XI. *On the parallax of the fixed stars.* *By* John Pond, *Esq. Astronomer Royal, F. R. S.*

Read February 20, 1817.

It is now very generally known to astronomers, that, for several years past, Dr. Brinkley, with the eight feet circle of the Observatory at Dublin, has constantly observed a periodical deviation of several fixed stars from their mean places; which strongly indicates the existence of an annual parallax in those stars. The magnitude and perfection of the instrument, the regular continuation of the same result without exception, during a period of several years, and above all, the judicious reflections of Dr. Brinkley, and his unprejudiced statement of every objection that might be supposed to occur, seem to leave but little doubt upon the subject. Thus much at least is certain, that the observed discordance arises from some very permanent cause, and is totally distinct from what has usually been termed *error of observation.*

The deviation from the mean place resulting from the supposed parallax being a very small quantity (never exceeding a single second), Dr. Brinkley was naturally desirous that the result of his observations should be confirmed by other astronomers. Few, however, are fortunate enough to possess instruments sufficiently accurate either to confirm or confute the hypothesis above stated.

The mural circle at the Royal Observatory, erected in the year 1812, was supposed to be well adapted to this species of investigation, and, I confess, I expected to find the effects of parallax in Dr. BRINKLEY's stars, and perhaps in some others, almost as decidedly as the effects of aberration and nutation. I soon however found (what indeed if I had sufficiently reflected on the subject, I ought to have foreseen), that this instrument (at least in the manner in which I employ it) is not so exactly adapted to the purpose as might at first be supposed. My principal object was to obtain the mean places of a certain number of stars, with the greatest precision that the nature of the instrument admitted. I therefore availed myself of the principles of its construction, to give every possible variety to my observations, by bringing a new system of divisions to bear upon those stars. The effect of parallax was necessarily involved in these changes; and, though I certainly did expect that under all these disadvantages a parallax so considerable as that assumed by Dr. BRINKLEY, would have become very apparent, yet, upon not finding it, I did not think it by any means fair to infer its non-existence, more particularly as the discordances I really did meet with, were very universally in favour of parallax.

Finding, therefore, that I could not elucidate this question in a perfectly satisfactory manner without dedicating the circle entirely to this investigation, I rather directed my attention to contrive some other instruments which might be employed exclusively to this object.

At the last visitation, I proposed that two or more telescopes should be fixed to stone piers, and directed to the particular stars whose parallax was suspected; that each telescope should be furnished with a micrometer, by which the star could be compared with others passing through the same field. This suggestion was approved of by the visitors, and, till a proper building can be contrived and erected, I have fixed two ten feet telescopes, one on the circle pier directed to α Aquilæ, and one on the quadrant pier directed to α Cygni, and with these temporary instruments I am about to commence a series of observations.

The advantages I presume those instruments to possess are, length of radius; great steadiness, and simplicity of construction; and being used only for a few select observations, these few are more likely to be made with extreme care.

Although, for the reasons above stated, I was unable to devote the mural circle entirely to the investigation of parallax, yet during the summer of 1813, and the following winter, I was induced to continue the telescope in the same position, with the view of examining any changes that might occur indicative of parallax, or any other irregularity. During this period, the three principal stars observed by Dr. BRINKLEY (α Lyræ, α Aquilæ, α Cygni) arrive at their maximum and minimum of parallax; as far, therefore, as the observations of one single year can be supposed to have any weight, these seem, I think, to be as good as ever may reasonably be expected to be made with the same instrument.

The object of the present communication is to submit the result of these observations to the Society; and whatever remarks I may be induced to make on the discordances between Dr. BRINKLEY's observations and my own, I hope, will be considered rather in the light of suggestions, arising from circumstances obviously presenting themselves to our notice, than as arguments to decide a question, which

I anxiously wish to keep open for future experiment and investigation.

The question of parallax in a theoretical point of view, is scarcely of any importance, it is in fact one of mere curiosity. The motion of the earth has long since ceased to be a subject of controversy, and could a difference of opinion still be supposed to exist, the advocates for the Copernican system would derive but slender support from the discussion of such small variations, as form the subject of this Paper. But with reference to the state of practical astronomy the case is very different; in the future history of this branch of the science, that period of time will always acquire a certain degree of celebrity, in which astronomical instruments shall have been brought to such a degree of perfection, as to exhibit distinctly the effects of parallax in the fixed stars, and to distinguish these from the variety of complicated oscillations to which, from other causes, they are perpetually subject: and, as far as relates to the natural history of the sidereal system (if I may so express myself), it is surely a subject of rational curiosity to ascertain whether the distance of the nearest fixed star can be numerically expressed from satisfactory data, or if it be really so immeasureably great, as to exceed all human powers either to conceive or determine.

As I have already observed, the object of this communication is not to decide this question, but to state the result of the Greenwich observations.

The first star I shall consider, is α Lyræ; this star having been diligently observed from the first erecting of the instrument with a view to this particular investigation.

In the annexed Tables will be seen the observations selected at those times when the parallax is at a maximum. To the observations themselves is subjoined the process of computing the correction to be applied for deducing the true polar distance. This correction, which is of the nature of an Index error, is usually found by comparing the observed places of all the stars, during the same period, with their computed places deduced from a standard catalogue derived from the instrument itself.

If all the stars were used indiscriminately for this purpose, the method would be liable to an objection stated by Dr. Brinkley, for if of the stars from which this correction is deduced, several were themselves subject to considerable parallax, the effect of this parallax would be involved in the correction, and, if they were selected near to the star whose parallax was sought, the effect of this would be to conceal the parallax, by showing only the difference of parallax instead of the whole. To obviate entirely this objection, I reject those stars supposed by Dr. Brinkley to have parallax, and likewise γ Draconis, whose parallax arrives at its maximum nearly at the same period with that of α Lyræ, α Aquilæ, and α Cygni. I employ chiefly those stars whose parallax must be neutral, and those opposite in right ascension, which method has rather a tendency to exaggerate the effect of parallax by exhibiting to a certain degree the sum of the parallaxes of different stars. The difference of these two methods, however, as may be seen in the annexed Tables, does not amount to one tenth part of a second. The above-mentioned objection, therefore, though theoretically just, cannot be made to explain the discordance which exists between Dr. Brinkley's observations and mine.

	°	′	″
The mean of 40 observations of α Lyræ from June 22, to August 21, gives for the north polar distance of that star - -	51	23	0,278
The mean of 20 taken nearer to the period of opposition will be - -	51	23	0,461
The mean of 30 winter observations is	51	23	0,867

The discordance between the winter and summer observations, therefore, does not exceed 0,6″ equal to one third of the discordance found by Dr. BKINKLEY, and with the refraction employed by him, it would be about one quarter of a second less.

α Cygni.

	°	′	″
Thirty observations of this star in summer, about the period of opposition, give -	45	22	56,933
The mean of 30 in winter - -	45	22	57,448
But as 10 of these observations were made too far distant from the time of conjunction, it will be better to take the mean of 20, which is - - -	45	22	57,489

The difference 0,556″ is the total discordance in favour of parallax. This quantity is likewise nearly equal to one-third of the discordance found by Dr. BRINKLEY.

α Aquilæ.

		°	′	″
Thirty observations of this star in the summer of 1813, are as follows: -	10=	81	36	58,555
	10=	81	36	58,536
	10=	81	36	58,300
Mean of 30 summer - -		81	36	58,464
Mean of 20 winter - -		81	36	59,300
Difference - - -				0,836

With Dr. Brinkley's refractions, this difference would be reduced to less than half a second, a quantity equal to one quarter of the discordance found by Dr. Brinkley.

On the Observations of the year 1812.

The observations of the year 1812, are liable to all the objections which I have already stated, yet so very small is the effect of change in the position of the telescope, that I should be inclined myself to prefer a mean taken from the two years observations, than to that deduced from the observations of 1813 above. The early observations in the summer of 1812, are probably not very good, the instrument being then in a very unfinished state. α Lyræ was diligently observed during the whole of the summer; there are but few observations of α Aquilæ, and none of α Cygni; but the winter observations of these stars are very good. The mean result of two years observations will stand as follows:

α Lyræ.

Summer	No. of Observations.	″	Winter	No. of Observations.	″
1812	24	0,165	1812	20	0,711
1813	40	0,278	1813	30	0,873
	64	0,236		50	0,808

Difference 0.572″ with Bradley's refractions.

The French refractions would reduce this difference to about 0,3″ or 0,4″.

α Aquilæ.

Summer	No. of Observations.	″	Winter	No. of Observations.	″
1812	10	58,052	1812	20	59,606
1813	30	58,464	1813	20	59,300
	40	58,361		40	59,453

Difference 1.092″

This quantity by the French refraction employed by Dr. BRINKLEY, would be reduced to about 0,5″.

α Cygni.

Winter Observations.			Summer Observations.		
		″			″
9	1812	57,120			
20	1813	57,489	1813	30	56,933
29		57,366			
Difference		0,433			

From the above observations then, it appears that in the three stars supposed by Dr. BRINKLEY to have the greatest parallax, viz. α Lyræ, α Cygni, and α Aquilæ, we find discordances between the summer and winter observations of nearly half a second; now, though these quantities are so much smaller than those found by Dr. BRINKLEY, they appear to me to be equally independent of any accidental error of observation, and it is not improbable but they may originate from some similar cause. But, I confess, I doubt much if this cause be parallax, and for the following reasons.

I do not find these discordances sensibly increased by direct comparison with an opposite star as Capella; now the maximum of parallax is nearly as great in Capella, as in α Aquilæ, at least in the proportion of 4 to 5; it is very unlikely then, the parallax of the one star should be above 5″, and the other an insensible quantity. It may be remarked, that both Dr. BRINKLEY and myself, find nearly the same discordance in all these stars, though the deduced parallax necessarily comes out very different. This is very unlikely to happen from parallax. Moreover, these stars all pass the meridian about the time of the winter solstice at their maximum of parallax, and, in proportion as stars do not possess this property, both Dr. BRINKLEY and myself find either a much smaller discordance, or none at all.

It is rather, therefore, to this peculiar circumstance that we should look for some explanation of the difficulties.

In addition to this I should add, that I find γ Draconis involved in this discordance, α Lyræ and γ Draconis have been observed together for five successive years. Above three hundred observations of each star have been made in opposition, and as many in conjunction, and I find the difference of parallax from the mean of all these observations to be about 0,25″, which quantity by the French refraction would be reduced one-half, or to an insensible quantity.

Now it is quite improbable, that two stars of such different brightness should have so exactly the same parallax.

These arguments, however, though they seem to me to arise naturally from the data before us, are nevertheless by no means absolutely conclusive, and I am well aware, how much easier it is to suggest doubts, than to propose satisfactory explanations. I shall, therefore, conclude this Paper, by expressing my hopes that, before a very long period shall elapse, the instruments lately erected may afford something more satisfactory and decisive.

Method of computing the Equation or Index Error to be applied to the observed North Polar distances.

1813. July and August. Position 0°.

	No. of Observations.	North Polar distances by circle.	North Polar distances by Catalogue.	Deduced Index Error.	Index Error multipled + No. of Observations.
		° ′ ″	″	″	″
Polaris, SP -	9	358 18 38,98	38.35	+ 0.63	+ 5.67
β Urs. Min. - -	27	15 4 49,31	48.93	0.38	10.26
β Cephei - -	14	20 15 31,50	30.54	0.96	13.44
α Urs. Maj. -	12	27 14 31,83	31.50	0.33	3.96
α Cephei - -	13	28 12 12,86	12.55	0.31	3.93
γ Urs. Maj. - -	8	35 15 55,69	55.25	0.44	3.52
γ Draconis -	39	38 29 3,96	3.55	0.41	15.99
η Urs. Maj. -	19	39 44 58,31	57.81	0.50	9.50
α Persei - -	6	40 49 53,10	52.37	0.73	4.38
Capella - -	27	44 12 20,64	20.46	0.18	4.86
α Cygni - -	23	45 22 57,30	56.98	0.32	7.36
α Lyræ -	39	51 23 0,70	0.48	0.22	8.58
Castor - -	6	57 42 47,12	46.74	0.38	2.28
Pollux -	11	61 31 56,63	56.42	0.21	2.21
β Tauri - -	17	61 33 44,46	43.67	0.79	13.43
α Cor. Bor. -	25	62 38 56,04	55.45	0.59	14.75
α Arietis, - -	5	67 25 36,64	36.51	0.13	0.65
Arcturus -	22	69 50 19,23	19.00	0.23	5.06
Aldebaran -	12	73 52 35,61	35.26	0.35	4.20
α Herculis - -	20	75 23 14,45	13.92	0.53	10.60
Regulus - -	3	77 7 22,65	22.62	0.03	0.09
α Ophiuchi -	33	77 17 39,07	38.88	0.19	6.27
α Aquilæ -	29	81 36 58,79	58.79	0.00	0.00
α Orionis - -	14	82 38 15,64	15.65	0.00	0.00
α Serpentis -	26	82 58 39,81	39.23	0.58	15.08
No. of Observations	459			0,36	166.07
Rejecting γ Draconis, α Lyræ, α Aquilæ, α Cygni	329			0.41	134.14

Method of computing the Equation or Index Error to be applied to the observed North Polar distances.

1813. November.

		° ′ ″	″	″	″
Polaris	13	1 41 23.38	21.65	+ 1.73	+ 22.49
SP.	12	358 18 40.90	38.35	2.55	30.60
β Urs. Min.	10	15 4 51.04	48.93	2.11	21.10
β Cephei	10	20 15 32.09	30.54	1.55	15.50
α Cephei	10	28 12 14.16	12.55	1.91	19.10
α Cassiop.	10	34 29 24.30	22.68	1.62	16.20
γ Urs. Maj.	4	35 15 56.81	55.25	1.56	6.24
γ Draconis	7	38 29 6.21	3.55	2.66	18.62
η Urs. Maj.	10	39 45 0.00	57.81	2.19	21.90
α Cygni	8	45 22 59.31	56.98	2.33	18.64
α Lyræ	10	51 23 2.52	0.48	2.04	20.40
α Andromed.	14	61 56 32.02	30.16	1.86	26.04
α Arietis	11	67 25 38.89	36.51	2.38	26.18
Arcturus	11	69 50 21.01	19.00	2.01	22.11
α Ophiuchi	3	77 17 40.74	38.88	1.86	5.58
α Aquilæ	10	81 37 1.30	58.80	2.50	25.00
	153			2.06	315.70
Rejecting γ Draconis, α Lyræ, α Aquilæ, α Cygni	118			1.97	233.04

1813. December.

		° ′ ″	″	″	
Polaris	7	1 41 24.40	21.65	+ 2.75	19.25
β Urs. Min.	3	15 4 52.41	48.93	3.48	10.44
β Cephei	2	20 15 31.88	30.54	1.34	2.68
α Cephei	3	28 12 15.88	12.15	3.73	11.19
α Cassiop.	8	34 29 25.56	22.68	2.88	23.04
γ Draconis	5	38 29 7.16	3.55	3.61	18.05
α Persei	5	40 48 54.85	52.37	2.48	12.40
Capella	2	44 12 23.17	20.46	2.71	5.42
α Cygni	4	45 23 0.42	56.98	3.44	13.76
α Lyræ	6	51 23 4.21	0.48	3.73	22.38
α Andromed.	2	61 56 31.90	30.16	1.74	3.48
α Arietis	7	67 25 39.63	36.51	3.11	21.77
Arcturus	2	69 50 22.10	19.00	3.10	6.20
Aldebaran	6	73 52 37.92	35.26	2.66	15.96
α Aquilæ	4	81 37 2.09	58.80	3.29	13.16
	66			3.02	199.18
Rejecting γ Draconis, α Lyræ, α Aquilæ, α Cygni	47			2.81	131.83

Method of computing the Equation or Index Error to be applied to the observed North Polar distances.

1814. January.

Polaris - -	5	1 41 5.30	2.00	+ 3.30	16.50
α Cassiop. -	5	34 29 6.70	2.85	3.85	19.25
α Persei -	6	40 48 42.02	38.87	3.15	18.90
Capella -	6	44 12 19.40	15.89	3.51	21.06
β Tauri -	4	61 33 43.10	39.84	3.26	13.04
α Andromeda -	4	61 56 14.99	10.17	4.82	19.28
α Arietis - -	5	67 25 22.34	19.11	3.23	16.15
Aldebaran -	4	73 52 30.83	27.31	3.52	14.08
	39			3.55	138.26

1814. February.

Polaris - -	11	1 41 5.40	2.00	+ 3.40	37.40
α Cassiop. -	9	34 29 6.52	2.85	3.67	33.03
α Persei -	12	40 48 42.30	38.87	3.43	41.16
Capella -	20	44 12 19.50	15.89	3.61	72.20
Castor - -	14	57 42 57.80	53.80	4.00	56.00
Pollux - -	12	61 32 8.50	4.42	4.08	48.96
β Tauri -	16	61 33 43.86	39.84	4.02	64.32
α Arietis - -	8	67 25 22.80	19.11	3.69	29.52
Aldebaran -	10	73 52 31.13	27.31	3.82	38.20
α Orionis -	16	82 38 18.18	14.28	3.90	62.40
	130			3.97	492.95

α Lyræ.

1813.	A	B	C	D
	° ′ ″	″	″	
June 22	51 22.59.64	−0.40	59.24	
23	23. 1.49		1.09	
24	0.87		0.47	
25	0.78		0.38	
26	1.13		0.73	0.549
27	1.34		0.94	
28	0.54		0.14	
July 5	0.73		0.33	
6	1.67		1.27	
9	1.30		0.90	
10	1.16		0.76	
11	0.26		59.86	
12	1.11		0.71	
13	0.17		59.77	
16	0.93		0.53	
17	1.86		1.44	0.374
18	1.80		1.40	
19	1.25		0.85	
23	22.59.28		58.88	
24	59.94		59.54	
25	59.67		59.27	
27	23. 0.72		0.32	
28	0.07		59.67	
29	22.59.80		59.40	
30	59.40		59.00	
Aug. 1	59.53		59.13	59.877
3	23. 0.18		59.78	
5	1.24		0.84	
7	1.50		1.10	
9	0.66		0.26	
10	0.75		0.35	
11	0.62		0.22	
12	0.33		59.93	
13	0.84		0.44	
15	0.69		0.29	0.313
16	0.51		0.11	
17	0.72		0.32	
19	1.43		1.03	
20	1.04		0.64	
21	0.20		59.80	

1813.	A	B	C	D
	° ′ ″		″	
Nov. 4	51 23. 2.00	−2.00	0.00	
6	1.31		59.31	
8	2.09		0.09	
11	2.50		0.50	
18	3.85		1.85	0.688
20	2.33		0.33	
27	2.90		0.90	
30	3.49		1.49	
Dec. 15	4.65	−2.80	1.85	
21	3.36		0.56	
23	3.24		0.44	
26	4.57		1.77	
30	4.31		1.51	
31	5.12		2.32	
1814.				
Jan. 11	4.10	−3.55	0.55	1.111
12	5.03		1.48	
29	4.90		1.35	
30	4.58		1.03	
31	3.87		0.32	
Feb. 2	4.14	−3.80	0.34	
3	3.81		0.01	
6	3.93		0.13	
14	3.73		59.93	
17	5.27		1.47	
19	5.70		1.90	0.801
20	5.11		1.31	
22	4.38		0.58	
24	4.58		0.78	
25	4.90		1.10	
26	4.60		0.80	

A. Observations given by the instrument corrected for precession, Abb. Nut. and Refraction.

B. Index Error.

C. Observations corrected.

D. Means of each series of 10 observations.

α Cygni.

1813.	A	B	C	D	1813.	A	B	C	D
July 27	45° 22′ 56″.68	— 0.40	56″.28		Oct. 22	45° 22′ 57″.33	— 0.88	56″.45	
28	57.84		57.44		25	58.01		57.13	
29	57.75		57.35		29	58.17		57.29	
30	57.93		57.53		31	57.88		57.00	
Aug. 3	57.56		57.16		Nov. 6	58.46	— 2.00	56.46	57.095
4	57.70		57.30	56.791	9	59.11		57.11	
5	56.68		56.28		11	58.88		56.88	
7	57.71		57.31		13	59.39		57.39	
9	56.09		55.69		14	59.36		57.36	
10	55.97		55.57		15	59.89		57.89	
11	57.43		57.03		18	59.52		57.52	
12	57.72		57.32		29	59.91		57.91	
13	58.28		57.88		Dec. 15	60.32	— 2.80	57.52	
15	57.70		57.30		26	60.46		57.66	
17	55.98		55.58		30	59.66		56.86	
19	56.84		56.44	56.987	31	61.26		58.46	57.650
20	57.53		57.13		1814.				
21	56.82		56.42		Jan. 7	60.85	— 3.55	57.30	
22	57.54		57.14		12	60.93		57.38	
23	58.03		57.63		13	61.18		57.63	
25	57.34		56.94		17	61.81		58.26	
26	57.77		57.37		30	60.10		56.55	
31	57.58		57.18		31	60.10		56.55	
Sep. 2	57.61		57.61		Feb. 2	6 .43		57.63	
3	58.29		58.29		3	61.09	— 3.80	57.29	
4	56.64		56.64	57.025	14	61.33		57.53	
5	56.87		56.87		15	62.19		58.39	57.599
6	56.12		56.12		17	60.90		57.10	
7	56.69		56.69		19	61.76		57.96	
9	56.54		56.54		20	62.40		58.60	
					21	62.19		58.39	

α Aquilæ.

1813.	A	B	C	D
July 11	81° 36′ 57.91″	—0.40	57.51″	
12	59.57		59.17	
16	58.90		58.50	
17	58.83		58.43	
19	58.18		57.78	58,555
21	58.96		58.56	
22	59.01		58.61	
25	59.88		59.48	
26	58.48		58.08	
27	59.83		59.43	
29	58.22		57.82	
30	59.58		59.18	
Aug. 2	59.98		59.58	
3	59.20		58.80	
7	59.27		58.87	58,536
10	57.88		57.48	
11	59.54		59.14	
12	58.54		58.14	
13	58.51		58.11	
15	58.64		58.24	
16	57.68		57.28	
17	59.30		58.90	
19	58.51		58.11	
21	57.67		57.27	
22	58.52		58.12	
24	59.29		58.89	58,300
25	58.62		58.22	
26	59.01		58.61	
31	59.19		58.79	
Sep. 2	58.81	—0.00	58.81	

1813.	A	B	C	D
Oct. 13	81° 36′ 58.68″	—0.88	57.80″	
14	60.10		59.22	
16	58.45		57.57	
18	60.51		59.63	
19	59.94		59.06	58,843
21	60.00		59.12	
25	58.67		57.79	
31	60.79		59.91	
Nov. 1	60.84	—2.00	58.84	
4	61.49		59.49	
6	61.06		59.06	
11	60.82		58.82	
13	61.06		59.06	
14	61.50		59.50	
18	61.93		59.93	59.224
22	61.17		59.17	
27	61.49		59.49	
30	61.61		59.61	
Dec. 15	61.24	—2.80	58.44	
20	61.96		59.16	
26	62.71		59.91	
31	63.46		60.66	
1814.				
Jan. 30	62.82	—3.55	59.27	
31	62.32		58.77	
Feb. 3	62.12	—3.80	58.32	59.375
15	63.34		59.54	
17	63.96		60.16	
19	62.98		59.18	
20	62.86		59.06	
24	62.68		58.88	

Appendix to Mr. Pond's *Paper on Parallax.*

Read March 13, 1817.

From the month of April 1814, to the present time, the observations have been made with two microscopes only, and not having this subject in view, they generally are not calculated to throw much additional light on this question. But last autumn, being induced to suspect, that the discordance I had met with in favour of parallax, might arise from the difference of temperature in summer and winter being in an opposite state relatively to the interior and exterior thermometer, I endeavoured this winter to keep the interior temperature of the observatory the same as that without, which the extreme mildness of the season rendered very easy to accomplish. It likewise so happens that from the 1st of July last to the present time, the index error of the instrument has suffered no variation. It may, perhaps, have oscillated a small fraction of a second on each side the mean, but not more; so that during this interval, the circle may be considered as having been a fixed instrument, and therefore not liable to any of the objections above stated by Dr. Brinkley. Under these circumstances, the observations, though not made with six microscopes, are very worthy of attention. Those of α Lyræ, γ Draconis, α Cygni, and α Aquilæ, are very numerous, and there does not appear the least indication of any periodical variation whatever; the extremely small discordance, which is no doubt accidental, happens, in some of the cases, to be in a direction contrary to parallax.

It now only remains to determine, whether the fixed instruments, lately erected for this particular investigation, will confirm the above result.

Months.	Number of Observations	Results in Seconds.	
			α Lyræ.
July	18,	48″.54	correct mean of 50 observations 49″.198. Summer.
Aug.	12,	49.70	
Sept.	12,	49.98	
Oct.	8,	48.76	
Nov.	12,	49.66	correct mean of 34 observations 49″.205. Winter.
Dec.	10,	48.77	
Jan.	9,	48.92	
Feb.	3,	49.69	
			γ Draconis.
July	16,	3″.54	correct mean of 31 observations 3″.776. Summer.
Aug.	7,	4.75	
Sept.	8,	3.40	
Oct.	7,	3.16	correct mean of 33 observations 3″.827. Winter.
Nov.	9,	4.37	
Dec.	8,	3.25	
Jan.	9,	3.95	
			α Cygni.
Sept.	14,	17″.67	correct mean of 37 observations 17″.36. Autumn.
Oct.	12,	17.01	
Nov.	11,	17.38	
Dec.	9	16.73	correct mean of 37 observations 17″.28. Winter.
Jan.	8,	17.11	
Feb.	11,	17.94	
Mar	9		
			α Aquilæ.
Aug.	12,	29″.65	correct mean of 33 observations 30″.29. Summer.
Sep.	14,	30.74	
Oct.	7,	30.31	
Nov.	16,	30.55	correct mean of 45 observations 30″45. Winter.
Dec.	12,	30.25	
Jan.	4,	30.74	
Feb.	5,	30.61	
Mar.			

With the French refractions, there would appear an extremely small discordance of 0,1″ in a contrary direction to the effect of parallax.