Cas T2	
Cas	
MO	In
MP	In
Cen T1	
Cen	
V392	Is
V653	Is?
V654	Is
Cep T2	
Cep	
SV	Is (A)?
BH	IsA (F)
BO	InsA (F)
Cep T3	
Cep	
SY	IsA (A)
YZ	IsA (F)
DI	IsT (K)
DZ	IsA?
Cyg T4	
Cyg	
NO	Ia (G)
V425	Ia (F)
V724	IsA
КЗП	
5097	Is?
Cyg T5	
Cyg	
V561	Is
V757	Is?
V761	Is
Cep	
DR	Is
DU	Is
КЗП	
5046	Is?
5154	Is?
5238	Is? (K)
Mon T2	
Mon	
WZ	Is
XY	Is
ZZ	Is
AD	Is
BQ	Ins
DK	Is
DO	Is (M)
DZ	Is
HH	Is? (F)
PZ	Ief? (K)
КЗП	
867	Is?
890	IsA?
Per T3	
LkHα — [37]	
−101	ne
Phe T1	
Phe	
SY	Is (F)
SZ	Is
TT	Is
Pup T1	
Pup	
UY	Is
FU	Is
CMa	
DZ	Is? (G)
КЗП	
1071	IsA? (F)
1162	Is?
III	
Aur	
AE	InK (O)
Boo	
UV	Is? (F)
Car	
DI	Inse
ES	Ins
Cen	
V342	Is
V540	IsA?
μ	Iae (B)
Cha	
T	Ins
CrA	
BN	Is
Cyg	
GY	Is? (M)
V568	Ia?e (B)
V733	Is?
Dra	
VX	IsA?
AQ	Ise? (F)
Gem	
BN	Ia?e (O)
Her	
AM	Is
HZ	Is
o	Ia? (B)
Lyn	
ST	Is
Mon	
VY	Inα
+2	nα [23]
Oph	
XX	IseA (B)
IX	In
V742	In?
Ori	
UX	Isα (A)
BN	Is (A)
CY	Is (G)
V339	Is
V346	IsA? (A)
V350	Is
Pav	
BS	IsA?
Per	
X	Ine (O)
XY	InsA(B,A)
HQ	Is
φ	Iae (B)
Psc	
RZ	IsA (G)
Sgr	
DU	Ins?
V771	Iae (B)
Sco	
AK	InsA (F)
V641	Is
V643	Ia
Tau	
BU	Iane (B)
Tel	
HH	Is
Vel	
BS	Is
КЗП	
511	Is?
566	Is?
720	IsA
963	Is?
1140	Is?
1736	Is?
3095	In?
5382	Is?
5423	Is?A
5609	IsA
101212	Is? (G)
BD + 22°	
545	Ins? (A)
BD + 56°	
728	Ia?e (O)
BD + 67°	
168	Ia (A)
x Cet	Is? (G)
СП3	
1090	Ine? (B)
Ori	
25	IseA? (B)
CoD — 59°	
1105	Ie? (F)
BD + 16°	
2767	Is? (K)
BD + 33°	
1646	Ie? (M)

In column m−M the visual distance modulus of the associations is given. It is determined by comparing the distribution of visual magnitudes of members of the association with the T-belt on the Russell diagram [6]. Such a comparison leads to a quite positive result only when several stars with known spectral classes are present in the group. In the absence of data on spectral classes we have assumed that the majority of stars of the group belong the spectral classes G−K. It should be emphasized that in essence we know only that In-type variables are situated within the T-belt. As to Is-type variables not connected with nebulae, we can assume that they also lie with the T-belt only as a first working hypothesis.

In column r real distances from the sun to the groupings under consideration are expressed in parsecs. They were obtained from the magnitudes of m−M with consideration of light absorption, according to P. P. Parenago's method [11]. We can judge the accuracy with which the values of r are determined by the accuracy with which the corresponding values of m−M are determined. In those cases where the system enters into an O-association and the distance to it is determined from B stars with constant brightness, and absorption is taken into account by using the color excesses of these stars, a dash appears in column m−M.

In column D the real diameters of the associations are expressed in parsecs. Finally, the name of the star, cluster, or nebula under which the given grouping has been referred to in previous works devoted to its study is presented in the last column of the table.

It must be mentioned that together with RW Aur-type variables we have considered variable stars of certain rare types (RCrB, Z, Cam, nova-like and unique stars) in order to establish that they are related to T-associations. The pecularities in the change of brightness of many of these stars is similar to pecularities in RW Aur-type irregular variables. For many of them the periods of constant light are characteristics. The brightness curves of RCrB-type variables very much suggest the curves of Algol-like RW Aur-type variables.

We did not succeed in discovering a definite connection between variables of the rare types mentioned above and T-associations. Only in a few cases did the clear occurrence in T-associations of poorly studied variables assigned in the "General Catalog of Variable Stars" [9] to type RCrB permit us to transfer them to type InA.

It is pertinent to draw attention also to the discovery by G. A. Manova [12] of a group of emission stars in the region of parabolic hydrogen nebula S 280 [13] bordering a dark nebula in whose center is situated the remarkable variable FU Ori. This discovery shows that FU Ori is not only connected with a dark and a comet-shaped nebula but is also situated in a T-association, which makes still more probable the hypothesis we enunciated on the possibility that this star belongs to type RW Aur [3].

In Table 2 a list of all stars of class RW Aur is presented with a designation of their type in the new classification. The table is split up into three sections. In section I the members of real T-associations are given (separately for each association), in section II members of possible T-associations and, finally, in section III isolated variables of this type. In assigning variables to the second or third sections, a certain subjectiveness was unavoidable; in exactly the same way errors were possible in the assignment of almost any concrete star to one association or the other.

In order to simplify the identification of variables which have no generally accepted final or preliminary designations, references to works containing data on such stars are given in square brackets, along with the appropriate symbols.

In a separate article we will consider peculiarities in the system of T-associations and certain other questions connected with the interpretation of the data presented above.

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