On the point of convergence of the Hyades

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A comparison between the colour indices of Frl. Güssow with the mean c_2/T' values given in *B.A.N.* No. 329 led to the formula: $c_2/T' = 2{\cdot}520 + 4{\cdot}093 \times (m_b - m_g)$. The corresponding values of c_2/T', for which the weight 90 was adopted except for 5 yellow stars, are given in the accompanying table together with the improved mean values of c_2/T' and their increased weights. For 5 yellow stars $m_b - m_g$ was graphically reduced to the c_2/T' scale. The weight 35 was assigned to the 5 values of c_2/T' thus obtained.

star name or P.G.C.	$\frac{c_2}{T'}$ Güssow	$\frac{c_2}{T'}$ mean	weight	star name or P.G.C.	$\frac{c_2}{T'}$ Güssow	$\frac{c_2}{T'}$ mean	weight	star name or P.G.C.	$\frac{c_2}{T'}$ Güssow	$\frac{c_2}{T'}$ mean	weight
β Cas	2·10	2·25	1639	36 Gem	1·78			ζ Dra	1·57	1·54	763
ζ Cas	1·46	1·38	1215	δ Gem	2·01	2·20	838	4382	2·16		
α Cas	3·74	3·58	634	ι Gem	3·35	3·36	644	β Dra	3·33	3·21	1287
η Cas	2·58	2·60	528	ρ Gem	2·08	2·15	365	γ Dra	4·41	4·34	667
γ Cas	1·36	(1·64)	1730	κ Gem	3·24	3·24	652	4620	1·64	1·53	158
δ Cas	1·92	1·91	1477	β Gem	3·19	3·36	903	μ Lyr	1·84		
ε Cas	1·42	1·49	1689	χ Cnc	2·41			α Lyr	1·70	1·69	1822
4 Per	1·64	1·55	264	σ_2 Cnc	3·53	3·44	158	γ Lyr	1·72	1·65	1083
γ And	3·70			ι UMa	2·06	2·01	880	ι Lyr	1·67	1·52	332
58 And	1·92	1·89	181	10 UMa	2·40	2·37	417	η Lyr	1·57	1·42	854
β Tri	1·99	1·91	1051	2437	3·53	3·34	612	ϑ Cyg	2·30	2·30	563
γ Tri	1·82	1·71	479	15 UMa	2·25	2·19	314	14 Cyg	1·75		
62 And	1·81			23 UMa	2·20	2·22	716	δ Cyg	1·72	1·63	1443
16 Per	2·23	2·20	448	ϑ UMa	2·41	2·46	934	5113	1·63		
π Per	1·88	1·75	196	υ UMa	2·10	2·14	727	γ Cyg	2·75	2·76	1385
ι Per	2·49	2·62	730	36 UMa	2·49	2·51	280	α Cyg	1·70	1·84	1598
κ Per	3·38	3·34	482	β UMa	1·69	1·70	1874	51 Cyg	1·63	1·54	332
α Per	2·10	2·47	1269	α UMa	3·47	3·50	735	5344	2·58	2·58	564
δ Per	1·49	1·55	1611	γ UMa	1·76	1·72	1590	η Cep	3·32	3·30	445
ε Per	1·46	1·45	2038	δ UMa	1·94	1·86	793	α Cep	2·03	2·05	1520
ξ Per	1·70	1·69	1140	ε UMa	1·60	1·70	1709	9 Cep	1·96	2·00	814
υ Tau	2·18	2·14	285	ζ UMa	1·77	1·78	1264	14 Cep	1·68	1·64	292
α Tau	4·16	4·43	625	η UMa	1·42	1·47	2150	ε Cep	2·17	2·16	534
97 Tau	2·09			86 UMa	1·76			4 Lac	1·73	1·80	516
ι Tau	2·02	1·96	280	α Dra	1·72	1·71	875	38 Peg	1·80		
103 Tau	1·71			β UMi	4·27	4·25	795	6 Lac	1·61	1·54	687
β Tau	1·40	1·53	1857	γ UMi	1·85	1·78	1036	10 Lac	1·45	1·36	1195
ζ Tau	1·39	1·41	1215	4021	2·00	1·86	158	η Peg	3·06	3·07	1062
χ_1 Ori	2·73	2·66	296	ϑ Dra	2·56	2·53	394	2 And	1·95		
μ Gem	4·54	4·50	380	η Dra	3·29	3·18	1236	7 And	2·16	1·94	547
ε Gem	4·17	4·03	615	19 Dra	2·48	2·44	280	18 And	1·68		
								σ Cas	1·52	1·52	713

On the point of convergence of the Hyades, by *Ejnar Hertzsprung.*

The present note contains a determination of the point of convergence of the Hyades by the use of the directions of the proper motions or the positions of their poles, which define points 90° away from the point of convergence.

The 32 stars used here are listed in Table 1. The proper motions have been taken from the G.C. In selecting the stars the radial velocity and the accuracy of the proper motion were taken into account. The 32 stars were given equal weight.

From a provisional examination of the case it is evident that the position of the point of convergence will be much more uncertain in the direction towards the centre of the group (66°·36, + 16°·66) than at right angles to that direction. The mean error ellipse is oriented in such a way that the equatorial co-ordinates of the point of convergence, A and D, are bound to one another.

For each of the 11 different pairs of A and D, given in Table 2, $\Sigma \sin^2 s$ was calculated, where s is the distance of the star's track from the point A, D considered. The values of $\Sigma \sin^2 s$ are well represented by the formula:

$10^4 \Sigma \sin^2 s = 77{\cdot}76 + 65{\cdot}67\, t_1 - 43{\cdot}50\, t_2 + 747{\cdot}45\, t_1^2 - 571{\cdot}84\, t_1 t_2 + 128{\cdot}02\, t_2^2$, where $t_1 = (D - 7°)/3$ and $t_2 = (96° - A)/3$.

Hence $\Sigma \sin^2 s$ is minimum for A = 94°·52, D = + 7°·43.

The position of the ellipse of mean errors is shown in Figure 1. It has an eccentricity of ·99 ($a/b = 7{\cdot}27$) and its major axis lies in the direction 111°·36.

The distance of the point of convergence from the centre of the group as defined above is 29°·00 ± 1°·15 (m.e.). At right angles to this direction the mean error of the position of the point of convergence in the system of the G.C. is ± °·16.

TABLE 1.

GC	star name	α (1950)	δ (1950)	$\mu_\alpha \cos\delta$ ″/1000 y	μ_δ ″/1000 y	sin s	ξ	η	$\xi_o - \xi_c$
		°	°						
3562	47 Ari	43·80	20·47	232	−33	+·011	·149	·375	+·012
4677		57·58	17·18	148	−28	+ 3	·155	·333	+ 3
4807		59·48	18·05	134	−33	+ 11	·149	·389	+ 13
4995	43 Tau	61·56	19·48	109	−32	+ 3	·162	·443	+ 4
5042	45 ,,	62·17	5·39	149	11	+ 11	·118	−·021	+ 10
5189	51 ,,	63·86	21·46	98	−35	− 10	·183	·519	− 10
5226	γ ,,	64·24	15·51	119	−24	− 3	·159	·310	− 3
5234	57 ,,	64·29	13·92	116	−20	+ 5	·146	·267	+ 6
5252	58 ,,	64·44	14·98	110	−23	+ 7	·148	·310	+ 8
5287	60 ,,	64·81	13·96	114	−25	+ 25	·128	·311	+ 27
5304	δ ,,	65·01	17·43	110	−31	+ 2	·160	·400	+ 3
5315	63 ,,	65·14	16·66	106	−29	+ 9	·152	·384	+ 10
5328	64 ,,	65·30	17·33	113	−39	+ 31	·132	·444	+ 34
5350	65 ,,	65·60	22·18	100	−48	+ 20	·153	·624	+ 26
5351	67 ,,	65·61	22·09	113	−54	+ 21	·156	·639	+ 27
5354	68 ,,	65·65	17·82	111	−29	− 17	·180	·382	− 18
5370	υ ,,	65·83	22·70	108	−47	− 8	·188	·602	− 8
5430	ε ,,	66·42	19·07	112	−38	− 5	·173	·467	− 5
5433	ζ_1 ,,	66·43	15·85	105	−28	+ 9	·150	·367	+ 11
5436	ζ_2 ,,	66·45	15·76	105	−26	+ 2	·156	·348	+ 2
5480		66·92	16·09	110	−28	− 2	·161	·358	− 1
5482	81 ,,	66·95	15·58	106	−24	− 7	·164	·327	− 7
5517	85 ,,	67·25	15·75	104	−28	+ 7	·152	·367	+ 9
5643	89 ,,	68·82	15·93	95	−24	− 12	·172	·348	− 13
5645	90 ,,	68·84	12·61	101	−12	− 18	·165	·194	− 19
5666	92 ,,	69·10	15·82	84	−18	− 28	·185	·310	− 29
5767		70·41	11·05	100	−14	+ 10	·136	·200	+ 10
5907	97 ,,	72·11	18·76	81	−35	− 8	·183	·539	− 8
6085	101 ,,	74·22	15·84	91	−24	− 37	·198	·341	− 40
6158	ι ,,	75·03	21·52	67	−43	− 8	·203	·768	− 9
6300	16 Ori	76·64	9·77	65	− 4	− 14	·153	·100	− 15
6973	122 Tau	83·54	17·01	49	−34	− 24	·222	·758	− 29

FIGURE 1.

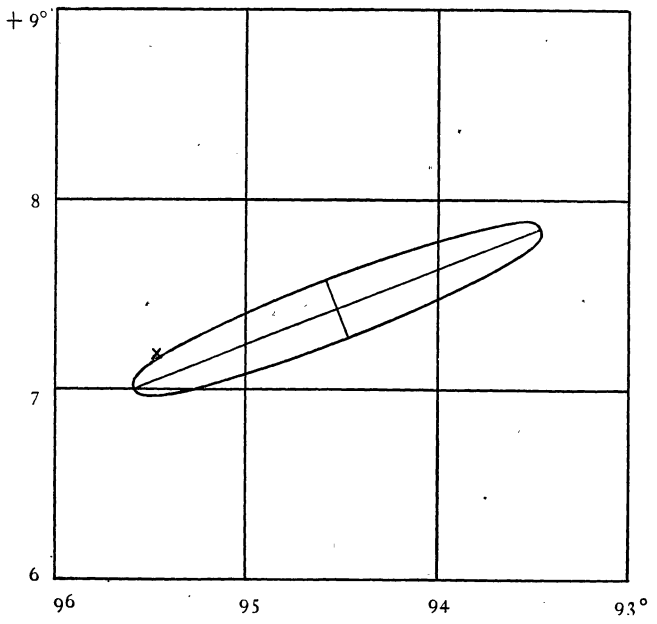

Figure 2 shows in central projection on a plane tangent to the North Pole the positions of the poles of the proper motions of the 32 stars. The normal from the Pole to a straight line through these points defines A by its direction and tang D by its length.

In Table 1 is $\xi = -\text{cotang}\,\delta_P \sin\alpha_P$ and $\eta = -\text{cotang}\,\delta_P \cos\alpha_P$, where α_P and δ_P are the co-ordinates of the pole of the proper motion. Thus ξ and η are the rectangular co-ordinates of the pole of the proper motion in the projection shown in Figure 2. The linear relation between ξ and η is found to be $\xi = ·1297 + ·0835\,\eta$. If the effect of the small distortion caused by the central projection on the positional accuracy of the points in Figure 2 is disregarded, the co-ordinates of the point of convergence are found to be A = 94°·77, D = +7°·37 or practically the same as by the $\Sigma \sin^2 s$ = min. method.

Four of the 32 stars used above, viz. G.C. 5226,

TABLE 2.

A	D	t_1	t_2	$10^4 \Sigma \sin^2 s$ O	C
105°	4°	−1	−3	329	327
102	4	−1	−2	211	215
99	4	−1	−1	361	359
102	7	0	−2	679	677
99	7	0	−1	245	249
96	7	0	0	78	78
93	7	0	1	167	162
90	7	0	2	501	503
93	10	1	1	401	404
90	10	1	2	178	172
87	10	1	3	194	197