ASTRONOMISCHE NACHRICHTEN.

N^o 3680-81.

Band 154.

8-9.

Double Star Observations.

Continued from A. N. 3466. By *W. Doberck*.

The following observations were, during my leave of absence from the Hongkong Observatory, made at the University Observatory, Copenhagen, by kind permission of Professor Thiele, who in 1894 added a new refractor with the most modern equipment to the instruments formerly in the observatory.

The object glass by Steinheil is of 14 inches diameter and $15\frac{1}{2}$ feet focal length. In spite of its shortness the definition is as good as in the Markree refractor of nearly equal diameter but of nearly double the length. However, I have not yet met with any large object glass, whose definition was defective. Such a glass must be judged by its performance under the best atmospheric conditions, and to bring out the defects would require an ideal state of the atmosphere. In this last respect, which is of vital importance, the observatory in Copenhagen, is to be classed midway between the observatory at Markree and observatories in the United States. It was not till late in October that I began to reduce the aperture to 10 or 8 inches. My experience at Markree would cause me to prefer a »gitter«, or a metal plate perforated by numerous circular holes before the object glass. But the images of the stars in the Copenhagen refractor are much fainter than in other refractors of smaller apertures, through which I have looked elsewhere. This may be attributed partly to its situation in the midst of a large town, but is no doubt due also to the great convexity of the lenses both in the object glass and in the eyepiece, owing to which a great percentage of the light is lost by reflection. It might be possible to obviate the drawback by using single lenses in the eyepiece in measuring close double stars. The short focal length by which the primary enlargement of the image is so much reduced, to be afterwards increased by a powerful eyepiece, is a great drawback for micrometric measures, both because it is more difficult to focus and to use the small eyepiece, and because the diameters of the wires are proportionately increased (quartz fibres not spider-lines ought to be used in so short telescopes), and also because a very much stronger light is then required to illuminate the field. In Copenhagen this illumination is insufficient under the highest powers. The shortness of the telescope was necessitated by the dimensions of d'Arrest's old dome, which could not be changed.

The telescope was mounted by Repsold in Hamburg and is quite steady except as regards the clamp in right-ascension, which did not always act satisfactorily, and sometimes allowed the telescope to tremble, when a moderate

breeze was blowing towards the shutter opening. Also the clamp, when applied, does not act at once, which is exceedingly inconvenient when a high power is in use. The driving clock, which goes some four or five hours without re-winding, is simply perfect, and is not approached in any instrument known to me. This is of course an improvement of the most vital description for double-star work, but it happens at times though rarely, that the clock (no doubt on account of too small driving weight) will not drive the telescope along. Once or twice I had then to work without having the telescope connected with the driving clock. On the whole Repsold's instrument is delicate and must be used with great care. It does not allow such rough handling as the American instruments, the prototype of which is Grubb's equatoreal at Markree, every part of which is strong and massive, while the German instruments have been evolved out of Fraunhofer's smaller and more delicate equatoreal at Dorpat. The goodness of the driving clock is especially useful in measuring double stars, whose components are several seconds asunder. In case of the closest couples the improvement fell short of my expectations, for I had anticipated that all difficulty in measuring double stars would vanish together with defects in the driving clock, which proved to be not quite the case. — The circles are read in microscopes placed near the eye-end and at the foot of the pier respectively, the circles being illuminated by electric light, which never failed. This arrangement is at least as convenient as any adopted in America, and is more accurate.

The micrometer is revolved in position angle by aid of a ring, which also serves to protect this fine apparatus from accidental blows. The field is illuminated by the same electric lamp, that illuminates the declination circle, but the illumination of the field is too faint under a high power. If it were greatly increased, it would also be well to have it coloured a pure red, which not only is agreeable to the eye but makes the blue light in the stars more conspicuous by contrast, and as the blue diffraction disc is smaller than the red, the apparent diameters of the components would be decreased, and the separating power improved. Blue glasses might even be introduced with advantage before the eyepiece for measuring close and bright double stars under high power. By turning two buttons other lamps, which illuminate the wires in a dark field, or the position circle and micrometer head, are lighted instead of the lamp referred to. The position angle is read in microscopes, the field of which requires to be doubled, and whose power

might as well be reduced to half of what it is at present. I could find no trace of excentricity or errors of division in the circle. The distance is measured by two wires of 0.37 diameter, and the angle is measured by aid of a wire perpendicular upon them. This third wire should be removed, when double stars are under observation, as it has a marked, disturbing effect. It is much better to have only two parallel wires in the field. Measuring the angle with the stars alternately on either side of the parallel wires, the difference sometimes amounted to a degree or several degrees. The sudden change in personal equation, no doubt remarked by all observers, while the observations are proceeding, which I rarely experienced at Markree but very often at Hongkong, never has occurred at Copenhagen.

One of the two parallel wires is fixed except in so far as it may be pushed a quarter revolution forwards or backwards, so as to eliminate the principal term in the expression for the periodic error, if any, in the screw. The divided head (on the other side) shows number of whole revolutions and decimal parts. Diametrically opposite to this is situated the head of a screw carrying the eyepiece. On one side of this is the head of the screw, mentioned above, that

Copenhagen.

Distance	Angle				Distance
	P. E.	Accidental error	Constant error	P. E.	
0.43	± 2.17	± 0.016	± 1.43	± 1.63	± 0.040
0.73	± 1.16	± 0.014	± 0.77	± 0.87	
1.24	± 1.01	± 0.022	± 0.59	± 0.82	
4.15	± 0.40	± 0.032	± 0.38	± 0.11	
72	± 0.15	± 0.188	± 0.15	0.00	

The accidental and still more the constant errors in position angle were much smaller at Copenhagen than at Columbus, O. The comparatively large error found in case of very great distances, is due to the manner of observing double stars. Were the micrometer and the telescope, respectively, reversed, as done when annual parallax is in question, this error could be reduced. The accidental error in the distances measured at Copenhagen is small while the distance remains below the sum of the wire thicknesses. When it exceeds this the error is larger but appears to be constant for all distances. This is due to the perfect clock at Copenhagen. Therefore this instrument is specially adapted for the determination of annual parallaxes.

At Columbus, O., the errors in measures of distances were smaller, but increased, as usual, with the distance. This is due to the use of Dawes' slide in the customary manner. When we compare the measures of double stars with measures of length in physical laboratories, where lengths are measured to nearly a millionth part, we see that the former are very rough. That is due to the atmosphere, for which there is no help except by erecting telescopes on high mountains.

The »constant errors«, referred to above, were discovered by Sir John Herschel, who termed them thus, because he found them constant during the night, though he

changes the zero, and on the other side is the head of a screw for moving both wires together. This screw is, however, not so convenient as Dawes' slide, in which the screw-head is fixed opposite to the divided head. In using a Dawes' slide the right hand of the observer has hold of the divided screw-head, while the left hand grasps the head of the screw moving both the wires. In Repsold's eyepiece the latter is apparently intended for only an occasional fine setting, the quality of the clock obviating the necessity for the slide.

In order to investigate the apparatus for measuring the distances, I observed a coincidence of the wires in four different positions of the head of the screw. Taking the differences from the mean I obtained with head up $+0.068$, with head down -0.066 , with head to the right -0.066 , and to the left $+0.064$. As I measure always double distances the change of zero, even if such exists, has no influence on the observations.

The following table exhibits the accidental and constant errors of one night's results, determined from the observations obtained during the summer months only at Copenhagen in 1900 and at Columbus, O., in 1897 (A. N. 3466).

Columbus, O.

Distance	Angle				Distance
	P. E.	Accidental error	Constant error	P. E.	
0.33	± 4.24	± 0.025	± 2.00	± 3.74	± 0.017
0.79	± 1.68	± 0.023	± 0.88	± 1.43	± 0.054
1.37	± 1.14	± 0.028	± 0.94	± 0.65	± 0.059
3.52	± 0.60	± 0.037	± 0.40	± 0.45	± 0.086

found them to be different on different nights. Attempts have since been made to apply harmonic analysis to the discussion of such errors, but it has been ascertained by Professor Thiele after extensive researches that such attempts must prove abortive, because they are constantly undergoing change, and Professor Thiele considers the term »constant errors« most objectionable. Sir John Herschel proposed to eliminate them by observing the images reflected from mercury. To carry out this suggestion with a large telescope is so difficult that it has never been attempted. Dawes' prism, placed before the eyepiece, enables the images to be kept horizontal, but one never hears of its being used of late. The hour angle at which the components are horizontal might be calculated and the objects in some cases observed in that hour angle. However, the constant errors, owing to the late improvements in driving clocks, are much smaller than formerly.

The dome is moved by a dynamo. It revolves an entire revolution in about 8 minutes. d'Arrest's old crank for opening the shutter is still doing its work. The chairs and steps are convenient, but still not so convenient as Burnham's chair.

But although arrangements might be further improved by combining the good points in the American instruments with the achievements of European constructors, it is still

possible for a single observer without any help to measure 20 double stars in one night at Copenhagen, weather permitting, and as I who had the use of the instrument during only a limited number of hours each night, obtained nearly 500 measures in four months, it is quite easy for an observer enjoying the sole use of this instrument to secure 1000 observations a year.

Observer Pechüle gave me the necessary instruction in the use of the apparatus and the value of a screw revolution. To him as well as to the Director, and to the whole staff I am indebted for much courtesy.

The first column in the following table exhibits the name and the number in the discoverer's catalogue, the second the right ascension, the third the declination for 1900, the fourth the epoch, the fifth the position angle, the sixth the mean of the errors of the single observations (the probable error cannot be calculated from this when the number of observations is less than eight), the seventh the number of observations, the eighth the distance, the ninth the number of measures, the tenth the hour angle, the eleventh the definition and steadiness, and the twelfth the magnifying power. The three last columns exhibit the annual means.

Name	RA.	Decl.	1900 +	θ	m	n	ρ	n	t	D, S	Power	Means		
												1900 +	θ	ρ
H. I. 39	0 ^h 1 ^m	+57° 53'	.751 .787 .803 .808	344.0 346.1 344.2 343.7	1.3 2.3 0.3 3.0	4 4 3 4	1".46 — 1.32 1.46	4 — 4 4	—3 ^h 3 —1.5 —3.5 +2.3	rb, m b, rg rg, m b, b	650 400 1100 400	.787	344.06	1".41
OΣ 12	0 26	+53 58	.803 .820	152.3 153.4	1.4 0.7	3 4	0.46 0.48	4 4	—2.4 —2.5	rg, rg m, m	1100 650	.812	152.8	0.47
η Cassiopeiae H. III. 3	0 42	+57 17	.734 .751 .756 .787	216.0 217.9 216.2 217.1	0.8 0.7 1.1 0.6	5 4 4 4	5.68 5.31 5.43 5.54	6 4 8 6	—4.3 —4.1 —4.9 —3.5	b, m m, rg vb, vb b, m	200 650 400 400	.757	216.8	5.49
36 Andromedae Σ 73	0 49	+23 4	.795 .797 .808 .820 .825 .829	19.2 18.5 14.8 27.7 18.6 339.7	1.0 0.6 1.1 2.0 0.9 0.5	4 4 4 4 4 6	1.06 1.19 1.22 0.85 1.09 29.88	4 6 4 4 4 10	—1.2 —0.1 +0.2 —2.4 —1.8 —0.1	rb, rb b, b vb, b m, b m, m rb, rb	650 400 400 650 650 400	.809 .829 .829 .829	19.8 339.7 108.2 121.8	1.08 29.88 (78.06) (99.45)
ψ ¹ Piscium AB H. IV. 9 AC BC	1 0 » »	+20 55 » »	.829 » » »	339.7 108.2 121.8	0.5 0.4 0.5	6 5 5	29.88 — —	10 — —	—0.1 0.0 0.0	rb, rb rb, rb rb, rb	400 400 400	.829 .829 .829	108.2 121.8	(78.06) (99.45)
ζ Piscium H. IV. 8	1 8	+7 2	.795 .797 .800	64.1 63.7 63.8	0.5 0.3 0.3	4 3 4	23.85 23.55 23.65	4 6 8	—0.5 —0.1 +0.1	b, m b, rb vg, rg	650 400 400	.797	63.9	23.68
Σ 115	1 16	+57 36	.767 .787 .803	324.9 148.1 330.2	0.1 1.7 1.2	5 4 4	0.98 1.16 1.02	4 4 4	—5.1 —2.9 —4.3	rb, m rb, rg rg, m	400 400 1100	.786	147.7	1.05
ψ Cassiopeiae BC Σ 117	1 18	+67 37	.767 .787 .803	254.3 253.6 254.2	1.4 2.3 1.3	4 4 4	2.58 2.59 2.58	4 6 4	—5.0 —3.3 —4.1	rb, m rb, rb rg, m	400 400 400	.786	254.0	2.58
H. V. 83 AC Σ 117 AB	» »	» »	.803 .767 .803 .829	111.8 108.1 108.2 107.8	0.9 0.6 0.0 0.7	2 4 2 4	25.79 27.54 27.50 27.08	2 6 2 6	—3.8 —4.8 —3.8 —4.2	m, m b, m m, m b, rg	400 400 400 650	.803 .800	111.8 108.0	25.79 27.37
γ Arietis H. III. 9	1 48	+18 49	.795 .797 .800	358.2 179.5 358.2	0.8 1.4 0.1	4 5 3	8.17 8.27 8.23	4 6 6	—0.9 —0.5 +0.1	vb, m b, b rg, rg	650 400 400	.797	358.6	8.22
α Piscium H. II. 12 OΣ 38	1 57 1 58	+2 16 +41 52	.797 .800 .792 .795 .800 .820	317.7 317.2 300.9 295.1 293.7 280.4	1.0 0.5 1.0 1.5 4.3 2.2	4 4 4 5 4 4	2.82 2.83 0.46 0.47 0.55 0.35	8 4 4 4 4 4	—0.3 +0.1 —2.3 —2.8 —0.7 —3.3	vb, b rg, rg b, rg b, rb b, g b, b	400 400 650 650 400 650	.799 .802	317.4 292.5	2.82 0.46
γ Andromedae H. III. 5	»	»	.795 .800 .820	63.4 63.1 62.9	0.3 0.6 0.6	3 3 5	10.26 10.00 9.98	4 6 4	—2.6 —0.5 —3.4	vb, rb vb, rg b, rb	650 400 650	.815	63.1	10.08

Name	RA.	Decl.	1900 +	θ	m	n	ρ	n	t	D, S	Power	Means		
												1900 +	θ	ρ
ϵ Trianguli	2 ^h 6 ^m	+29° 50'	.797	74° 1	1.3	5	—	—	—0.2	vb, b	400			
H. II. 34			.800	73.8	0.4	4	3.64	6	—0.3	m, rg	400			
			.808	74.9	0.9	4	3.89	8	—0.6	vb, b	400			
			.820	72.9	0.5	4	3.36	4	—3.0	b, vb	650	.806	73° 9	3.63
259 Andromedae	2 8	+47 1	.792	269.0	2.8	3	—	—	—2.3	b, m	650			
Σ 228			.795	265.2	0.7	3	0.51	4	—2.5	m, m	650			
			.820	261.8	3.2	5	0.54	4	—3.2	rb, rb	650	.802	265.3	0.52
ϵ Cassiopeiae AB	2 21	+66 58	.756	248.2	0.8	4	2.21	8	—5.3	vb, vb	400			
H. I. 34			.790	250.7	1.5	5	1.92	4	—4.7	rb, m	400			
			.795	250.0	0.4	3	1.82	6	—2.6	rb, rb	650			
			.803	251.0	1.8	3	1.77	6	—4.6	rb, rb	1100	.786	250.0	1.93
H. III. 4 AC	»	»	.756	113.1	1.3	4	7.38	4	—5.2	vb, vb	400			
			.790	111.7	1.0	5	7.49	4	—4.7	rb, m	400			
			.795	112.4	0.4	3	7.46	4	—2.4	m, vb	650			
			.803	113.2	1.6	5	7.59	4	—4.5	m, m	400	.786	112.6	7.48
H. N. 65 BC	»	»	.790	102.7	0.8	5	8.79	4	—4.5	rb, m	400			
			.795	101.6	0.9	4	9.46	4	—2.2	m, vb	650			
			.803	103.7	0.3	3	9.35	4	—4.4	rg, m	400	.796	102.7	9.20
ϵ Arietis	2 53	+20 56	.800	204.1	0.2	4	1.42	4	—1.9	g, b	400			
Σ 333			.808	199.6	3.9	5	1.20	4	—1.2	b, m	400			
			.822	200.3	1.5	5	1.23	6	—0.2	rb, vb	650			
			.829	205.9	0.8	5	1.27	4	—1.6	m, m	400			
			.836	200.9	0.7	4	1.24	4	+1.1	rg, rg	500	.819	202.2	1.27
Σ 346 AB	2 59	+24 53	.880	266.1	1.9	5	0.61	4	+0.3	rb, rb	650	.880	266.1	0.61
Med. & C			.880	352.7	0.5	4	5.15	6	+0.5	vb, vb	650	.880	352.7	5.15
H. IV. 88	3 28	+24 9	.880	59.0	0.6	5	22.17	6	+0.3	b, b	650	.880	59.0	22.17
H. N. 17	4 1	+22 51	.880	7.4	1.4	4	4.83	6	0.0	m, m	650	.880	7.4	4.83
Σ 535	4 18	+11 10	.880	328.8	2.6	7	—	—	0.0	vb, m	500	.880	328.8	—
14 i Orionis	5 2	+8 22	.822	171.1	2.1	4	0.69	4	—1.6	rb, rb	650			
O Σ 98			.836	173.7	1.0	4	1.02	6	—0.8	m, m	500			
			.840	174.7	1.4	4	0.93	4	+0.4	m, m	400			
			.846	172.9	2.0	4	1.04	4	+0.5	m, m	400	.836	173.1	0.92
H. II. 75	5 23	+25 5	.932	200.6	0.7	4	4.65	8	+0.1	g, g	650	.932	200.6	4.65
θ Orionis AC	5 30	—5 29	.822	131.0	0.3	4	12.86	4	—1.2	b, b	650			
H. III. 1			.836	131.2	0.3	3	—	—	—1.1	m, m	500			
			.840	131.7	0.5	4	13.04	6	—0.9	m, m	400			
			.846	131.4	0.2	2	12.67	8	—1.0	m, m	400	.836	131.3	12.86
» BC	»	»	.822	162.4	0.4	3	16.51	4	—1.0	b, b	650			
			.840	162.0	0.2	3	16.81	6	—1.1	m, m	400			
			.846	162.4	0.2	2	16.72	8	—0.8	m, m	400	.836	162.3	16.68
» DC	»	»	.822	242.0	1.0	4	13.40	4	—1.0	b, b	650			
			.840	240.8	0.3	3	13.38	8	—1.5	m, m	400			
			.846	242.1	0.2	2	13.40	8	—0.7	m, m	400	.836	241.6	13.39
» AB	»	»	.822	31.7	1.5	4	8.48	6	—0.9	b, b	650			
			.840	32.1	1.4	4	8.64	8	—1.3	m, m	400			
			.846	32.1	1.1	4	8.72	6	—0.5	m, m	400	.836	32.0	8.61
» AD	»	»	.822	95.9	0.3	4	21.76	4	—0.7	b, b	650			
			.840	96.1	0.9	4	21.56	8	—1.8	m, m	400			
			.846	95.0	0.1	2	21.57	8	—0.3	m, m	400	.836	95.7	21.63
» BD	»	»	.822	118.9	0.3	4	19.21	8	—0.5	b, b	650			
			.840	119.7	0.9	4	19.53	8	—1.7	m, m	400			
			.846	119.0	0.6	4	19.51	6	—0.2	m, m	400	.836	119.2	19.42
Σ 950	6 35	+10 1	.932	12.6	1.2	6	16.63	10	—0.6	g, g	400	.932	12.6	16.63
12 Lyncis AB	6 37	+59 34	.800	117.9	0.5	4	1.70	6	—4.2	g, rb	400			
H. I. 6			.822	117.8	0.6	4	1.31	4	—3.7	m, rb	650			

Name	RA.	Decl.	1900 +	θ	m	n	p	n	t	D, S	Power	Means		
												1900 +	θ	p
12 Lyncis AB	6 ^h 37 ^m	+59° 34'	.829	118.4	0.8	4	1.43	4	-5.1	m, m	400			
H. I. 6 (contin.)			.852	119.0	1.4	5	1.72	4	-3.1	m, m	1100	.826	118.3	1.54
H. III. 22 AC	»	»	.800	306.2	0.7	3	8.40	4	-4.1	rg, m	400			
			.822	305.9	0.4	4	8.62	4	-3.6	m, rb	650			
			.829	306.2	1.2	5	8.89	6	-4.9	m, m	400			
			.852	307.7	0.2	4	8.56	4	-3.0	m, m	1100	.826	306.5	8.62
H. III. 22 BC	»	»	.800	303.8	0.2	3	10.32	4	-3.9	rg, m	400			
			.822	304.2	0.4	4	10.34	4	-3.4	m, m	650			
			.829	304.0	0.9	3	10.31	4	-4.8	m, m	400			
			.852	306.5	0.8	5	10.34	4	-2.8	m, m	1100	.826	304.6	10.33
α Geminorum	7 28	+32 7	.800	225.2	0.4	4	5.52	6	-4.5	rb, rb	400			
H. II. 1			.808	226.2	1.6	4	5.58	8	-4.6	b, rb	400			
			.822	224.6	0.8	6	5.59	4	-3.8	b, b	650			
			.840	225.8	0.5	5	5.76	8	-2.6	m, m	400			
			.846	224.6	0.9	4	5.65	6	-1.9	rg, rg	400	.823	225.3	5.62
α^1 C	»	»	.840	159.8	0.3	4	70.79	4	-2.4	m, m	400			
			.846	159.9	0.0	2	70.59	4	-1.8	rg, rg	400			
			.852	160.1	0.0	3	70.53	6	-3.4	rg, g	400	.846	159.9	70.64
α^2 C	»	»	.840	164.1	0.2	3	73.43	4	-2.3	m, m	400			
			.846	163.4	0.0	2	73.13	6	-1.6	rg, rg	400			
			.852	164.3	0.3	4	73.25	4	-3.3	m, rg	400	.846	163.9	73.27
Ω 179	7 38	+24 39	.932	234.8	0.5	4	6.59	6	-1.3	rg, rg	400	.932	234.8	6.59
ζ Cancri AB	8 7	+17 57	.840	0.8	0.6	4	1.18	4	-2.4	m, m	400			
H. I. 24			.846	4.4	0.8	4	0.97	4	-2.1	m, rb	1100			
			.932	4.1	0.4	5	1.29	6	-1.4	m, b	1100	.873	3.1	1.15
H. III. 19 AC	»	»	.840	117.1	0.1	2	—	—	-2.3	m, m	400			
			.846	114.9	1.0	4	5.60	6	-1.9	m, rb	1100			
			.932	114.3	1.1	4	5.46	6	-1.3	m, b	1100	.873	115.4	5.53
			.840	126.8	0.4	2	5.71	6	-2.3	m, m	400			
H. III. 19 BC	»	»	.846	124.7	1.8	4	6.08	6	-1.8	m, b	1100			
			.932	125.3	0.3	4	5.78	8	-1.1	m, b	1100	.873	125.6	5.86
H. II. 40	8 21	+27 18	.932	217.4	0.7	4	4.80	8	-1.0	m, m	1100	.932	217.4	4.80
π Bootis	14 36	+16 52	.618	103.6	0.4	4	5.80	4	+3.0	b, rb	200			
H. III. 8			.626	103.7	0.5	4	5.83	4	+2.8	rb, rg	650	.622	103.6	5.81
ϵ Bootis	14 41	+27 30	.618	332.9	1.0	4	2.86	4	+2.3	b, m	650			
H. I. I			.626	332.5	1.1	4	2.89	4	+2.9	rb, rg	650	.622	332.7	2.88
ζ Bootis	14 47	+19 31	.569	202.1	0.7	4	2.65	4	+1.8	g, g	400			
H. II. 18			.571	199.7	1.5	4	2.65	4	+1.7	b, vg	400			
			.577	202.4	0.7	4	2.50	4	+2.0	rb, g	400	.572	201.4	2.60
44 Bootis	15 1	+48 4	.615	241.7	0.8	4	4.59	6	+2.8	b, m	200			
H. I. 15			.621	242.4	0.6	4	4.54	6	+2.9	m, g	650	.618	242.0	4.56
Σ 1926	15 11	+38 40	.541	260.7	1.6	5	—	—	+1.8	m, g	650			
			.569	258.2	2.3	4	1.16	4	+1.7	vg, vg	400			
			.571	259.1	1.6	4	1.36	4	+1.7	rb, vg	400			
			.599	256.8	1.8	4	1.13	4	+1.1	vb, vb	400	.570	258.7	1.22
Σ 1932	15 14	+27 11	.533	330.1	1.3	4	0.60	4	+0.7	rg, g	400			
			.569	331.8	0.8	4	0.70	4	+1.5	vg, vg	400	.551	331.0	0.65
η Coronae Bor.	15 19	+30 39	.525	0.4	0.5	4	—	—	+0.5	rg, g	200			
H. I. 16			.530	359.4	1.1	4	0.65	4	0.0	g, g	400			
			.538	359.4	1.0	5	0.49	4	+0.3	g, g	650	.531	359.7	0.57
μ^2 Bootis	15 21	+37 43	.569	76.8	0.5	4	0.90	4	+2.1	vg, vg	400			
H. I. 17			.570	74.3	0.6	4	1.00	4	+1.7	rb, vg	400	.570	75.5	0.95
Med. & C	»	»	.571	171.5	0.2	4	108.22	4	+1.9	rb, vg	400			
			.596	171.4	0.1	3	108.34	4	+2.4	b, rg	400	.583	171.5	108.28
ζ Coronae, H. II. 8	15 36	+36 57	.566	301.4	0.4	4	6.02	4	+1.0	vg, vg	400			

Name	RA.	Decl.	1900 +	θ	m	n	ρ	n	t	D, S	Power	Means		
												1900 +	θ	ρ
ζ Coronae, H. II. 8 (continued)	15 ^h 36 ^m	+36° 57'	.571	301.3	0.4	4	6.22	4	+1.1	b, vg	400	.571	301.5	6.18
γ Coronae Borealis	15 38	+26 36	.577	301.7	0.7	4	6.29	4	+0.9	m, vg	400			
Σ 1967			.527	105.7	6.6	7	—	—	0.0	g, g	400			
			.530	109.7	1.5	4	0.69	4	-0.3	b, g	400			
			.536	110.1	5.9	6	0.60	4	+0.9	b, g	400			
			.538	114.3	2.4	4	0.47	4	+0.7	rg, m	650			
			.566	114.1	2.3	4	0.70	4	+1.5	vg, vg	400	.545	110.7	0.61
			.571	110.1	3.0	4	—	—	+1.8	b, vg	400			
β 619	15 39	+13 59	.544	359.4	1.8	4	0.41	4	+0.4	g, g	650			
			.569	356.6	3.4	4	—	—	+1.5	vb, vg	400			
$O\Sigma$ 303	15 56	+13 33	.538	145.6	1.9	7	0.79	4	+0.6	m, rg	650			
			.569	143.9	2.3	4	0.85	4	+1.4	m, vg	400	.553	144.8	0.82
ξ Scorpii	15 59	-11 5	.530	238.7	1.8	4	0.49	4	-0.3	b, g	400			
H. I. 33			.541	240.6	1.9	4	0.49	4	+1.0	m, g	650			
Med. & C			.547	237.4	3.5	4	0.35	4	+0.2	rg, g	650			
			.541	64.8	1.2	5	7.19	6	+1.0	rb, g	650			
			.599	63.8	1.6	4	—	—	+1.1	vb, vb	200	.581	64.3	7.20
			.604	64.2	0.6	4	7.21	4	+1.0	vb, m	400			
σ Coronae	16 11	+34 7	.569	212.5	0.3	4	—	—	+2.3	vg, vg	400			
H. I. 3			.571	213.4	0.4	4	4.61	4	+1.7	rg, vg	400			
			.599	212.3	0.4	4	4.59	4	+1.3	b, m	400	.580	212.7	4.60
Σ 2049	16 24	+26 12	.530	204.4	1.1	6	1.09	4	+0.4	rg, g	400			
			.544	210.6	0.6	4	1.08	6	-0.2	g, g	650			
			.569	206.1	0.7	4	1.09	4	+1.6	rg, vg	400			
λ Ophiuchi	16 26	+ 2 12	.525	56.1	0.4	5	1.09	4	-0.4	rg, g	200	.531	56.7	1.19
H. I. 83			.530	57.7	1.2	5	1.19	4	-0.3	rb, g	400			
			.538	56.3	1.7	5	1.29	4	+0.3	rb, rb	650			
ζ Herculis	16 38	+31 47	.530	259.9	7.9	4	—	—	-0.3	vb, g	400			
H. I. 36			.541	(204.7)	6.0	3	—	—	+0.4	rb, m	650			
			.544	243.3	0.6	4	—	—	-0.1	vb, g	650	.537	251.6	—
			.547	(299.0)	7.0	3	—	—	-0.1	b, g	650			
Σ 2094	16 40	+23 42	.544	77.7	0.7	3	1.44	4	+0.2	g, rg	650			
			.569	79.7	0.5	4	1.24	4	+1.5	g, g	400			
			.571	77.0	0.2	4	1.58	4	+1.0	rg, g	400	.561	78.1	1.42
$O\Sigma$ 315	16 46	+ 1 23	.525	159.2	2.4	4	—	—	0.0	rg, g	250			
			.604	159.0	1.8	4	0.75	4	+0.6	b, rg	400			
Σ 2114	16 57	+ 8 35	.530	162.7	0.5	4	1.03	4	0.0	m, g	400	.536	162.1	1.06
			.541	161.6	1.9	4	1.10	4	+1.1	rb, m	650			
Σ 2135	17 8	+21 21	.569	177.3	0.4	4	7.04	4	+1.3	g, g	400			
			.585	177.7	0.5	4	7.19	4	+0.3	m, g	400			
			.615	176.1	0.5	4	7.09	4	+1.2	rb, rg	650	.590	177.0	7.11
α Herculis	17 10	+14 30	.547	112.3	0.8	4	4.61	4	+0.1	rb, vg	650			
H. II. 2			.577	113.0	0.9	4	4.86	4	-0.1	rb, g	400			
ρ Herculis	17 19	+37 16	.577	312.3	0.9	4	4.08	4	+0.2	b, g	650	.587	312.1	3.97
H. II. 3			.596	311.9	1.4	4	3.86	4	+0.8	b, m	650			
Σ 2173	17 25	- 0 59	.530	332.2	1.8	5	1.09	4	-0.2	rg, g	400			
			.536	332.2	1.0	4	0.91	4	-0.3	rg, g	400			
			.544	331.3	1.1	4	1.08	4	+0.1	rg, rg	650	.537	331.9	1.03
$O\Sigma$ 331	17 27	+ 2 54	.541	335.6	0.9	4	0.79	4	0.0	b, g	650			
			.571	342.6	1.2	4	0.76	4	+1.2	b, g	400			
β 1 Ophiuchi	17 40	+ 2 37	.610	93.0	0.9	8	20.52	14	+0.1	g, vg	400	.613	93.0	20.61
H. IV. 32			.615	93.0	0.2	3	20.71	6	+1.2	b, rb	650			
Σ 2215	17 43	+17 44	.536	295.7	3.2	5	0.70	4	-0.2	rb, g	400			
			.541	297.2	0.5	4	0.53	4	0.0	m, g	650	.538	296.5	0.61
$O\Sigma$ 337	17 46	+ 7 17	.541	277.8	4.0	4	—	—	+0.3	m, g	650			

Name	RA.	Decl.	1900 +	θ	m	n	ρ	n	t	D, S	Power	Means		
												1900 +	θ	ρ
<i>O</i> Σ 337 (contin.)	17 ^h 46 ^m	+ 7° 17'	.544	279.9	1.4	4	0.36	4	—0.1	rg, rg	650	.552	275.2	0.36
			.571	267.8	4.3	4	—	—	+0.6	b, g	400			
<i>O</i> Σ 338	17 47	+15 21	.541	8.9	0.8	4	—	—	+0.3	rb, g	650	.560	10.3	0.92
			.569	11.0	0.7	4	0.75	4	0.0	m, vg	400			
Σ 2244	17 52	+ 0 7	.571	11.1	1.6	4	1.09	4	+0.4	rg, g	400	.611	276.5	1.01
			.604	278.0	1.1	4	1.00	4	—0.3	rg, g	400			
			.610	275.1	1.8	4	1.08	4	+0.3	vb, m	400	.602	257.6	2.13
			.618	276.4	0.5	4	0.95	4	—0.1	rb, m	400			
τ Ophiuchi	17 58	— 8 11	.596	257.1	0.8	4	2.16	4	—0.4	vb, b	400	.588	64.1	1.99
H. I. 88			.599	258.1	1.7	3	—	—	+0.1	vb, b	400			
			.610	257.7	0.3	3	2.09	4	—0.8	rg, rb	400	.622	82.7	0.87
70 p Ophiuchi	18 0	+ 2 33	.571	64.9	0.6	4	2.23	4	+1.0	b, g	400			
H. II. 4			.585	63.7	1.5	4	2.19	6	—0.4	vb, rg	400	.632	250.5	—
			.596	63.4	1.0	4	1.77	4	—0.7	vb, b	400			
			.599	64.6	1.2	4	1.77	6	—0.2	vb, rg	400	.622	82.7	0.87
Σ 2283	18 4	+ 6 8	.618	81.3	3.5	4	—	—	0.0	vb, rg	650			
			.621	83.9	1.2	3	0.70	4	+1.6	vb, m	650	.632	250.5	—
			.623	83.8	1.9	4	0.95	4	+0.1	b, rg	650			
			.626	81.7	0.7	4	0.95	4	+0.1	b, rb	650	.618	230.9	1.07
73 Ophiuchi	18 5	+ 3 58	.632	250.5	4.2	5	—	—	—0.4	vb, rg	650			
417 B Herculis	18 6	+16 27	.615	230.5	0.7	4	1.06	4	+0.4	b, b	650	.633	298.1	0.40
Σ 2289			.618	231.2	0.7	4	1.16	4	+0.2	vb, b	650			
			.621	230.9	0.8	4	1.00	4	+1.4	vb, m	650	.659	68.9	0.38
Σ 2294	18 9	+ 0 8	.632	293.2	4.4	5	0.36	4	—0.3	vb, m	650			
			.635	123.0	4.1	4	0.45	1	+0.8	vb, m	650	.659	68.9	0.38
β 1203	18 21	+ 0 45	.634	80.2	5.2	4	0.35	1	+0.7	g, g	650			
			.656	60.4	4.7	4	—	—	+0.2	vb, b	650	.579	318.6	3.91
			.659	66.9	4.8	5	0.41	4	—0.3	m, rg	650			
			.686	68.2	2.2	4	0.38	4	—0.1	m, g	650	.587	6.5	29.52
59 Serpentis	18 22	+ 0 8	.557	319.6	1.0	4	3.86	4	+0.3	rg, g	400			
H. I. 12			.584	318.2	1.2	4	—	—	—0.5	vb, rg	400	.624	13.3	1.79
			.595	318.0	0.4	4	3.96	4	—0.4	b, b	400			
Σ 2342	18 31	+ 4 51	.557	6.4	0.3	4	29.60	4	+0.5	rg, g	400	.579	291.1	21.06
			.584	6.6	0.9	4	29.40	4	—1.4	rb, rg	400			
			.609	6.6	0.2	4	29.55	8	+0.1	b, rg	400	.645	8.0	0.52
<i>O</i> Σ 358	18 31	+16 55	.622	13.9	0.6	3	1.77	6	0.0	b, rg	650			
			.625	12.7	0.4	4	1.82	4	—0.2	m, m	650	.625	13.3	3.03
Σ 2346	18 32	+ 7 27	.557	291.2	0.2	4	20.87	4	+0.7	g, g	400			
			.584	290.8	0.4	4	21.15	4	—0.2	rb, rg	400	.625	13.3	3.03
			.595	291.4	0.6	4	21.17	4	—0.2	m, rg	400			
β Delphini	18 33	+14 13	.622	10.7	1.2	4	0.49	4	+1.7	m, g	650	.625	13.3	3.03
β 151			.654	7.9	0.8	3	—	—	+0.3	vb, vb	650			
			.659	5.3	2.0	4	0.56	4	+0.5	g, g	650	.622	129.5	2.28
ϵ^2 Lyrae	18 41	+39 31	.617	129.5	0.9	9	2.50	6	+0.1	b, rg	650			
H. II. 6			.622	129.4	0.6	3	2.12	8	—0.9	vb, g	650	.625	13.3	3.03
			.628	129.6	1.0	4	2.22	4	—1.2	b, vg	650			
ϵ^1 Lyrae	18 41	+39 35	.622	12.9	0.5	3	3.01	4	—1.6	g, g	650	.625	13.3	3.03
H. II. 5			.628	13.7	0.7	4	3.05	4	—1.5	g, vg	650			
Med. & Med.	18 41	+39 33	.622	172.5	0.1	4	210.17	8	—1.3	b, g	200	.625	172.5	210.12
			.628	172.6	0.1	4	210.07	6	—1.8	vg, vg	200			
ϵ^1 & ϵ^2	"	"	.631	172.9	0.0	3	207.47	6	—1.3	rg, vg	200	.631	172.9	207.47
75 Tauri Pon. B	18 41	+ 5 24	.595	113.5	0.5	4	—	—	—0.6	b, rg	400			
Σ 2375			.609	115.1	0.9	4	2.38	4	—0.8	vb, rg	400	.609	113.5	2.38
			.614	112.3	0.8	4	2.34	4	—0.6	rb, rb	650			
			.620	113.2	0.4	4	2.43	4	—0.5	rg, rg	650			

Name	RA.	Decl.	1900 +	θ	m	n	ρ	n	t	D, S	Power	Means		
												1900 +	θ	ρ
β 265	18 ^h 45 ^m	+11° 24'	.620	231.9	1.6	4	1.28	4	-0.4	vb, rb	650			
			.622	228.8	1.7	4	1.03	4	0.0	b, g	650			
			.625	230.1	1.6	4	1.46	4	-0.3	m, m	650	.622	230.3	1.26
β 139	19 8	+16 41	.622	319.8	1.4	4	0.56	4	-0.3	rb, g	650			
			.625	320.6	0.9	4	0.70	4	-0.6	rg, rg	650	.623	320.2	0.63
$O\Sigma$ 368	19 12	+15 59	.620	216.3	2.4	4	0.99	4	-0.4	vb, rb	650			
			.622	218.1	2.1	4	0.90	4	-0.2	rb, g	650			
			.625	212.2	1.5	4	1.33	4	-0.4	rg, rg	650			
			.631	219.7	1.2	4	0.85	4	-0.1	rb, rg	650	.622	216.6	1.02
$O\Sigma$ 371	19 12	+27 16	.620	155.6	1.4	4	0.83	4	-0.2	vb, g	650			
			.622	155.2	0.7	4	0.66	4	0.0	rb, g	650			
			.625	156.2	1.0	4	0.86	4	-0.2	rg, g	650			
			.631	155.2	1.5	4	0.97	4	-1.1	g, rg	650	.625	155.5	0.83
Med. & C	"	"	.620	267.9	0.2	3	47.59	8	-0.2	vb, g	650			
			.625	267.4	0.3	3	47.40	6	0.0	rg, g	650	.623	267.6	47.50
Σ 2504	19 17	+18 58	.705	284.5	0.3	4	8.91	4	+0.5	m, m	650			
			.710	285.8	0.5	3	8.79	6	+0.7	rg, rg	650	.707	285.1	8.85
22 Cygni B	19 22	+27 7	.631	317.4	1.6	4	0.44	4	-1.0	g, g	650			
Σ 2525			.634	319.3	3.2	5	0.45	4	-0.8	vg, vg	650	.632	318.4	0.44
H. III. 57	19 23	+20 58	.705	148.9	0.5	4	6.52	4	+0.1	rb, m	650			
			.710	148.3	0.4	3	6.47	6	+0.5	rg, rg	650	.708	148.6	6.49
Σ 2556	19 35	+22 1	.631	142.9	1.7	4	0.40	4	-0.8	g, g	650			
			.659	143.6	1.5	4	0.44	4	-1.4	m, g	650	.645	143.2	0.42
$O\Sigma$ 380	19 38	+11 36	.634	73.4	2.3	4	—	—	-1.0	vb, g	650			
			.654	70.6	2.9	5	—	—	-1.2	vb, vb	650			
			.656	68.6	3.9	5	—	—	-0.9	vb, b	650			
			.659	76.7	1.7	4	0.53	4	-1.2	m, rg	650	.651	72.3	0.53
π Aquilae	19 44	+11 34	.631	118.3	0.8	4	—	—	-0.4	b, g	650			
H. I. 92			.634	117.8	0.2	4	1.29	4	-2.0	vg, m	650			
			.637	117.4	0.9	4	1.43	4	-1.0	vg, vg	650	.634	117.8	1.36
$O\Sigma$ 387	19 45	+35 3	.614	336.9	1.2	4	0.56	4	-0.7	rb, rg	650			
			.620	335.2	1.3	4	0.97	4	-0.5	b, m	650			
			.625	337.6	1.6	4	0.63	4	-0.3	rg, rg	650	.620	336.6	0.72
A. C. 16	19 54	+26 59	.631	237.3	1.6	4	0.39	4	-1.4	vg, vg	650			
			.634	240.8	2.4	4	0.42	4	-1.6	vg, vg	650	.633	239.0	0.41
$O\Sigma$ 395	19 58	+24 39	.634	102.6	0.4	4	0.63	4	-1.8	vg, vg	650			
			.651	284.6	2.1	4	—	—	-2.2	vb, vb	650			
			.654	101.6	0.8	4	—	—	-2.1	vb, vb	650	.647	102.9	0.63
β 428	20 2	+12 40	.659	355.6	1.4	4	0.61	4	-1.5	rb, rg	650			
			.686	353.1	2.7	4	0.66	4	-1.5	vb, m	650	.672	354.3	0.63
θ Sagittae AB	20 6	+20 36	.654	327.7	0.5	4	11.29	8	-2.0	b, b	200			
H. III. 24			.683	327.7	0.3	4	11.44	6	-1.1	b, m	200			
			.699	327.5	0.5	4	11.52	6	-1.5	g, g	200			
			.702	327.4	0.2	4	11.69	6	-1.5	m, rb	200	.684	327.6	11.48
" AC	"	"	.654	224.1	0.3	3	78.62	8	-1.8	vb, b	200			
			.683	224.6	0.4	3	78.41	6	-0.9	b, m	200			
			.699	224.5	0.2	3	78.39	6	-1.6	g, g	200			
			.702	224.5	0.2	3	78.51	6	-1.3	m, rb	200	.684	224.4	78.48
" BC	"	"	.683	216.6	0.3	3	81.99	6	-0.8	rb, m	200			
			.699	216.2	0.2	3	81.62	6	-1.3	g, g	200			
			.702	216.4	0.1	3	81.68	8	-1.2	m, rb	200	.695	216.4	81.76
$O\Sigma$ 403	20 11	+41 49	.651	173.7	1.8	4	0.73	4	-2.0	vb, vb	650			
			.656	172.0	0.9	4	0.73	4	-0.5	m, rb	650			
			.683	175.4	1.2	4	—	—	-2.1	vb, vb	650	.663	173.7	0.73
β 63	20 25	+10 34	.686	347.2	2.0	4	1.09	4	-1.2	rb, b	650			
			.702	361.7	3.6	5	—	—	+0.3	vb, vb	650	.694	354.5	1.09

Name	RA.	Decl.	1900 +	θ	m	n	ρ	n	t	D, S	Power	Means		
												1900 +	θ	ρ
Δ 1	20 ^h 26 ^m	+10° 55'	.659	222.7	1.5	4	0.46	4	-1.7	m, g	650			
			.686	217.8	1.8	4	0.44	4	-1.8	rb, g	650	.672	220.2	0.45
H. III. 16	»	»	.659	255.5	0.3	3	15.53	6	-1.6	g, g	650			
			.686	255.8	0.7	4	15.54	6	-1.6	m, b	650	.672	255.6	15.53
94 Vulpeculae B	20 28	+25 28	.656	81.0	0.8	4	—	—	-0.2	vb, b	650			
Σ 2695			.694	79.8	1.6	4	0.87	4	-0.1	b, rb	650	.675	80.4	0.87
H. IV. 92 AB	20 32	+14 23	.699	290.1	0.3	4	25.46	6	-0.7	rb, rb	650			
			.705	290.2	0.2	4	25.57	8	-0.6	m, m	650			
			.710	289.9	0.2	3	25.43	6	-0.2	rg, rg	650	.705	290.1	25.49
» AC	»	»	.699	236.5	0.2	3	70.79	6	-0.5	rb, rb	650			
			.705	236.9	0.2	3	71.07	6	-0.3	m, m	650			
			.710	236.7	0.1	3	71.03	6	+0.1	rg, rg	650	.705	236.7	70.96
» BC	»	»	.699	217.0	0.0	3	59.34	6	-0.4	rb, rb	650			
			.705	216.5	0.1	4	59.67	6	-0.5	m, m	650			
			.710	216.3	0.5	4	59.40	6	0.0	rg, rg	650	.705	216.6	59.47
H. N. 87	20 35	+38 16	.656	330.2	0.6	4	27.87	8	-1.6	m, rg	200			
			.694	330.1	0.2	4	27.83	6	-1.8	b, b	650	.675	330.1	27.85
$O\Sigma$ 410	20 36	+40 13	.651	197.2	0.8	4	0.74	4	-2.7	vb, vb	650			
			.656	15.9	0.5	4	0.58	4	-1.3	m, m	650			
			.683	195.6	0.7	4	—	—	-2.2	vb, vb	650			
			.694	198.4	1.0	6	0.64	4	-1.7	rb, rb	650	.671	196.8	0.65
» Med. & C	»	»	.656	69.7	0.1	4	68.80	8	-1.4	m, rg	200			
			.683	69.4	0.1	3	69.02	8	-2.3	b, m	200			
			.694	69.6	0.2	4	69.27	6	-1.5	b, rb	650	.678	69.6	69.03
43 Delphini B	20 40	+11 57	.659	100.3	1.0	4	1.25	4	-1.4	m, rg	650			
Σ 2723			.686	100.4	1.1	4	1.27	4	-1.7	m, rb	650	.672	100.3	1.26
H. II. 66	20 41	+15 32	.702	1.9	0.6	4	5.34	4	+0.2	b, rb	650			
			.705	1.8	0.9	4	5.16	4	-0.1	b, b	650			
			.729	2.7	0.6	4	5.21	4	-0.9	m, rb	800	.712	2.1	5.24
γ Delphini	20 43	+15 45	.651	270.0	0.7	4	11.24	10	-1.1	vb, vb	200			
H. III. 10			.654	270.3	0.8	5	—	—	-1.6	vb, vb	650			
			.656	271.1	0.4	4	11.01	8	-0.2	vb, rg	200			
			.683	270.7	0.5	4	11.01	6	-1.2	b, b	200	.661	270.5	11.09
$O\Sigma$ 413	20 43	+36 7	.651	62.2	1.2	4	—	—	-2.2	vb, vb	650			
			.683	63.7	1.6	5	—	—	-1.9	vb, vb	650			
			.694	65.0	2.5	4	0.61	4	-2.2	vb, b	650	.676	63.6	0.61
$O\Sigma$ 414	20 44	+42 3	.651	94.4	1.0	4	9.93	6	-2.0	rb, m	200			
			.683	94.2	0.9	4	9.95	6	-2.1	vb, vb	650	.667	94.3	9.94
Hough 144	20 48	+19 45	.659	374.2	5.2	4	0.34	4	-1.4	b, m	650			
			.686	355.3	2.4	5	0.24	4	-1.2	rb, rg	650			
			.705	327.1	2.2	4	—	—	-0.4	vb, vb	650			
			.713	349.5	3.2	5	0.45	4	-1.0	rb, vg	500	.691	251.5	0.34
$O\Sigma$ 417	20 49	+28 45	.713	30.3	1.9	4	0.61	4	-0.9	vg, vg	500	.713	30.3	0.61
$O\Sigma$ 418	20 51	+32 20	.651	288.6	1.9	4	—	—	-1.7	vb, vb	650			
			.656	292.1	1.1	4	1.16	4	-0.7	b, b	650			
			.694	110.0	1.4	4	1.17	4	-1.5	b, b	650	.667	290.2	1.16
ϵ Equulei	20 54	+ 3 55	.659	284.7	1.0	4	0.63	4	-1.1	b, m	650			
Σ 2737			.683	286.4	2.2	4	—	—	-1.0	vb, vb	650			
			.686	284.4	1.7	4	0.56	4	-1.2	rg, m	650	.676	285.2	0.59
H. III. 21	»	»	.659	73.9	0.4	4	10.57	6	-0.9	b, b	650			
			.683	73.5	0.7	3	11.22	6	-1.1	b, b	200			
			.686	73.9	0.6	4	10.90	6	-1.0	b, b	650	.676	73.8	10.90
Σ 2744	20 58	+ 1 9	.659	162.6	1.2	4	1.33	4	-0.8	m, rg	650			
			.686	163.8	1.6	5	1.51	4	-1.6	rb, rb	650			
			.694	164.4	1.9	4	1.26	4	-0.3	vb, b	650	.680	163.6	1.37
Σ 2749 A & Med.	21 0	+ 3 8	.713	158.2	0.9	4	3.80	6	-0.3	m, m	500			

Name	RA.	Decl.	1900 +	θ	m	n	ρ	z	t	D, S	Power	Means		
												1900 +	θ	ρ
Σ 2749 A & Med. (cont.)	21 ^h 0 ^m	+ 3° 8'	.734	157.9	2.0	5	3.56	6	-0.1	m, m	200			
BC	»	»	.743	158.2	1.5	5	3.79	6	+0.8	m, m	400	.730	158.1	3.72
Σ 2760	21 2	+33 43	.743	336.1	1.6	4	0.85	6	+0.7	m, m	400	.743	336.1	0.85
			.699	226.4	0.5	4	6.35	6	-0.3	m, m	650			
			.756	225.8	0.3	4	6.36	4	-1.1	m, m	400	.728	226.1	6.35
O Σ 527	21 3	+ 4 45	.713	274.2	5.2	4	0.48	4	-0.5	rg, vg	500			
			.795	262.8	7.0	5	—	—	+0.2	vb, b	650			
			.803	284.4	6.7	4	—	—	-0.3	vb, m	400	.770	273.8	0.48
P. XXI. 1	21 4	+29 49	.699	311.4	1.2	4	3.74	6	-0.6	m, m	650			
H. II. 97			.734	310.9	0.5	4	3.80	6	0.0	m, m	200	.717	311.2	3.77
O Σ 535 AB	21 10	+ 9 36	.710	247.2	2.5	4	—	—	-0.2	vb, m	650			
			.713	272.4	1.8	3	—	—	-0.7	vb, vb	500	.711	?	?
» Med. & C	»	»	.686	18.6	0.2	3	42.99	8	-0.7	b, rb	650			
			.710	18.5	0.5	4	43.39	6	-0.2	vb, m	650			
			.734	18.8	0.1	3	43.21	8	+0.6	b, m	200	.710	18.6	43.20
O Σ 432	21 10	+40 44	.694	125.8	0.8	4	1.24	6	-1.7	m, m	650			
			.699	124.6	0.6	4	1.19	6	-2.2	rg, rb	650	.696	125.2	1.21
A. G. C. 13	21 11	+37 37	.699	188.3	1.4	4	—	—	-2.1	vb, vb	650			
			.713	202.2	10.7	4	—	—	-1.7	vb, rg	500			
			.729	199.9	4.2	4	—	—	-2.8	b, b	650	.714	196.8	?
Hough 286	21 15	+37 49	.694	230.7	9.2	4	—	—	-1.6	vb, vb	650			
			.699	185.7	4.0	4	—	—	-2.1	vb, vb	650			
			.713	172.7	7.2	4	0.30	1	-1.8	vb, vg	500			
			.729	197.9	9.2	4	—	—	-2.7	vb, b	650	.709	196.7	0.39
β 164	21 20	+ 8 57	.686	239.1	4.6	4	0.41	4	-0.7	b, m	650			
			.713	243.4	1.5	4	0.52	4	-1.1	g, vg	500	.700	241.2	0.46
Σ 2793	»	»	.686	241.6	0.4	3	26.79	6	-0.6	rb, rb	650	.686	241.6	26.79
Σ 2797	21 22	+13 16	.699	216.3	1.2	4	3.25	6	-0.4	b, rb	650			
			.734	216.2	0.9	4	3.80	6	-0.1	m, m	200			
			.752	215.9	0.7	4	3.08	4	-0.3	m, m	650			
			.756	215.9	1.0	4	3.57	4	-1.2	m, m	400	.735	216.1	3.42
20 (B) Pegasi	21 24	+10 39	.710	119.5	1.1	5	1.36	6	-0.1	rb, m	650			
Σ 2799			.713	119.4	0.9	4	1.65	4	-1.3	vg, vg	500			
			.729	118.4	1.5	4	1.43	6	-1.8	rg, rb	800	.717	119.1	1.48
β 1212	21 34	- 0 31	.743	268.4	1.6	4	0.50	4	+0.4	rg, rg	800			
			.751	276.0	1.7	4	0.60	4	-0.4	m, m	650	.747	272.2	0.55
β 688	21 38	+40 35	.699	195.3	3.5	5	0.45	4	-2.3	b, rb	650			
			.713	23.0	3.4	4	0.49	4	-2.4	vg, vg	500	.706	199.1	0.47
μ Cygni	21 39	+28 18	.759	123.8	0.4	4	2.61	4	-0.8	rb, m	400			
H. III. 15			.767	124.7	0.5	4	2.57	6	-0.2	b, vb	400			
			.776	126.4	0.5	4	2.68	6	-0.9	b, m	400	.767	125.0	2.62
Hough 166	21 39	+27 23	.729	85.1	2.3	4	0.40	4	-2.9	b, m	800			
			.743	93.4	2.5	4	0.28	4	+0.5	rg, rg	800	.736	89.3	0.34
147 Cephei B	21 49	+55 20	.756	194.5	0.3	4	18.90	4	-2.6	rb, rb	400			
H. IV. 79			.759	194.8	0.4	4	19.25	4	-2.4	rb, rg	400			
			.767	194.4	0.2	4	19.05	6	-1.9	rb, m	400	.761	194.6	19.07
β 694	21 58	+44 0	.729	5.3	2.4	4	—	—	-3.0	m, m	800			
			.759	5.9	3.7	4	—	—	-2.0	vb, m	650			
			.795	358.1	2.9	4	0.61	4	-1.0	m, m	650	.761	3.1	0.61
ξ Cephei	22 0	+64 6	.776	282.5	0.4	5	6.49	8	-1.7	b, m	400			
H. II. 16			.803	285.0	1.2	3	6.60	6	-1.9	m, m	400			
			.805	282.7	0.4	3	—	—	-2.2	b, b	400			
			.808	282.6	0.1	3	6.39	6	+4.1	b, b	400	.798	283.2	6.48
148 Pegasi B	22 9	+ 7 29	.710	124.4	0.8	4	1.34	4	-0.6	b, m	650			
Σ 2878			.734	131.4	1.3	4	1.04	6	-0.7	vb, rb	650			
			.743	128.2	1.8	4	1.37	4	+0.3	rg, b	800	.729	128.0	1.25

Name	RA.	Decl.	1900 +	θ	m	n	ρ	n	t	D, S	Power	Means		
												1900 +	θ	ρ
Σ 2881	22 ^h 10 ^m	+29° 3'	.729	100°3	1.8	5	1.48	6	-2.8	m, m	800			
			.734	100.0	2.0	5	1.46	4	+0.1	m, m	200	.732	100°2	1.47
Σ 2886	22 11	+48 52	.702	108.4	0.2	3	19.92	6	-2.7	b, b	650			
			.705	108.4	0.5	4	19.76	4	-3.2	g, g	200			
			.710	108.5	0.4	4	19.64	8	-3.0	g, g	650			
			.713	108.8	0.7	4	19.96	6	-3.1	g, g	400	.708	108.5	19.82
Σ 2890	22 12	+49 21	.705	10.7	0.0	3	9.37	4	-3.1	g, g	200			
			.710	10.9	0.2	3	9.38	6	-2.7	rg, g	650	.708	10.8	9.37
Σ 2891	22 12	+47 28	.702	308.9	0.1	3	12.72	6	-1.7	b, b	650			
			.705	308.8	0.6	4	12.95	4	-3.5	g, g	200			
			.710	308.8	0.3	3	12.77	6	-2.5	rg, g	650	.706	308.8	12.81
Hough 180	22 12	+43 24	.694	225.4	2.2	4	0.61	4	-2.3	b, rb	650			
			.713	227.1	1.4	4	0.57	4	-2.6	g, vg	500			
			.729	226.1	2.1	4	0.68	4	-3.3	m, m	800	.712	226.2	0.62
33 Pegasi	22 19	+20 20	.756	324.9	0.2	3	66.68	4	-2.0	rb, m	400			
H. V. 99			.759	324.8	0.2	5	66.14	4	-2.0	rb, rb	400			
			.776	325.0	0.2	3	66.48	8	-1.1	b, m	400			
			.795	324.9	0.2	3	67.15	4	-0.8	vb, m	650	.771	324.9	66.61
H. N. 64	22 19	+44 49	.702	89.9	0.8	4	6.41	6	-2.0	b, b	650	.702	89.9	6.41
ζ Aquarii	22 23	- 0 32	.734	141.8	0.9	4	3.36	8	0.0	rb, rb	200			
H. II. 7			.743	141.2	1.0	4	3.18	6	+0.3	rg, b	800			
			.751	139.7	0.2	4	3.30	6	-0.8	rb, m	650			
			.795	141.7	0.3	4	2.86	6	-0.7	rb, rb	650			
			.825	140.7	1.0	4	3.05	4	+0.5	g, g	650	.770	141.0	3.15
δ Cephei	22 25	+57 52	.734	191.9	0.2	3	40.67	8	-1.8	m, m	200			
H. V. 4			.751	191.9	0.5	4	40.83	4	-2.1	rg, rg	650			
			.756	192.0	0.3	3	40.73	4	-3.0	b, rb	400	.747	191.9	40.74
$O\Sigma$ 483	22 54	+11 11	.743	226.1	0.4	4	1.16	4	-0.1	g, b	800			
			.795	225.7	0.2	4	0.84	4	-1.0	rb, rb	650			
			.820	231.3	1.6	5	0.62	4	-0.8	m, rb	650	.786	227.7	0.87
Σ 2976 AC	23 3	+ 6 3	.743	192.6	0.9	4	17.35	6	-0.1	rg, b	800			
			.795	191.9	0.6	3	17.14	4	-0.6	vb, vb	650	.769	192.2	17.24
AB	"	"	.743	261.2	2.7	4	—	—	0.0	rg, b	800			
			.820	262.8	0.9	5	—	—	-0.8	rb, rb	650	.781	262.0	(7.91)
BC	"	"	.743	164.9	0.9	4	—	—	0.0	rg, b	800			
			.820	165.4	0.4	5	—	—	-0.7	m, rb	650	.781	165.1	(16.30)
$O\Sigma$ 495	23 20	+56 59	.751	320.9	2.5	4	—	—	-2.5	m, m	650			
			.759	300.9	8.0	4	—	—	-3.7	vb, rg	650	.755	310.9	—
β 720	23 29	+30 47	.829	183.6	6.6	4	—	—	-2.0	vb, rg	650			
			.852	170.5	3.4	5	0.55	4	+3.3	b, b	1100	.840	177.0	0.55
$O\Sigma$ 500	23 33	+43 53	.829	152.8	1.1	4	0.54	4	-2.2	vb, rg	650			
			.852	144.9	3.0	5	0.60	4	+3.5	m, m	1100	.841	148.9	0.57
$O\Sigma$ 507 AB	23 44	+64 20	.763	260.1	2.4	4	0.83	4	-2.9	rb, m	400			
			.803	266.6	1.9	5	0.49	4	-3.4	rg, m	1100			
			.820	260.7	5.0	4	0.73	4	-2.0	rb, rb	400	.795	262.5	0.68
Med. & C	"	"	.767	352.6	0.3	4	49.29	6	-2.6	m, m	400			
			.776	352.7	0.3	3	49.32	6	-3.2	b, m	400	.771	352.7	49.30
37 Andromedae B	23 54	+33 12	.829	215.7	0.8	4	2.41	6	-2.1	m, m	650			
H. N. 58			.836	213.0	0.7	5	2.50	6	+3.5	rg, rg	400	.832	214.3	2.45
Σ 3056 AB	23 59	+33 42	.829	148.7	2.9	5	0.42	4	-2.3	vb, m	650			
			.836	153.4	2.1	4	0.69	4	+3.6	m, m	500			
			.852	326.9	2.8	4	0.47	4	+3.2	b, m	1100	.839	149.7	0.53
Med. & C	"	"	.836	358.6	0.7	4	22.75	6	+3.8	m, m	500			
			.852	358.7	0.5	4	22.57	8	+3.4	b, m	1100	.844	358.7	22.66

Copenhagen, 1900 December.

W. Doberck.