XII. *Catalogue of Double Stars. By Mr.* Herſchel, *F. R. S. communicated by Dr.* Watſon, *Jun.*

Read January 10, 1782.

INTRODUCTORY REMARKS.

THE following catalogue contains not only double-ſtars, but alſo thoſe that are treble, double-double, quadruple, double-treble, and multiple. The particulars I have given of them are comprehended under the following general heads.

I. The names of the ſtars and number in FLAMSTEAD's Catalogue; or, if not contained therein, ſuch a deſcription of their ſituation as will be found ſufficient to point them out.

II. The comparative ſize of the ſtars. On this occaſion I have uſed the terms equal, a little unequal, pretty unequal, conſiderably unequal, very unequal, extremely unequal, and exceſſively unequal, as expreſſing the different gradations to which I have endeavoured to affix always the ſame meaning.

III. The colours of the ſtars as they appeared to me when I viewed them. Here I muſt remark, that different eyes may perhaps differ a little in their eſtimations. I have, for inſtance, found, that the little ſtar which is near *α* Herculis, by ſome to whom I have ſhewn it has been called green, and by others blue. Nor will this appear extraordinary when we recollect that there are blues and greens which are very often, particularly by candle-light, miſtaken for each other. The ſituation will alſo affect

the

the colour a little, making a white ftar appear pale red when the altitude is not fufficient to clear it of the vapours. It is difficult to find a criterion of the colours of ftars, though I might in general obferve that Aldebaran appears red, Lyra white, and fo on; but when I call the ftars garnet, red, pale red, pale rofe-colour, white inclining to red, white, white inclining to blue, blueifh white, blue, greenifh, green, dufky, I wifh rather to refer to the double ftars themfelves to explain what is meant by thofe terms.

IV. The diftances of the ftars are given feveral different ways. Thofe that are eftimated by the diameter can hardly be liable to an error of fo much as one quarter of a fecond; but here muft be remembered what I have before remarked on the comparative appearance of the diameters of ftars in different in-ftruments. Thofe that are meafured by the micrometer, I fear, may be liable to an error of almoft a whole fecond; and if not meafured with the utmoft care, to near 2″. This is, however, to be underftood only of fingle meafures; for the diftance of many of them that have been meafured very often in the courfe of two years obfervations can hardly differ fo much as half a fecond from truth, when a proper mean of all the meafures is taken. As I always make the wires of my micrometer outward tangents to the apparent diameter of the ftars, all the mea-fures muft be underftood to include both their diameters; fo that we are to deduct the two femi-diameters of the ftars if we would have the diftance of their centers. What I have faid con-cerns only the wire micrometers, for my laft new micrometer is of a fuch a conftruction, that it immediately gives the diftance of the centers and its meafures (as far as in a few months I have been able to find out) may be relied on to about one-tenth of a fecond, when a mean of three obfervations is taken. When I have

added *inaccurate,* we may fufpect an error of 3 or 4″. *Exactly eftimated* may be taken to be true to about one-eighth part of the whole diftance; but only *eftimated,* or *about,* &c. is in fome refpect quite undetermined; for it is hardly to be conceived how little we are able to judge of diftances when, by conftantly changing the powers of the inftrument, we are as it were left without any guide at all. I fhould not forget to add, that the meafure of ftars, whereof one is extremely fmall, muft claim a greater indulgence than the reft on account of the difficulty of feeing the wires when the field of view cannot be fufficiently enlightened.

V. The angle of pofition of the ftars I have only given with regard to the parallel of declination, to be reduced to that with the ecliptic as occafion may require. The meafures always fuppofe the large ftar to be the ftandard, and the fituation of the fmall one is defcribed accordingly. Thus in figure 12. AB reprefents the apparent diurnal motion of a ftar in the direction of the parellel of declination AB; and the fmall ftar is faid to be fouth preceding at *mn,* north preceding at *op,* fouth following at *qr,* and north following at *st.* The meafure of thefe angles, I believe, may be relied upon to 2° or at moft 3°, except when mentioned inaccurate, where an error amounting to 5° may poffibly take place. In mere eftimations of the angle, without any wires at all, an error may amount to at leaft 10°, when the ftars are near each other.

VI. The dates when I firft perceived the ftars to be double, treble, &c. are marked in the margin of each ftar.

To fhorten the work as much as poffible, I have put L. for the large ftar; S. for the fmall ftar; w. for white; r. for red; d. for dufky; n. for north; f. for fouth; and have likewife

occa-

occafionally ufed other abbreviations that will be eafily under-
ftood.

It may be feen, that this catalogue is yet in a very imper-
fect ftate, many of the ftars not having even the principal
elements of diftance and pofition determined with any degree
of accuracy ; but having already mentioned the reafon why I
give it imperfect as it is, I can only add that my endeavours
will not be wanting foon to remove thofe defects. However,
fince this can only be a work of fome time, we may hope, in
the mean while, that many lovers of the fcience will turn
their thoughts upon the fame fubject.

CATALOGUE OF DOUBLE STARS.

FIRST CLASS.

1. ε Bootis. FLAMST. 36.   Ad dextrum femur in perizomate.

Sept. 9.   Double. Very unequal. L. reddifh ; S. blue, or
1779.   rather a faint lilac. A very beautiful object. The
            vacancy, or black divifion between them, with 227
            is ¾ diameter of S. ; with 460, 1¼ diameter of L. ;
            with 932, near 2 diameters of L. ; with 1159, ftill
            farther ; with 2010 (extremely diftinct) 2¾ diameters
            of L.   Thefe quantities are a mean of two years ob-
            fervation.   Pofition 31° 34′ n. preceding.

2. ξ Urfæ majoris. FL. 53.   In dextro pofteriore pede.

May 2,   Double.   A little unequal.   Both w. and very
1780.   bright.   The interval with 222 is ⅔ diameter of L. ;
            with 227, 1 diameter of L. ; with 278, near 1½ dia-
            meter of L.   Pofition 53° 47′ f. following.

3. σ Coronæ borealis, FL. 17.

Aug. 7,
1780.

Treble. The two neareſt pretty unequal; the third very faint with powers lower than 460. The two neareſt both w.; the third d. Interval of the two neareſt with 227, full 1¼ diameter of L.; with 460, 2 diameters of L. Poſition 77° 32′ n. preceding. Diſtance of the third from L. 24″ by exact eſtimation. Poſition 25° n. following by eſtimation.

4. In conſtellatione Draconis, FL. 16.

Aug. 8,
1780.

Double. It is the ſtar to which a line drawn from ν through μ points, at nearly the ſame diſtance from μ as μ from ν. Conſiderably unequal. L. w.; S. w. inclining to r. With 222, 1 diameter of L.; with 278, 1½ diameter of L. Poſition 24° 0′ ſ. following. There is a third ſtar, at ſome diſtance, preceding.

5. σ Caſſiopeæ, FL. 8. In dextro cubito.

Aug. 31,
1780.

Double. It is the ſtar at the vertex of a teleſcopic iſoſceles triangle turned to the ſouth. Very unequal. L. w. a little inclining to r.; S. d. With 222, near 1 diameter of L.; with 460, 1½ diameter of L. Poſition 60° 28′ n. preceding.

6. Quæ infra oculum Lyncis, FL. 12.

Oct. 3,
1780.

A curious treble ſtar. Two neareſt pretty unequal. L. w.; S. w. inclining to roſe colour. With 227, about ½ diameter; with 460, full ¾ diameter of S. Poſition 88° 37′ ſ. preceding. The firſt and third conſiderably unequal; ſecond and third pretty unequal. The third pale r. Diſtance from the firſt 9″ 23‴; too difficult to be extremely exact. Poſition with regard to the firſt 32° 33′ n. preceding.

7. *b* Draconis,

7. *b* Draconis, FL. 39. Trium in recta, in prima inflectione colli, borea.

Oct. 3. 1780.   A minute double ftar. Extremely unequal, the fmall ftar being a fine lucid point. L. w.; S. inclining to r. With 227, ¾ diameter of L.; with 460, full 1½ diameter of L.; with 932 (extremely fine) full 2 diameters of L. Pofition 77° 8′ n. following. A third ftar at fome diftance; dufky r. Pofition 63° 22′ n. following.

8. *ε* Draconis, FL. 63. In quadrilatero inflexionis primæ.

Oct. 3. 1780.   A very minute double ftar. Exceffively unequal; the fmall ftar can only be feen when the air is perfectly clear. L. w.; S. d. With 227, lefs than 1 diameter of L.; with 278, not a diameter of L. Pofition 63° 14′ n. preceding. A pretty large third ftar at about 3 or 4′. Pofition of this third ftar with *ε* 88° 16′ n. following.

9. In cauda Lyncis media, FL. 38.

Nov. 24. 1780.   Double. Very unequal. L. w.; S. inclining to r. With 227, extremely clofe; with 460, at leaft ½ diameter of S. A very fine object. Pofition 25° 51′ f. preceding. A proper motion is fufpected in one of the ftars.

10. In finiftro anteriore pede Monocerotis, FL. 11.

Feb. 15. 1781.   A curious treble ftar; may appear double at firft fight; but with fome attention we fee that one of them again is double. The firft, or fingle ftar, is the largeft; the other two are both fmaller, and almoft equal, but the preceding of them is rather larger than the following. They are all w. The two neareft with 227, 1 diameter of the preceding, or nearly

nearly 1¼ of the following; with 460, 1¼ diameter of
the preceding.   Pofition of the two nearest 11° 32′ f.
following.   For an account of the single ftar, fee
the fecond clafs.   As perfect as I have feen this treble
ftar with 460, it is one of the moft beautiful fights
in the heavens; but requires a very fine evening.

11. In conftellatione Cancri, FL. 11.

Mar. 13,   Double.   Confiderably unequal.   Both pale r.
  1781.   With 227, 1 full diameter of L.; with 460, about
          1¾ diameter of L.   Pofition 85° 10′ n. preceding.

12. *d* Serpentis, FL. 59.   In Cauda.

July 17,   Double.   Very unequal.   L. reddifh w.; S. fine
  1781.   blue.   With 227, 1 full diameter of L.; with 278,
          1⅓ diameter of L.   Pofition 44° 33′ n. preceding.

13. In conftellatione Aquilæ, near FL. 37.

July 25,   A curious treble ftar.   It is the laft ftar of a tele-
  1781.   fcopic trifolium n. following *k*, fimilar to that in the
          hand of Aquarius.   The two neareft very unequal;
          the third ftar exceffively fmall, and not vifible with
          227.   The two neareft with 460, no more than ½
          diameter of L.; the fartheft about 7 or 8″.

14. In conftellatione Aquilæ, FL. 24.

July 30,   Double.   In HARRIS's maps it is the ftar in the
  1781.   elbow of Antinous.   Exceffively unequal; the fmall
          ftar is but juft vifible with 227; but with 460 it is
          pretty ftrong.   L. pale r.; S. d.   With 227, 1 full
          diameter of L.; with 460, 1½ diameter of L.   Pofi-
          tion 72° 0′ f. following.

15. *i* Bootis, FL. 44.

Aug. 17.   Double.   In HARRIS's maps it is marked *i*, but has
  1781.   no letter in FL. Atlas.   Confiderably unequal.   Both
                                        w.

w. With 227 they feem almoft to touch, or at moft $\frac{1}{4}$ diameter of S. afunder; with 460, $\frac{1}{2}$ or $\frac{3}{4}$ diameter of S. This is a fine object to try a telefcope, and a miniature of α Geminorum. Pofition 29° 54′ n. following.

16. η Coronæ borealis, FL. 2.

Sept. 9. 1781.

Double. A little unequal. They are whitifh ftars. They feem in contact with 227, and though I can fee them with this power, I fhould certainly not have difcovered them with it; with 460, lefs than $\frac{1}{4}$ diameter; with 932, fairly feparated, and the interval a little larger than with 460. I faw them alfo with 2010, but they are fo clofe that this power is too much for them, at leaft when the altitude of the ftars is not very confiderable; with 460 they are as fine a miniature of *i* Bootis as that is of α Geminorum. Pofition 59° 19′ n. following.

17. In conftellatione Bootis, near FL. 51.

Sept. 10. 1781.

Double. It is a ftar near μ not marked in FLAM-STEAD's Catalogue. Confiderably unequal. Both dufky w. inclined to r. The interval with 460 is $\frac{3}{4}$ diameter of S. The pofition of the fmall ftar is turned towards μ a little following the line which joins L to μ Bootis. See μ Bootis in the fixth clafs.

18. In conftellatione Coronæ borealis.

Sept. 10. 1781.

Double. It is the fmalleft of two telefcopic ftars between θ and δ, not contained in FL. Cat. Equal. Both d. With 460, about $1\frac{3}{4}$ diameters. Pofition 21° 0′ n. following.

19. *h* Draconis, near FL. 19.

Sept. 10.
1781.
One of the moſt minute of all the double ſtars I have hitherto found. It is the ſmall teleſcopic ſtar near the preceding *h* Draconis. Confiderably unequal. Both duſky w. inclining to r. With 460, they ſeem in contaƈt; I have however had a very good view of a ſmall dark diviſion between them. Poſition (by exaƈt eſtimation) 25 or 30° ſ. preceding. They are too minute for any micrometer I have. It is in vain to look for them if every circumſtance is not favourable. The obſerver as well as the inſtrument muſt have been long enough out in the open air to acquire the ſame temperature. In very cold weather, an hour at leaſt will be required; but in a moderate temperature, half an hour will be ſufficient.

20. In dextro humero Orionis, FL. 52.

Oƈt. 1.
1781.
Double. A little unequal. Both w. a little inclining to pale r. With 227, ¼ diameter; with 460, ½ diameter. Poſition 69° 41′ ſ. preceding.

21. *c* Trianguli, near FL. 12. and 13.

Oƈt. 8.
1781.
Double. It is the moſt north of a ſmall teleſcopic trapezium of unequal ſtars. Extremely unequal. With 460, ¾ diameter of L. Poſition (by eſtimation) 55 or 60° n. preceding.

22. *n* Orionis, FL. 33. Duarum præcedentium 13^{am} (*ω*) antecedens.

Oƈt. 22.
1781.
Double. Confiderably unequal. L. w.; S. w.; inclining to blue. With 227, they ſeem almoſt in contaƈt; with 460, ½ diameter of S. Poſition 60° 55′ n. following. A very pleaſing objeƈt and eaſily ſeen.

     23. In

23. In pofterioribus femoribus Canis minoris.

Nov.21, 1781.

A moft minute double ftar. It is the fmall tele-fcopic ftar following Procyon. A little unequal. Both w. With 278, $\frac{1}{3}$ of a diameter of S.; with 460, near $\frac{1}{4}$ of a diameter of S. They are clofer than η Coronæ, becaufe their diameters, by which they are eftimated, are fmaller. Pofition 27° 21′ f. following. To fee this very minute double ftar well, Procyon fhould be near its meridian altitude. There is a fmall telefcopic ftar preceding the double ftar. Diftance 1′ 59″ 39‴ from center to center.

24. ζ Cancri, FL. 16.

Nov.21, 1781.

A moft minute treble ftar. It will at firft fight appear as only a double ftar, but with proper atten-tion, and under favourable circumftances, the pre-ceding of them will be found to confift of two ftars, which are confiderably unequal. The largeft of thefe is larger than the fingle ftar; and the leaft of the two is lefs than the fingle ftar. The firft and fecond (in the order of magnitude) pretty unequal. The fecond and third pretty unequal. The two neareft both pale r. or r. With 278, but juft fepa-rated; with 460, $\frac{1}{4}$ diameter of S. Pofition 86° 32′ n. following. For meafures relating to the third or fingle ftar fee ζ Cancri in the third clafs of double ftars.

SECOND CLASS OF DOUBLE STARS.

1. † α Geminorum, FL. 66. In capite præcedentis II

April 8, 1778. Double. A little unequal. Both w. The vacancy between the two ftars, with a power of 146, is 1 diameter of S.; with 222, a little more than 1 diameter of L.; with 227, 1½ diameter of S.; with 460, near 2 diameters of L.; (fee fig. 6.) with 754, 2 diameters of L.; with 932, full 2 diameters of L.; with 1536 (very fine and diftinct) 3 diameters of L.; with 3168, the interval extremely large, and ftill pretty diftinct. Diftance by the micrometer 5″,156. Pofition 32° 47′ n. preceding. Thefe are all a mean of the laft two years obfervations, except the firft with 146.

2. † α Herculis, FL. 64. In capite.

Aug. 29, 1779. A beautiful double ftar. Very unequal. L. r.; S. blue inclining to green; the colours with every power the fame. The interval with 222, 1¼ diameter of L.; with 227, above 2 diameters of L.; with 932, above 3 diameters of L. Diftance 4″966. All a mean of two years obfervations. A fingle meafure with my laft new micrometer, from center to center, 4″ 34‴. Pofition 30° 35′ f. following.

3. * ρ Herculis, FL. 75. Trium in finiftro femore, tertia.

Aug. 29, 1779. Double. Pretty unequal. Both w. With 227, 1¼ diameter of L.; with 460, 2 diameters of S. Diftance 2″,969. Pofition 30° 21′ n. preceding. The meafures a mean of two years obfervations.

4. * p Serpentarii, FL. 70. Tres has fequitur, quafi fupra mediam.

Aug. 29.
1779.

Double. Confiderably unequal. L. w.; S. inclining to r. With 227, $1\frac{2}{3}$ diameter of L.; with 460, much above 2 diameters of L. Pofition 9° 14′ f. following. Mean of two years obfervations.

5. et 6. * ε Lyra, FL. 4. and 5.

Aug. 29.
1779.

A very curious double-double ftar. At firft fight it appears double at fome confiderable diftance, and by attending a little we fee that each of the ftars is a very delicate double ftar. The firft fet confifts of ftars that are confiderably unequal. The ftars of the fecond fet are equal, or the preceding of them rather larger than the following. The colour of the ftars in the firft fet L. very w.; S. a little inclining to r. In the fecond fet both w. The interval between the ftars of the unequal fet, with a power of 227, is full 1 diameter of L.; with 460, near $1\frac{1}{2}$ diameter of L.; with 932, full $1\frac{1}{2}$ diameter; with 2010, $2\frac{1}{3}$ diameters. The interval between the equal fet with a power of 227 is almoft $1\frac{1}{2}$ diameter of either; with 460, full $1\frac{3}{4}$ diameter; with 932, 2 diameters; with 2010, $2\frac{1}{2}$ diameters. Thefe eftimations are a mean of two years obfervations. Pofition of the unequal fet 56° 0′ n. following. Pofition of the equal fet 72° 57′ f. following.

7. * ζ Aquarii, FL. 55. Trium in manu dextra præcedens.

Sept. 12.
1779.

Double. Equal, or the preceding rather the largeft. Both w. With 227, $1\frac{1}{4}$ diameter; with 449, $1\frac{1}{3}$ diameter; with 460, 2 diameters; with 910, near 2 diameters; with 932, $2\frac{1}{2}$ diameters;

<div align="center">R 2</div> <div align="right">with</div>

with 2010, pretty diftinct; but too tremulous to efti-
mate. With my 20 feet reflector, power 600, full
2 diameters, very diftinct. Pofition, 71° 39′ n.
following. Diftance 4″,56, mean of two years
obfervation.

8. ζ Coronæ borealis, FL. 7.

Oct. 1.   Double. Confiderably unequal. L. fine w. S.
1779.   w. inclining to r. With 222, almoft 3 diameters
of L. Diftance 5″,468. Pofition 25° 51′ n. pre-
ceding, mean of two years obfervations.

9. λ Orionis, FL. 39.   In capite nebulofa.

Oct. 7.   Quadruple, or rather a double ftar and two more
1779.   at a fmall diftance. The double ftar confiderably un-
equal. L. w.; S. pale rofe colour. With 222, 1½
diameter of L.; with 449, above two diameters of
L. Diftance 5″,833, a mean of all the meafures.
Pofition 45° 14′ n. following. As every one of the
four ftars is perfectly diftinct, it is evident, the whole
appeared nebulous to FLAMSTEAD for no other reafon
than becaufe his telefcope had not fufficient power to
diftinguifh them.

10. and 11. σ Orionis, FL. 48.   Ultimam cinguli præcedit ad
auftrum.

Oct. 7.   A double-treble ftar, or two fets of treble ftars,
1779.   almoft fimilarly fituated. Preceding fet. The two
neareft equal; the third larger and, compared with
either of the former two, pretty unequal. The two
neareft with 222, about 2 diameters. Pofition of the
following ftar of the two neareft with the third
66° 35′ f. preceding. Pofition of the two neareft,
by exact eftimation, 2 or 3° n. following or f. pre-

5   ceding

ceding the following fet. The two neareft very unequal. The largeft of the two and the fartheft confiderably unequal. L. w.; S. blueifh. The two neareft with 222, about 2¼ diameters of L.; the two fartheft 43″ 12‴. Pofition of the two neareft 5° 5′ n. following. Pofition of the two fartheft 29° 4′ n. following. A pretty object with 227.

12. α Pifcium, FL. ultima. In nodo duorum linorum.

Oct. 19, 1779.   Double. Confiderably unequal. Both w. With 222, not quite 2 diameters of L.; with 460, about 3 diameters of L. Diftance 5″,123 mean meafure. Pofition 67° 23′ n. preceding.

13. μ Draconis, FL. 21. In lingua.

Oct. 19. 1779.   Double. Equal. Both w. With 227, 1½ diameter; with 460, 2½ diameters. Diftance 4″,354 mean meafure. Pofition 37° 38′ f. preceding or n. following.

14. ω Aurigæ, FL. 4.

Oct. 30, 1779.   Double. Very unequal. L. w.; S. r. With 227, almoft 2 diameters of L.; with 460, full 3 diameters of L. Pofition 82° 37′ n. preceding.

15. ψ Cygni, FL. 24. In ala dextra.

Nov. 2, 1779.   Double. Extremely unequal; the fmall ftar a mere point. L. w.; S. r. With 227, near 1¼ diameter of L; with 278, near 1½ diameter of L.; with 460, 2 diameters of L. Pofition 89° 32′ n. preceding.

16. ξ Cephei, FL. 17. In pectore.

Nov. 7, 1779.   A fine double ftar. Confiderably unequal. L. w. inclining to r.; S. dufky grey. With 222, nearly 2 diameters of L. Single meafure 5″,00. Pofition 20° 18′ n. preceding.

17. * In finiftro anteriore pede Monocerotis, FL. 11.

Dec. 5,   Double. With 222, about 1½ diameter. Pofition
1779.   (taken Oct. 20, 1781) with the fartheft of the other
two ftars 31° 38′ f. following. See the tenth ftar in
the firft clafs.

18. ξ Bootis, FL. 37.

April 9,   Double. Very unequal. L. pale r. or nearly r.
1780.   S. garnet, or deeper r. than the other. With 222,
1½ diameter of L , with 460, full 3 diameters of
L. Diftance 3″ 23‴ fingle meafure. Pofition
65° 53′ n. following.

19. *g* Serpentarii, FL. 5.

May 2,   Double. It is a ftar in the body of Cancer, and
1780.   the double ftar is at the angular point of the three
telefcopic *g*'s making a rectangle. Pretty unequal.
Both w. With 227, 1½ diameter of L. Pofition
82° 10′ f. preceding.

20. and 21. ξ Libræ, FL. ultima.

May 23,   Double double. The firft fet very unequal. L.
1710.   fine w. With 227, nearly 2 diameters of L *. By
the micrometer 6″ 23‴, but too large a meafure.
Pofition 1° 23″ n. following. The other fet both
fmall and obfcure. With 227, perhaps 5 or 6 of
their diameters afunder.

22. ε Perfei, FL. 45. In finiftro genu.

Aug. 2,   Double. Extremely unequal. L.w.; S. d. With
1780.   222, 2½ diameters of L. Pofition 81° 28′ f. fol-
lowing, a little inaccurate. A third ftar near at
about 1½ or 1¾ min.

* In a future collection this fet will be found as a treble ftar of the firft clafs,
the large white ftar, with a power of 460 and 932, appearing to be two ftars.

23. In conftellatione Serpentarii, near FL. 11.

Aug. 7, 1780.   Double. It is the fmalleft and preceding of two in the finder. Pretty unequal. L. pale r.; S. dufky r. With 222, about 1¼ diameter of L.; with 278, about 1½ diameter of L.; with 460, above 2 diameters of L. Pofition 46° 24′ n. preceding. A little inaccurate.

24. In conftellatione Aquarii, FL. 108. In fequenti flexu 5ᵃ ad A.

Aug. 23, 1780.   Double. In HARRIS's maps it is marked *i*. Unequal. With 227, 2 diameters; with 460, about 3 diameters.

25. *k* Cygni, FL. 52.

Sept. 8, 1780.   Double. Extremely unequal. L. w. inclining to r.; S. d. and extremely faint; with 227, 2½ diameters of L.; with 460, about 4 diameters of L. or more. Pofition 28° 17′ n. following.

26. In conftellatione Orionis, near FL. 42. In longo enfis.

Oct. 23, 1780.   Double. It is the moft north of three telefcopic ftars in a line at the end of a clufter near *c*. Extremely unequal. L. w.; S. d. With 278, 1¼ diameter of L. Pofition 26° 5′ n. following.

27. δ Geminorum, FL. 55. In inguine finiftro fequentis IIⁱ.

Mar. 13, 1781.   Double. Extremely unequal. L. w. inclining to r.; S. r. With 227, about 2½ full diameters of L.; with 460, 4 or 5 diameters. Pofition 85° 51′ f. preceding.

28. In conftellatione Aquilæ, near FL. 54.

July 23, 1781.   Double. It is a ftar following *o*. Exceffively unequal. The fmall ftar is not vifible with 227, nor with 278. It is vifible with 460; but not without attention.

attention. Diſtance with 460, about 4 or 5 diame-
ters of L. Poſition, by very exact eſtimation, 36° 28′
n. preceding.

29. In conſtellatione Aquilæ, near FL. 63. In medio capite.

July 31,   Double. It is the ſtar at the vertex of a teleſcopic
1781.   iſoſceles triangle near τ. Extremely unequal. Both
r. With 460, 2 diameters of L. Poſition 75° 48′
n. preceding.

30. ζ Sagittæ, FL. 8. Trium in arundine ſequens.

Aug. 23,   Double. Extremely unequal. The ſmall ſtar
1781.   brighter with 460 than with 227 or with 278; with
460, between 4 or 5 diameters of L.; with 278, 2½
diameters of L. Diſtance 5″ 27‴ inaccurate. Poſi-
tion 34° 10′ n. preceding.

31. In conſtellatione Draconis, FL. 56.

Sept. 6,   Double. A little unequal. Both w. With 460,
1781.   near 3 diameters. Diſtance 5″ 7‴.

32. In conſtellatione Sagittæ, near FL. 4.

Sept. 7,   Double. It is the ſtar north following ε. L. pale
1781.   r.; S. d. Diſtance 5″ 3‴ inaccurate.

33. β Orionis, FL. 19. In ſiniſtro pede ſplendida.

Oct. 1,   Double. Extremely unequal. L. w.; S. inclin-
1781.   ing to r. With 227, 2¼ or 2½ diameters of Rigel.
With 460, more than 3 diameters of L. Diſtance
6″ 27‴. Poſition 68° 12′ ſ. preceding. The ſmall
ſtar not wanting apparent magnitude is better to be
ſeen with my power of 227 than with 460.

34. ι Trianguli, FL. 6.

Oct. 8,   Double. It is marked *b* in the ſmall triangle of
1781.   HARRIS's maps. Very unequal. L. pale r. or red-
diſh w.; S. blueiſh r. With 227, full 1¼ diameter

                                                    of

of L.; with 460, full 1½ diameter of L. Pofition 4° 23′ n. following. A pretty object, fomewhat re-fembling α Herculis, but fmaller and not fo bright.

35. In conftellatione Trianguli, near FL. 6.

Oct. 8, 1781.   Double. It is the ftar following *t*. Equal. Both dufky w. With 460, about 2½ diameters.

36. In conftellatione Eridani, FL. 32.

Oct. 22. 1781.   Double. Confiderably unequal. L. reddifh w.; S. blue. Diftance 4″ 19‴. Pofition 73° 23′ n. pre-ceding.

37. In capite Monocerotis.

Oct. 22. 1781.   Double. It is one of a clufter of fix telefcopic ftars, arranged in pairs.

38. In conftellatione Bootis.

Dec. 24, 1781.   Double. It is the moft north and largeft of three in a line, f. following FL. 15. Confiderably unequal, L. w.; S. inclining to r. Diftance 5″ 10‴. Pofi-tion 83° 5′ f. preceding.

THIRD CLASS OF DOUBLE STARS.

1. † θ Orionis, FL. 41. Trium contiguarum in longo enfis media.

Nov. 11. 1776.   Quadruple. It is the fmall telefcopic Trapezium in the Nebula. Confiderably unequal. The moft fouthern ftar of the following fide of the Trapezium is the largeft; the ftar in the oppofite corner is the fmalleft; the remaining two are nearly equal. L. pale r.; the ftar preceding L. inclined to garnet; fol-lowing L. inclined to garnet; oppofite to L. d. With 460, the ftars are all full, round, and well-defined.

The two ftars in the preceding fide diftance 8″,780^a_b;
in the fouthern fide, 12″,812; in the following fide
15″,208; in the northern fide, 20″,396.

2. ζ Urfæ majoris, FL. 59. Trium in cauda media.

Aug.17,   Double. Confiderably unequal. L. w; S. w;
1779.   inclining to pale rofe colour. Diftance 14″,5 by
two years obfervation, not a mean but that which I
fuppofe neareft the truth. Pofition 56° 46′ f. fol-
lowing.

3. η Caffiopeæ, FL. 24. In cingulo.

Aug.17,   Double. Very unequal. L. fine w. ; S. fine gar-
1779.   net, both beautiful colours. Diftance 11″,275 mean
meafure. Pofition 27° 56′ n. following.

4. In extremitate pedis Caffiopeæ, FL. 55. Ptolemæi.

Aug.17,   Double. Extremely unequal. L. w.; S. blueifh r.
1779.   Diftance 7″,5 fingle meafure. Pofition 10° 37′ f.
following ‡.

5. * γ Andromedæ, FL. 57. Supra pedem finiftrum.

Aug.25,   Double. Very unequal. L. reddifh w.; S. fine
1779.   light fky-blue, inclining to green. Diftance 9″,254
a mean of two years obfervation. Pofition 19° 37′,
n. following. A moft beautiful object.

6. β Cephei, FL. 8. In cingulo ad dextrum latus.

Aug.31.   Double. Very unequal. L. blueifh w.; S. gar-
1779.   net. Diftance 13″,125. Pofition 15° 28′ f. preceding.

7. * β Scorpii, FL. 8. Trium in fronte, lucidarum, borea.

Sept.19,   Double. Very unequal. L. whitifh r; S. r.
1779.   Diftance 14″,375. Pofition 64° 51′ n. following.

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‡ In a future collection this will be found as a treble ftar of the firft clafs; the
large ftar having a fmall one preceding, eafily feen with 460 and 932.

8. * π Bootis, FL 29

Sept. 20,   Double. Pretty unequal. L. w.; S. w. inclining
1779.   to r. Diftance 6″,171. Pofition 6° 28′ f. following.

9. † γ Arietis, FL. 5. Quæ in cornu duarum præcedens.

Sept. 27,   Double. Equal, or if any difference the following
1779.   is the largeft. Diftance 10″,172, a mean of two
          years obfervation. L. w. inclining a little to r.; S.
          w. Pofition 86° 5′ n. preceding.

10. * γ Delphini, FL. 12. Borea fequentis lateris, quadrilateri.

Sept. 27,   Double. Nearly equal, the following a little
1779.   larger. Both w. Diftance 11″,822, being a mean of
          the meafures taken in Sept. Oct. Nov. and Dec. 1779.
          As I fufpect a motion in one of thefe ftars, I thought
          it beft not to join other obfervations in that meafure.
          Pofition 4° 9′ n. preceding.

11. κ Bootis, FL. 17. Trium in finiftro manu præcedens.

Sept. 27,   Double. Very unequal. L. w.; S. d. Diftance
1779.   12″503, a mean of the obfervations in 1779, 80, 81.
          Pofition about 30° f. preceding.

12. ι Orionis, FL. 44. Trium contiguarum in enfe auftrina.

Oct. 7,   Treble. It is the following or largeft of the two
1779.   ι's. One is L.; the other two are extremely fmall.
          L. w.; the other two both dufky r. Diftance of
          the neareft 12″,5. Diftance of the fartheft 48″ 31 ″.
          Pofition of the neareft 43° 51′ following. Pofition
          of the fartheft 11° 19′ f. following.

13. and 14. ι Orionis, FL. 44. Trium contiguarum in enfe
    auftrina.

Oct. 7,   Double-treble. It is the preceding or fmalleft of
1779.   the two ι's. The preceding fet (forming a triangle)
          confifts of three equal ftars. All dufky r. Diftance

                    S 2   of

of the two neareft, with 227, about 3 diameters. The following fet (forming an arch) confifts of three ftars of different fizes. The middle ftar is the largeft; that to the fouth is alfo pretty large; and the third is very fmall. L. w.; l. w.; S. pale r. Diftance 36″,25.

15. * μ Cygni, FL. 78.

Oct. 19, Double. Confiderably unequal. L. w.; S. blueifh.
1779.   Diftance 6″,927 mean meafure. Pofition 20° 15′ f. following.

16. * In conftellatione Delphini, FL. 1.

Nov. 15, Double. It is the ftar fouth preceding ε. A little
1779.   unequal. Both w. Diftance 12″,5. Pofition 9° 42′ f. preceding.

17. In extremitate caudæ Lacertæ, FL. 1.

Nov. 20, Double. Confiderably unequal. L. w.; S. d.
1779,   inclining to r. Diftance 13″ 43‴ inaccurate. Pofition 76° 16′ f. preceding.

18. † γ Virginis, FL. 29. De quatuor in ala finiftra, fequens.

Jan. 21, Double. Equal. Both w. Diftance 7″,333 mean
1780.   meafure. Pofition 40° 44′ f. following.

19. † ζ Cancri, FL. 16.

April 5, Double. Confiderably unequal. L. pale r.; S.
1780.   pale r. Diftance 8″,046 mean meafure. Pofition 88° 16′ f. preceding. See the 24th in the firft clafs.

20. In conftellatione Bootis.

June 25, Double. Draw a line through π and ζ to the fmall
1780.   ftar under the right foot, and erecting a perpendicular towards the left foot of equal length, the end of it will mark out this double ftar. Pretty unequal.
          Both

Both r. Diſtance 7″ 36‴ full meaſure. Poſition 59° 32′ n. preceding.

21. In conſtellatione Equulei, FL 1.

Aug. 2, 1780. Double. Conſiderably unequal. L. w.; S. much inclining to r. Diſtance 9″,375 mean meaſure. Poſition 5° 39′ n. following. A third ſmall ſtar follows at ſome diſtance.

22. Quæ infra oculum Lyncis, FL. 12.

Aug. 7, 1780. Double. With 222, about 3 diameters of L. Conſiderably unequal. L. w.; S. pale r. Diſtance 9″ 23‴, not extremely accurate. Poſition 32° 33′ n. preceding. See the ſixth ſtar in the firſt claſs.

23. In conſtellatione Caſſiopeæ, FL. 34.

Aug. 8, 1780. Double. It is one of two teleſcopic ſtars, and is marked φ in HARRIS's maps. Extremely unequal. L. pale r.; S. d. Diſtance about 12″ or more.

24. θ Sagittæ, FL. 17.

Aug. 8, 1780. Treble. The two neareſt extremely unequal. L. pale r.; S. d. Third ſtar pale r. Diſtance of the two neareſt 11″ 8‴. Diſtance of the two largeſt 1′ 7″ 49‴.

25. In conſtellatione Serpentarii, FL. 39.

Aug. 24, 1780. Double. It is the moſt ſouth and largeſt of two in the finder. Very unequal. L. w.; S. inclining to blue. Diſtance 10″ 2‴, a little inaccurate. Poſition 87° 14′ n. preceding.

26. * In conſtellatione Cerberi 1. HEVELII 1. FL. Herculis 95.

Sept. 8, 1780. Double. It is the ſtar in the leaf neareſt to Hercules's face and hand. Equal. Preceding w. Following

lowing blueifh w.   Diftance 6″ 6‴.   Pofition 4° 9′
f. preceding or n. following.

27. In conftellatione Navis, near FL. 3.

Feb. 15,   Double.   It is a ftar between η Canis majoris and
1781.   ξ Navis.   Equal.   Diftance about 15″.

28. In conftellatione Navis, near FL. 9.

Feb. 15,   Double.   It is one of two telefcopic ftars under
1781.   Monoceros.   Diftance about 8″.

29. In naribus Monocerotis, FL. 8.

Feb. 15,   Double.   Diftance about 12″.

30. * In conftellatione Leonis, FL. 54.   Duarum fupra dor-
fum fequens.

Feb. 21,   Double.   Confiderably unequal.   L. brilliant w.;
1781.   S. afh-colour, or greyifh w.   Diftance 7″ 6″ mean
measure.   Pofition 9° 14′ f. following.

31. In conftellatione Herculis.

May 20,   Double.   Over ι ::.   Equal.   Both very fmall.
1781.   Diftance about 10″.

32. In conftellatione Aquilæ, FL. 11.

July 25,   Double.   It is the moft fouth of two near ε and ζ.
1781.   Exceffively unequal.   S. hardly vifible with 227, but
pretty ftrong with 460.   Diftance about 7″.

33. In conftellatione Aquilæ, near FL. 7. and 8.

July 30,   Double.   It is a ftar preceding the two fmall ftars
1781.   north of k and l.   Unequal.   L. w.; S. blueifh w.
Diftance 11″ 35‴ inaccurate, but not much.

34. In conftellatione Aquarii, FL 94.

Aug. 20,   Double.   Between ψ and ω towards δ.   Very un-
1781.   equal.   Diftance 13″ 45‴.   L. pale r.; S. d.

35. In conftellatione Serpentarii, FL. 54.

Aug. 21,   Double.   It is the preceding of two ftars in the
head.

3

1781.   head. Exceffively unequal. L. reddifh w.; S. d. Diftance about 8″.

36. In conftellatione Perfei.

Sept. 14,   Double. A little fouth of γ. Confiderably un-
1781.   equal. L. w.; S. w. inclining to r. Diftance
11″ 53‴, rather full meafure.

37. and 38. In conftellatione Perfei, near FL. 38 ‡.

Sept. 24,   Double-double. South preceding the firft *o*. The
1781.   equal fet with 227, about 4 or 5 diameters. The
unequal fet about 5 or 6 diameters. Near this laft
fet is alfo a third ftar forming an obtufe angle with
the ftars of this fet. Diftance about 10″.

39. *o* Perfei, FL. 40.

Sept. 24,   Double. It is the fecond or moft northern *o*. Ex-
1781.   tremely unequal. L. w.; S. d. With 227, S. is
hardly vifible; with 460, it appears at firft fight.
Diftance 14″ 59‴, inaccurate on account of the ob-
fcurity of S.

40. In conftellatione Herculis, near FL. 87.

Oct. 10,   Double. Of three ftars, forming an obtufe angle,
1781.   whereof FL. 87. (a ftar fouth of μ) is at the angular
point, that towards Ramus Cereb. Extremely un-
equal. L. w.: S. d. Diftance 10″ 20‴. Pofition
19° 37′ f. following.

41. * *i* Herculis, FL. 43.

Oct. 10,   Double. Equal. Preceding ftar w. A little in-
1781.   clined to r. Following w. Diftance 11″ 43‴.
Pofition 88° 23′ n. following.

42. In conftellatione Trianguli.

Oct. 10,   Double. It is a ftar north following δ. Unequal. L.
1781.   reddifh. S. blueifh. Both d. Diftance about 6 or 7″.

‡ Mr. BRYANT of Bath firft obferved thefe ftars.

43. In finistro anteriore pede Monocerotis.

Oct. 20,   Double. It is the most south of two telescopic
1781.   stars preceding the treble star. Extremely unequal.
            L. w.; S. d.   Position 23° 39'. n. preceding.

44. In ore Monocerotis.

Oct. 20,   Double. Considerably unequal. L. w.; S. r.
1781.   Distance 12" 30"'.   Position 60° 14' n. following.

45. In constellatione Tauri, near FL. 10.

Oct. 22,   Double. It is near the star sub pede et scapula
1781. dextra.   Extremely unequal.   L. pale r.; S. d.   Posi-
            tion 35° 33' s. preceding.

46. In constellatione Monocerotis.

Oct. 22,   Double. It is the star following the tip of the
1781.   ear.

FOURTH CLASS OF DOUBLE STARS.

1. α Ursæ minoris, FL. 1. Stella Polaris.

Aug. 17,   Double. Extremely unequal. L. w.; S. r.
1779.   Distance 17" 15"'.   Position 66° 42' s. preceding.

2. * η Lyræ, FL. 20. Duarum contiguarum ad ortum a testa,
    borea.

Aug. 29,   Double. Considerably unequal. L. w.; S. r.
1779.   Distance 25" 42"'.   Position 31° 51' s. preceding.
        Three other stars in view.

3. ξ Capricorni, FL.

Sept. 19,   Double. It is the preceding star of two. Ex-
1779.   tremely unequal.   Distance about 25".

4. η Perſei, I. HEVELII 9. In dextro brachio.

Sept. 20, 1779. Double. Very unequal. L. r.; S. blue. Diſtance 26″, very inaccurate. Poſition 20° 5′ n. preceding.

5. In conſtellatione Arietis, FL. 33. Quatuor inform. ſup. dorſ. præc.

Sept. 27, 1779. Double. It is the firſt in the head of the fly. L. w.; S. d. Conſiderably unequal. Diſtance 25″ 32‴ inaccurate. Poſition 87° 14′.

6. † θ Serpentis, FL. 63. In extremitate Caudæ.

Oct. 17. Double. Equal. Both w. Diſtance 19″,375.

7. ψ Draconis, FL. 31. Prima ad ψ.

Oct. 19. 1779. Double. Pretty unequal. L. w.; ſ. pale r. Diſtance 28″ 14‴.

8. * ζ Piſcium, FL. 86. Trium in lino lucidarum ſequens.

Oct. 19, 1779. Double. Pretty unequal. L. w.; S. w. inclining to blue. Diſtance 22″,187, not very accurate. Poſition 22° 37′ n. following.

9. * Prima ad ψ Piſcium, FL. 74. Trium in pinna coſtarum præcedens.

Oct. 30, 1779. Double. Diſtance 27″,5. Poſition about 80° ſ. following. An obſcure ſtar alſo within 1½ minute.

10. χ Tauri, FL. 59. Auſtralis ſequentis lateris quadrilateri, in cervice.

Oct. 30. Double. Diſtance 18″,75, very inaccurate.

11. χ Cygni, FL. 17.

Nov. 20. 1779. Double. Very unequal. L. w.; S. duſky r. Diſtance 24″ 52‴.

12. * ψ Aquarii, FL. 91.

Nov. 26, 1779. Double. It is the firſt of three ψ's. Unequal. Diſtance 23″ 5‴, pretty accurate.

13. In conſtellatione Leonis, FL. 83.

April 6,   Double. It is a ſmall ſtar north preceding τ. A
1780.   little unequal. Both inclining to r. Diſtance
      29″ 5‴. Poſition 54° 55′ ſ. following.

14. In conſtellatione Aquilæ, FL. 57.

Aug. 2,   Double. It is the preceding of two, near the
1780.   ſouth end of Antinous's bow. A little unequal. L.
      w.; S. w. inclining to r. Diſtance 29″ 28‴, pretty
      accurate. Poſition 81° 55′ ſ. preceding.

15. In dextra aure Camelopardali. 1. HEVELII ultima.

Aug. 2,   Double. A little unequal. L. reddiſh w.; S.
1780.   reddiſh w. Diſtance 20″ 5‴.

16. In conſtellatione Caſſiopeæ, FL. 31.

Aug. 2,   Double. It is marked with the letter A in HAR-
1780.   RIS's maps. Diſtance about 20″ or more.

17. * Cor Caroli, FL. 12. Canum Venaticorum.

Aug. 7,   Double. Very unequal. L. w.; S. inclining to r.
1780.   Diſtance 20″ 0‴, inaccurate. Poſition 41° 47′ ſ.
      preceding.

18. * In conſtellatione Cygni, FL. 61.

Sept. 20.   Double. It is a ſtar preceding τ. Pretty unequal.
1780. L. pale r.; S. r.; or L. r.; S. garnet. Diſtance
      16″ 7‴. Poſition 36° 28′ n. following.

19. In conſtellatione Aurigæ, FL. 14.

Sept. 24,   Double. It is the preceding ſtar of a cluſter of
1780.   ſtars that precede φ and χ. Very unequal. L. red-
      diſh w.; S. d. Diſtance 16″ 8‴, a little inaccurate.
      Poſition 37° 38′ ſ. preceding.

20.   *o* Draconis, FL 47.

Oct. 3,   Double. Very unequal. L. pale r.; S. duſky r.
1780.   Diſtance 26″ 39″. Poſition 90° n. preceding or fol-
      lowing, by exact eſtimation.   21.

21. ζ Orionis, FL. 50. Trium in cingulo fequens.

Oct. 10, 1780.   Double. Very unequal. L. w.; S. d. Diftance about 25″. Pofition 83° 25′ n. following, very inaccurate.

22. f Cygni, FL. 63. ::

Oct. 27, 1780.   Double. Extremely unequal. L. fine w.; S. d. Diftance 18″ 11‴.

23. 2 ad ω Cygni, FL. 45. In genu dextro.

Oct. 27, 1780.   Double. Confiderably unequal. L. reddifh w.; S. d. Diftance within 30″. Pofition 7° 23′ n. preceding.

24. 3 ad ω Cygni, FL. 46. In genu dextro.

Oct. 27, 1780.   Treble. Very unequal, and extremely unequal. L. fine garnet; S. r.; fmalleft d. All within 30″. Pofition of the brighteft of the two fmall ftars 44° 19′ n. preceding. Pofition of the fainteft —— preceding.

25. In conftellatione Ceti.

Dec. 23, 1780.   Double. It is a ftar near the place of the periodical ftar *o*. Diftance 16″,875, a little inaccurate.

26. In conftellatione Navis, FL. 19. ::

Feb. 15, 1781.   Double. It is a ftar under the ham of Monoceros's right-foot. Diftance about 25″.

27. In conftellatione Comæ Berenices, FL. 24.

Feb. 28, 1781.   Double. Confiderably unequal. L. whitifh r.; S. blueifh r. Mean diftance 18″ 24‴. Pofition 3° 28′ n. preceding.

28. In conftellatione Geminorum.

Mar. 13, 1781.   Double. It is near γ towards ζ Tauri. A little unequal. Both r. Diftance 19″ 41‴. Pofition 57° 0′ f. preceding.

          29. Urfæ

29. *h* Urſæ majoris, FL. 23.   Duarum in collo ſequens.

Apr. 25,   Double.   Extremely unequal.   L. reddiſh w. ;
1781.   S. d.   Diſtance with 460, 19″ 14‴.   Poſition 3° 14′
          n. preceding.

30. In conſtellatione Lyncis, FL. 44.

May 26,   Double.   It is the eye or noſe of Leo minor.
1781.   Unequal.   Diſtance 24″ 53‴ inaccurate.

31. In conſtellatione Cephei, near FL. 27.

May 27,   Treble.   It is a ſtar near δ.   Diſtance of the neareſt
1781.   about 20″.

32. * In conſtellatione Serpentarii, FL. 61.

July 15,   Double.   It is a ſtar near γ.   A little unequal.
1781.   L. w.; S. grey.   Diſtance 19″ 4‴, inaccurate.   Po-
          ſition almoſt directly following.

33. In conſtellatione Aquilæ.

July 19,   Treble.   It is the firſt of two ſtars preceding *v.*
1781.   Diſtance of the two neareſt 21″ 59‴, inaccurate.

34. In conſtellatione Aquilæ, near FL. 64.

July 25,   Double.   It is near a ſtar preceding θ.   Equal
1781.   diſtance about 30″.

35. β Delphini, FL. 6.   Auſtrina præcedentis lateris quadri-
      lateri.

Aug. 1,   Double.   Extremely unequal.   Hardly viſible with
1781.   227; pretty ſtrong with 460.   Diſtance 25″ 54‴,
          rather narrow meaſure.   Poſition 78° n. preceding,
          by exact eſtimation.

36. β Serpentis, FL. 28.   In eductione colli.

Aug. 13,   Double.   Extremely unequal.   L. w.; S. ex-
1781.   tremely faint.   Diſtance 24″, pretty exactly eſti-
          mated.   Poſition 3 or 4° ſ. preceding, too obſcure for
          meaſuring.

37. δ Equulei, FL. 7.   Duarum in ore fequens.

Aug.13,   Double. Exceffively unequal. S. hardly vifible
1781.   with 227; but with 460, vifible at firft fight. L.
        w.; S. d.   Diftance 19″ 32‴. S. too obfcure to be
        very accurate. Pofition 11° 39′ n. following.

38. In conftellatione Aquarii, FL. 24.

Aug.14,   Double. It is the ftar in the cheek or hair of the
1781.   neck. Very unequal. L. w.; S. d. Diftance 25″,
        very inaccurate.

39. In conftellatione Cygni.

Oct. 1,   Double. It is a ftar north following σ. Extremely
1781.   unequal. L. w.; S. d. Diftance 18″ exact eftima-
        tion. Pofition 30° 28′ f. following.

40. α Trianguli, FL. 10.

Oct. 8,   Double. It is the preceding of three telefcopic
1781.   ftars. Unequal. Diftance 17″ 19‴, pretty accu-
        rate.

41. μ Herculis, FL. 86.

Oct. 10,   Double. Exceffively unequal. The fmall ftar is
1781.   not vifible with 227, nor with 278. I faw it very
        well with 460. L. inclined to pale r.; S. d. Dif-
        tance, by pretty exact eftimation, 18″. Pofition, by
        very exact eftimation, 30° f. preceding.

42. In conftellatione Herculis.

Oct. 10,   Double. It is a ftar juft by ν. Confiderably une-
1781.   qual. L. inclined to r.; S. inclined to blue. Diftance
        18″ 19‴. Pofition 4° 58′ n. preceding.

43. λ Eridani, FL. ultima.   In origine fluvii.

Oct. 22,   Double. It is the middle of three telefcopic ftars.
1781.   Very unequal. L. w.; S. r.

44. In

44. In conſtellatione Tauri, near FL. 4.

Dec. 22,   Double. It is a ſmall teleſcopic ſtar ſouth fol-
1781.   lowing *s*. Extremely unequal. L. w.; S. d.

FIFTH CLASS OF DOUBLE STARS.

1   δ Herculis, FL. 11.   In ſiniſtro humero.

Aug. 9,   Double. Extremely unequal. L. w.; S. inclin-
1779.   ing to r. Diſtance 33″,75. Poſition 72° 28′ ſ.
        following.

2. * ζ Lyræ, FL. 6.

Aug. 29,   Double. Pretty unequal. L. w.; S. w. inclining
1779.   to pale roſe colour. Diſtance 41″ 58‴, perhaps a
        little inaccurate. Poſition 62° 18′ ſ. following, a
        little inaccurate.

3. * β Lyræ, FL. 10.   Duarum in jugimento borea.

Aug. 29,   Quadruple. All w. Firſt and ſecond conſiderably
1779.   unequal. Firſt and third very unequal. Firſt and
        fourth very unequal. The ſecond a little inclining
        to r. The third and fourth more inclining to r.
        Diſtance of the firſt and ſecond 43″ 57‴. Poſition
        60° 28′ ſ. following, a little inaccurate.

4. δ Cephei, FL. 27.   Sequitur tiaram.

Aug. 31,   Double. Conſiderably unequal. L. reddiſh w.;
1779.   S. blueiſh w. Diſtance 38″ 18‴; a bright object.

5. † β Cygni, FL. 6.   In ore.

Sept. 12,   Double. Conſiderably unequal. L. pale r.; S. a
1779.   beautiful blue. The eſtimation of the colours the
                                                        ſame

same with 227 and 460. Diftance 39″ 32‴, pretty accurate. Pofition 36° 28′ n. following.

6. * ν Scorpii, FL. 14. Duarum adjacentium boreæ frontis, borea.

Sept. 19,   Double. Very unequal. Both w. Diftance
1779.   38″ 20‴, pretty accurate. Pofition 69° 28′ n. pre- ceding.

7. μ Sagittarii, FL. 13. In fummo arcu, borealis.

Sept. 19,   Treble. Two fmall ftars near on each fide.
1779.   L. w. ; S. both r. Diftance of the neareft about 30″. Pofition — preceding, the other — following.

8. κ Herculis, FL. 7. In dextri brachii ancone.

Sept. 20,   Double. A little unequal. L. r. ; S. garnet ; or
1779.   L. pale r. ; S. r. (when the ftars are low the firft eftimation of the colours will take place). Diftance 39″ 59‴. Pofition 79° 37′ n. following. Has alfo a third ftar.

9. ι Bootis, FL. 21. Trium in finiftra manu, media.

Sept. 27.   Double. Very unequal. L. w. ; S. d. Diftance
1779.   37″,56. This is not a mean of the meafures ; for I fufpect a motion in one of the ftars, which another year or two may fhew. Pofition 52° 51′ n. following.

10. * δ Orionis, FL. 34. Trium in cingulo præcedens.

Oct. 6,   Double. Confiderably unequal. L. w. ; S. blueifh
1779.   r. Diftance 52″,968 full meafure. Pofition 88° 10′ n. preceding.

11. † γ Draconis, FL. 24. and 25, In ore duplex.

Oct. 19,   Double. A little unequal. L. pale r. ; S. pale r.
1779.   Diftance 54″ 48‴. Pofition 44° 19′ n. preceding.

From the right afcenfion and declination of thefe ftars in FLAMSTEAD's catalogue we gather, that in

his

his time their diftance was 1′ 11″,418 ; their pofi-
tion 44° 23′ n. preceding; their magnitude equal or
nearly fo. The difference in the diftance of the
two ftars is fo confiderable, that we can hardly
account for it otherwife than by admitting a proper
motion in either one or the other of the ftars, or in
our folar fyftem ; moft probably neither of the three
is at reft.

12. * λ Arietis, FL. 9.   In vertice.

Oct. 30,   Double. Confiderably unequal. L. pale r.; S.
1779.   dufky garnet. Diftance 36″ 44‴, a little inaccurate.
Pofition 42° 0′ n. following.

13. φ Tauri, FL. 52.   Borea fequentis lateris quadrilateri in
Cervice.

Oct. 30.   Double. Diftance 55″,625, inaccurate.

14. In conftellatione Monocerotis.

Dec. 5,   Multiple. It is a fpot over the right fore-foot ;
1779.   4 or 5 fmall ftars within one minute.

15. *c* Urfæ majoris, FL. 16.

May 2,   Double. Very unequal. L. whitifh r.; S. d.
1780.   Diftance with 460, 48″ 59‴. Pofition 80° 47′ f.
preceding.

16. σ Pifcium, FL. 76.   Duarum in ore pifcis fequentis bo-
realior.

Aug. 3,   Double. Extremely unequal. L. pale r.; S.
1780.   dufky r. Diftance 48″,125, pretty accurate. Pofi-
tion 15° 28′ n. preceding.

17. π Andromedæ, FL. 29.   In dextro humero.

Aug 25,   Double. Extremely unequal. L. w.; S. blueifh.
1780.   Diftance 34″ 12‴, inaccurate.

18. α Caffiopeæ, FL. 18.   In pectore.

Aug. 31,   Double.   Extremely unequal.   L. pale r.; S. d.
1780.   Diftance 52″,812.   Pofition 40° 58′ n. preceding.

19. γ Herculis, FL. 20.   In dextro brachio.

Sept. 4,   Double.   Extremely unequal.   L. reddifh w.; S.
1780.   r.   Diftance 41″ 49‴, a little inaccurate.   Pofition
        19° 30′ f. preceding.

20. *e* Pegafi, FL. 1.

Sept. 8,   Double.   Very unequal.   L pale r.; S. d.; Dif-
1780.   tance 37″ 5‴, pretty accurate.   Pofition 38° 19′ n.
        preceding.

21. τ Aurigæ, FL. 29.

Sept. 26,   Double, about 30″.

22. λ Aurigæ, FL. 15.

Sept. 30.   Multiple.   Two are within about 30″.

23. In conftellatione Orionis.

Oct. 10,   Double.   It is a ftar following *f.*   Diftance about
1780.   40″

24.   In conftellatione Ceti, FL. 37.

Oct. 12.   Double.   It is a ftar between η and θ towards the
1780.   north.   Diftance 42″,812, inaccurate.

25. τ Orionis, FL. 20. fupra talum in tibia.

Oct. 23,   Double.   Very unequal.   Diftance about 30″

26. *h* Leonis, FL. 6.

Feb. 21,   Double.   Very unequal.   L. r.; S. d.   Diftance
1781.   35″ 48‴.   Pofition 12° 55′ n. following.

27. In conftellatione Libræ, near FL. 31.

May. 24,   Double.   The moft fouth of three fmall ftars in
1781.   the finder.   Equal, or the preceding rather the
        largeft.   Both w. inclining to pale r.   Diftance
        44″ 12‴, a little inaccurate.   Pofition 40° 17′ f.
        following.

28. In conftellatione Cephei.

May.27,　　Double.　It is a ftar near β.　Extremely unequal.
1781.　　Diftance about 30″.

29. ν Serpentis, FL. 53.　Poft dextrum femur Serpentarii.

July 16.　　Double.　Unequal.　Diftance about 35″.

30. In conftellatione Serpentarii, FL. 53.

July 19,　　Double.　It is a ftar between α and β one-third
1781.　　of the way from α.　Very unequal.　L. w.; S.
inclining to r.　Diftance 32″ 21‴, narrow mea-
fure.

31. In conftellatione Aquilæ.

July 19,　　Double.　It is the ftar next but one preceding δ.
1781.　　Very unequal.　L. r.; S. d.　Diftance about 30″.

32. α Andromedæ.

July 21,　　Double.　Extremely unequal.　The fmall ftar
1781.　　better with 460 than with 227.　L. w.; S. d.　Dif-
tance 55″ 32‴, rather narrow meafure.　Pofition
10° 37′ f. preceding.

33. h Aquilæ, FL. 15.

July.25,　　Double.　Unequal.　Both pale r.　Diftance 33″ 53‴,
1781.　　inaccurate.

34. In conftellatione Aquilæ, near FL. 28.

July 25,　　Double.　It is one of two ftars near A.　Diftance
1781.　　about 35″.

35. In conftellatione Aquilæ.

July 25.　　Double.　It is a ftar near that which follows θ.
1781.　　Very unequal.　Diftance about 40″.

36. o Scuti, FL. 2. in conftellatione Aquilæ.

July 30,　　Double.　Very unequal.　L. pale r.; S. d.　Dif-
1781.　　tance 42″ 44‴, a little inaccurate.

37. υ Coronæ, FL. 18.

Sept. 21, 1781.   Treble. Very unequal. L. w.; S. both r. Dif-
tance of the neareft about 50″; the 1½ min. ‡

38. In conftellatione Herculis, FL. 23.

Sept. 21, 1781.   Double. It is the ftar between υ and ξ Coronæ,
the largeft of a telefcopic triangle. Diftance
36″ 27‴, rather narrow meafure. L. w.; S. w.
inclining to r.

39. α Lyræ, FL. 3. In tefta fulgida.

Sept. 24. 1781.   Double. Exceffively unequal. By moon-light I
could not fee the fmall ftar with 278, and faw it with
great difficulty with 460; but in the abfence of the
moon I have feen it very well with 227. L fine
brilliant w.; S. dufky. Diftance 37″ 13‴. Pofi-
tion 26° 46′ f. following.

Oct. 22, 1781.   Having often meafured the diameters of many of
the principal fixed ftars, and having always found that
they meafured lefs and lefs the more I magnified, I
fixed upon this fine ftar for taking a meafure with
the higheft power I have yet been able to apply, and
upon the largeft fcale of my new micrometer I could
conveniently ufe. With a power of 6450 (deter-
mined by experiments upon a known object at a
known diftance) I looked at this ftar for at leaft a
quarter of an hour, that the eye might adapt itfelf
to the object; having experimentally found, that
the aberration by this means will appear lefs and lefs,
and, in the telefcope I ufed upon this occafion with
powers from 460 to 1500, will often quite vanifh, and

‡ In a future collection the fmall ftar at the obtufe angular point will be found
as a double ftar of the fecond or third clafs.

U 2   leave

leave a very well-defined circular diſk for the apparent
diameter of the ſtars.   The diameter of α Lyræ, by
this attention, appeared perfectly round, and occa-
ſionally ſeparated from rays that were flaſhing about
it.   From the very brilliant appearance of the ſtar
with this great power, and a pretty accurate rough
calculation founded on its apparent brightneſs, when
obſerved with the naked eye with 227, with 460,
with 6450, I ſurmiſe, that it has light enough to
bear being magnified at leaſt a hundred thouſand
times with no more than ſix inches of aperture, pro-
vided we could have ſuch a power, and other conſi-
derations would allow us to apply it.   When I had as
good a view as I expected to have, I took its diameter
with my new micrometer upon a ſcale of eight inches
and 4428 ten thouſandth to 1″ of a degree, and found
it ſubtended an angle of 0″,3553.   I had no perſon
at the clock; but ſuppoſe the time of its paſſing
through the field of my teleſcope (which in this
great power is purpoſely left undefined, and as large
as poſſible) was leſs than three ſeconds.

40. ν Lyræ, FL. 8.

Sept.24,   Treble.   Extremely unequal.   L. w. ; S. both d.
1781.   One n. preceding, the other f. following.   Diſtance
        of the following ſtar 56″ 47‴, a little inaccurate.
        Poſition of the ſame 28° 27′ ſ. following.

41. A Perſei, FL. 43.

Sept.24.   Double.   Unequal.   L. w.   Diſtance about 50″.

42. In conſtellatione Lyræ.

Sept.25,   Double.   It is a ſmall ſtar juſt by η.   A little un-
                                                equal

1781. equal. Both r. Diſtance 38″ 8‴. Poſition 26° 18′ n. following.

43. In conſtellatione Cygni, FL. 76.

Oct. 1, Double. It is the third ſtar from ρ towards υ.
1781. Unequal. Diſtance 48″ by exact eſtimation. Poſition —— preceding.

44. In conſtellatione Cygni, FL. 69.

Oct. 1, Treble. Very unequal. L. w.; S. both reddiſh.
1781. Poſition both —— preceding.

45. In conſtellatione Cygni.

Oct. 1, Double. It is the moſt ſouth of two teleſcopic ſtars
1781. following τ. Very unequal. L. w.; S. d. Diſtance 44″ by exact eſtimation. Poſition —— following.

46. c Cygni, FL. 16. 1ᵃ ad c.

Oct. 5, Double. It is the ſtar next following θ. Almoſt
1781. equal. Both pale r. Diſtance 30″ by pretty exact eſtimation.

47. c Cygni, FL. 26. 2ᵃ ad c.

Oct. 8, Double. Very unequal. L. reddiſh w.; S. duſky
1781. r. Diſtance 39″ by pretty exact eſtimation.

48. * In conſtellatione Piſcium.

Oct. 8, Double. It is a teleſcopic ſtar juſt by θ north-
1781. wards. Both d. Diſtance about 45″.

49. * In conſtellatione Arietis, FL. 30.

Oct. 15, Double. It is a ſmall ſtar over the Ram's back.
1781. Nearly equal. Diſtance 31″ 6‴, inaccurate.

50. γ Leporis, FL. 13. In poſterioribus pedibus auſtrina.

Oct. 22, Double. Conſiderably unequal. Diſtance about 40′.

51. In conſtellatione Sagittæ.

Nov. 23, Double. It is a ſtar north following ε. Extremely
1781. unequal. Diſtance 32″ 48‴. L. r.; S. blue.

SIXTH CLASS OF DOUBLE STARS.

1. *o* Ceti, FL. 68.   In pectore nova.

Oct. 20. 1777.   Double. Very unequal. L. garnet. S. dusky.

Dist. $\left\{\begin{array}{l}\text{mean of some very accurate measures } 1' 44'', 218\\ \text{mean of other very accurate measures } 1' 53'', 032.\end{array}\right.$

As I can hardly doubt the motion of this star, I have given the mean of the most accurate measures separately; and hope in a few years time to be able to give a better account of it.

2. *o* Serpentarii, FL. 67.

Aug. 29, 1779.   Double. Distance about 1¼ min.

3. *δ* Lyræ, FL. 11.

Aug. 29, 1779.   Double. Extremely unequal. L. w.; S. d. Distance about 4', pretty exact estimation.

4. *α* Capricorni, FL. 5.

Sept. 19, 1779.   Double. Very unequal. L. r.; S. d. Distance about 1¼ min. Position —— f. preceding.

5. In constellatione Arietis, FL. 35. supra dorsum.

Sept. 27, 1779.   Double. It is the star in the body of the fly. Distance 2' 5'' 35'''.

6. *ε* Capricorni, FL. 39.   Duarum in eductione caudæ præced.

Sept. 27, 1779.   Double. Unequal. L. pale r. Distance about 1¼ min.

7. * *τ* Tauri, FL. 94.   In eductione cornu borei.

Oct. 6.   Double. Distance 1' 11'', 25''', pretty accurate.

8. *κ* Tauri, FL. 59.

Oct. 6.   Double. At a considerable distance.

9. * ζ Geminorum, FL. 43. In finiſtro genu ſequentis ♊¹.

Oct. 7,　　Double. Very unequal. L. reddiſh w. ; S. duſky r.
1779.　　Diſtance 1′ 31″ 52‴, rather full meaſure. Poſition
　　　　81° 14′ n. preceding.

10. *o* Cygni, FL. 31. Duarum in dextro pede ſequens.

Nov. 2,　　Double. Conſiderably unequal. L. pale r. S.
1779.　　blue. It is the following ſtar of the two *o*'s that are
　　　　cloſe together. Diſtance 1′ 39″ 57‴. Poſition
　　　　87° 14′ f. preceding.

11. * α Leonis, FL. 32. In corde.

Nov.14,　　Double. Very unequal. L. w. ; S. d. Diſtance
1779.　　2′ 48″ 20‴. Poſition 30° 5′ n. preceding.

12. * τ Leonis, FL. 84. Quaſi in cubito.

April 6,　　Double. Conſiderably unequal. L. r. ; S. in-
1780.　　clining to blue. Diſtance 1′ 22″ 42‴. Poſition
　　　　73° 29′ f. following.

13. *o* Leonis, FL. 95. In extremitate caudæ.

April 6,　　Double. Extremely unequal. L. reddiſh w. ; S.
1780.　　d. Diſtance about 1½ min. Poſition about 80° n. fol
　　　　lowing.

14. η Serpentis, FL. 58. In cauda.

June19,　　Double. Extremely unequal. L. pale r. ; S. d.
1780.　　Diſtance 1′ 21″ 2‴. Poſition 9° 7′ f. following.

15. In conſtellatione Bootis, near FL. 6.

June 25,　　Double. It is a teleſcopic ſtar near that which
1780.　　forms a rectangle with α and η. Diſtance about 2′.

16. δ Bootis, FL. 49. In dextro humero.

July 23,　　Double. Conſiderably unequal. Diſtance about
1780.　　2¼ min. L. reddiſh w. ; S. w. Poſition 5° 46′ n.
　　　　following.

17. μ Bootis, FL. 51.   In baculo recurvo.

July 30,   Double. Unequal. Diſtance 2′ 8″, exact eſtima-
1780.   tion. Poſition 80° 25′ ſ. following. L. reddiſh w.
S. pale r.   See the 17th ſtar of the firſt claſs.

18. ν Coronæ, FL. 21.

July 30,   Double. Very unequal. L. r.; S. garnet. At
1780.   ſome conſiderable diſtance. Poſition about 80° n.
following.

19. χ Perſei.

Aug 2,   Multiple. An aſtoniſhing number of ſmall ſtars
1780.   all within the ſpace of a few minutes. I counted not
leſs than 40 within my ſmall field of view.

20. μ Perſei, FL. 51.   Duarum in dextro poplite ſequens.

Aug. 2,   Double. Very unequal. L. w. Diſtance about 1′½.

21. η Pegaſi, FL. 44.

Aug. 23.   Double.   Diſtance about 2¼ min.

22. In conſtellatione Draconis, I. HEVELII 69.

Aug. 7,   Double. It is the ſtar between α Draconis and
1780.   the tail of Urſa major.   Diſtance about 3½ min.

23. In naribus Lyncis.

Aug. 7.   Double.   Diſtance about 2′.

24. d Caſſiopeæ, FL. 4.

Aug. 12,   Treble. Two are large. Diſtance about 2′. A
1780.   third is obſcure. Diſtance about 1¼ min. They
form almoſt a rectangle.

25. In conſtellatione Caſſiopeæ, FL. 3.

Aug. 18.   Double. Diſtance about 2¼ min.

26. ε Sagittæ, FL. 11.

Aug. 19,   Double.   Very unequal. L. r.; S. r. inclining to
1780,   blue. Diſtance 1′ 31″ 53‴. Poſition 8° 32′ ſ.
following.

27.

27. In conſtellatione Aquilæ.

Aug. 24.   Double. It is a ſtar north of θ. Diſtance about 1'.

28. β Capricorni, FL. 9. Trium in ſequente cornu auſtrina.

Aug. 26,   Double. Conſiderably unequal. Diſtance about
1780.   3'. Poſition —— preceding.

29. π Capricorni, FL. 10. Trium in roſtro præcedens.

Aug. 26.   Double. Diſtance about 2½ min.

30. α Aurigæ, FL. 13. In humero ſiniſtro.

Sept. 8,   Double. Extremely unequal. L. w.; S. d.
1780.   Diſtance 2' 49'' 8'''. Poſition 33° 42' ſ. following.
With a power of 227, and my common micrometer,
the diameter of this ſtar meaſured 2'',5. The cir-
cumference was remarkably well defined.

31. d Tauri, FL. 88. In ſiniſtro cubito.

Sept. 24,   Double. Diſtance 1' 10'',625. A little inac-
1780.   curate.

32. λ Cygni, FL. 54.

Sept. 20,   Double. Extremely unequal. L. blueiſh w.; S.
1780.   d. Diſtance about 1 min. Poſition 12° 42' ſ. fol-
lowing.

33. In conſtellatione Cygni, FL. 32.

Sept. 20.   Double. Diſtance about 2 min.

34. θ Aurigæ, FL. 37. In dextro carpo.

Sept. 26.   Double. Diſtance about 2½ min.

35. In conſtellatione Camelopardali, FL. 13.

Sept. 26.   Double. It is the ſtar over the goat's head. Diſ-
1780.   tance about 2'.

36. In conſtellatione Camelopardali, FL. 10.

Sept. 30.   Double. Diſtance about 1½ min.

37. *c* Draconis, FL. 46.   In flexura colli.

  Oct. 3.   Double.   Diſtance 3 or 4'.   A rich ſpot.

38. *c* Draconis, FL. 64 or 65.

  Oct. 3.   Double.   Diſtance about 2'.

39. α Orionis, FL. 58.   In dextro humero lucida rutilans.

  Oct. 10,   Double.   Extremely unequal.   L. r. but not deep;
  1780.   S. d.   Diſtance 2' 6'' 2'''.   Poſition 62° 18' f. fol-
    lowing.

40. γ Leporis, FF. 13.

  Feb. 21, 1781.   Double.   Diſtance about 2½ min.

41. ρ Cancri 5 ad ρ, FL. 67.

  Feb. 21,   Double.   Very unequal.   L. reddiſh w.; S. d.
  1781.   Diſtance 1' 35'' 59'''.   Poſition 50° 33' n. preceding.

42. β Geminorum, FL. 78.   In capite ſequentis ♊.

  Mar. 13,   Multiple.   Extremely unequal.   The neareſt dif-
  1781.   tance 1' 56'' 45''', rather full meaſure.   Poſition
    24° 28' n. following, not extremely accurate.   This
    is the ſmalleſt.   The next diſtance 3' 17'' 19''',
    pretty accurate.   Poſition 15° 56' n. following.   A
    third I did not meaſure.

43. θ Virginis, FL. 51.   De quatuor ultima et ſequens.

  May 14,   Double.   Extremely unequal.   L. w.; S. d.   Dif-
  1781.   tance 1' 3'' 53''', inaccurate.   Poſition 24° 55' n.
    preceding.

44. ι Libræ, FL. 24.

  May 24,   Double.   Very unequal.   L. w.; S. duſky r.
  1781.   Diſtance 1' 5'' 10''', not accurate.   Poſition 22° 31'
    f. following.

45. In conſtellatione Andromedæ.

  July 21,   Double.   It is a ſtar near ι towards *o*.   L. r.   Dif-
  1781.   ance about 1½ min.

                                                46.

46. α Aquilæ, FL. 53.

July 23,   Double. Extremely unequal. L. w.; S. d. Dif-
1781.   tance 2′ 23″ 18‴. Pofition 64° 44′ n. preceding.

47. In conftellatione Aquilæ, near FL. 35.

July 25,   Double. It is one of the preceding ftars of a
1781.   fmall quartile near *c*, not very near.

48. In conftellatione Aquilæ, near FL. 35.

July 25,   Double. It is alfo one of the preceding ftars of a
1781.   fmall quartile near *c*, not very near.

49. In conftellatione Aquilæ.

July 26.   Double. The following ftar of a trapezium near l.

50. In conftellatione Aquilæ.

July 26,   Double. The following ftar of a trapezium near
1781,   l. not near.

51. In monte Mænali Heveliana.

Aug. 5,   Double. It is a ftar near the middle. The fol-
1781.   lowing of two, not very near.

52. In conftellatione Bootis.

Aug. 17,   Double. It is a ftar between ε and *f.* Diftance
1781.   above 1′. Unequal.

53. In conftellatione Bootis.

Aug. 17,   Double. It is a ftar more fouth than *i.* Diftance
1781.   above 1′.

54. In conftellatione Serpentarii.

Aug. 21,   Double. It is a ftar more fouth than *o.* Diftance
1781.   75″, exact eftimation.

55. In conftellatione Caffiopeæ, FL. 2.

Sept. 6.   Double. It is a ftar near *e.* L. r. Dift. within $2\frac{1}{2}$.

56. θ Lyræ, FL. ultima.

Sept. 25,   Double. Very unequal. L. w.; S. inclining to r.
1781.   Diftance about $1\frac{1}{2}$ min. Pofition —— n. following.

X 2   57. In

57. In conſtellatione Cygni, FL. 79.

Oct. 1,   Double. It is the fifth ſtar from ρ to υ. Unequal.
1781.   L. w.; S. pale r. Diſtance 1′ 40″ eſtimation.

58. In conſtellatione Aquarii, FL. 5.

Oct. 5,   Double. It is the moſt ſouth of two in the arrow
1781.   of Antinous. Diſtance above 1′.

59. In conſtellatione Cygni, near FL. 28.

Oct. 5,   Double. It is a ſtar near *b*. Diſtance 73″, exact
1781.   eſtimation.

60. In conſtellatione Cygni.

Oct. 8,   Double. It is a ſtar near the ſecond *c*. Conſi-
1781.   derably unequal. L. w.; S. d. Diſtance 88″, exact
              eſtimation.

61. In conſtellatione Piſcium, near FL. 7.

Oct. 8,   Treble. It is a ſtar preceding *b*. They form a
1781.   triangle, each ſide of which is about 1′.

62. κ Piſcium, FL. 8. In ventre.

Oct. 8.   Double. Diſtance near 2′.

63. In conſtellatione Sagittæ.

Oct. 12,   Double. It is near the ſtar north following ε.
1781.   Extremely unequal. L. w. inclining to r.; S. d.
              Diſtance 1′ 30″ 56‴. Poſition 4° 9′ ſ. preceding.
              A third ſtar in the ſame direction, at a little more
              than twice the diſtance. A fourth ſtar in view.

64. In conſtellatione Eridani.

Oct. 22,   Double. It is the ſmall ſtar near ν. Diſtance
1781.   about 1¼ min.

65. In capite Monocerotis.

Oct. 22,   Multiple. It is one ſtar with at leaſt 12 around it,
1781.   all within the field of my teleſcope.

7   66.

66. α Tauri, ꜰʟ. 87.   Splendida in auſtrina oculo.

Dec. 19,   Double. Extremely unequal. L. r. ; S. d. Dif-
1781.   tance 1′ 27″ 45‴. Poſition 52° 58′ n. following.
    With 460, the apparent diameter of this ſtar, when
    on the meridian, meaſured 1″ 46‴, a mean of two
    very compleat obſervations, they agreed to 6‴; with
    932, it meaſured 1″ 12‴, alſo a mean of two excel-
    lent obſervations; they agreed to 8‴. The apparent
    diſk was perfectly well defined with both powers.

POSTSCRIPT TO THE CATALOGUE OF DOUBLE STARS.

SINCE my having delivered my paper on the Parallax of
the Fixed Stars, in which I refer to the above Catalogue of
Double Stars, I have received, by the favour of our Preſident
Sir JOSEPH BANKS, the fourth volume of the Acta Academiæ
Theodoro Palatiīnæ, which contains a moſt excellent Memoir of
Mr. MAYER's, " De novis in Cœlo ſidereo Phænomenis;"
wherein I ſee that the idea of aſcertaining the proper motion
of the ſtars by means of ſmall ſtars that are ſituated at no great
diſtance from large ones, has induced that gentleman before
me to look out for ſuch ſmall ſtars. In the courſe of that un-
dertaking he has diſcovered a good many double ſtars, of which
he has given us a pretty large liſt, ſome of them the ſame with
thoſe in my catalogue. My view being the annual parallax
required ſtars much nearer than thoſe that would do for Mr.
                                                    MAYER's

MAYER's purpofe; therefore I examined the heavens with much higher powers, and looked out chiefly for fuch as were exceedingly clofe.

The above catalogue contains 269 double ftars, 227 of which, to my prefent knowledge, have not been noticed by any perfon. I hope they will prove no inconfiderable addition to the general ftock, efpecially as in that number there are a great many which are out of the reach of Mr. MAYER's and other mural quadrant or tranfit inftruments. It can hardly be ex-pected, that a power of 70 or 80 would be fufficient to dif-cover thofe curious ftars that are contained in the firft clafs of my catalogue; fo that it is not ftrange they fhould have in-tirely efcaped Mr. MAYER's notice. We fee that it is not for want of his looking at thofe ftars; for we find he has fre-quently obferved ζ Cancri, the ftar near Procyon, and the ftar in Monoceros, without perceiving the fmall ftars near them, which I have pointed out. Nor is it only in the firft clafs that his telefcope wanted power, light, and diftinctnefs; for the fmall ftars that are near β Orionis, β Serpentis, ζ Orionis, ε Pegafi, α Lyræ, α Andromedæ, μ Sagittarii, α Aquilæ, η Pegafi, δ Lyræ, ι Libræ, κ Pifcium, α Tauri, and many more, have efcaped his difcovery, though he has given us the places of other more diftant fmall ftars not far from them, and therefore muft have had them frequently in the field of view of his telefcope. In fettling the relative fitua-tions of very clofe double ftars, neither Mr. MAYER's inftru-ments, nor his method, were adequate to the purpofe. It is well known, that whenever we employ time as a meafure, the refults cannot be very accurate; becaufe a miftake of no more than a tenth part of a fecond in time will produce an error of a whole fecond and an half in meafure, fo that his Æ muft

be

be extremely defective. Nor could his micrometer give the declination much better unlefs the telefcope had bore a power of at leaft 4 or 500. When the angle of pofition is but fmall, fuch as 3, 4, 5, or 6 degrees, and the diftance of the ftars not above a few feconds, it is evident, that a micrometer muft be able to meafure tenths of a fecond at leaft to give even a tolerable exactnefs of pofition. On the contrary, the pofition being meafured with fuch a micrometer as I have conftructed for the purpofe, we may from thence deduce the declination, with great confidence, true to a quarter of a tenth of a fecond for every fecond of the diftance of the ftars.

Mr. MAYER's account of α Geminorum, for inftance, gives a difference of 0″,7 of time in Æ, of 3″,8 in declination, and of 1 to 6 in magnitude or degree of light of the ftars. Thefe quantities reduced to my notation, and compared with my meafures of the fame ftar, give

Mr. MAYER's		Mine	
	Diftance 9″,635 from center to center		5″,156 diameters included.
	Pofition 23° 14′ n. preceding		32° 47′ n. preceding.
	Magnitude extremely unequal		A little unequal.

To account for this difference I afcribe Mr. MAYER's error in diftance to his method of meafuring by time. The error of pofition follows always from an obfervation of the declination taken with the common micrometer, when it is deduced from an erroneous Æ. In my meafures the diftance and pofition are independent of each other, which I look upon as no fmall advantage of my crofs-hair micrometer. The error in the magnitudes of the ftars I afcribe to the want of power in Mr. MAYER's telefcope, which did not feparate the ftars far enough for him to judge accurately of their fize, otherwife he would foon have found, that inftead of five there is hardly fo much as

one

one fingle degree of difference in their magnitudes. See fig. 6.
for a reprefentation of thofe ftars with my power of 460.

I do not mean to depreciate Mr. MAYER's method, the excel-
lence of which is well known; and with fome ftars of my
third, all thofe of the fourth, fifth, and fixth claffes, as well
as with thofe ftill farther diftant, to which he has applied
it with admirable fkill, and " magno labore, multifque
" nocturnis vigillis" (as he very juftly expreffes himfelf) a
better can hardly be wifhed for; but with ftars of the fecond
clafs which generally differ no more than one, two or three-
tenths of a fecond of time in Æ, and can never differ more
than four tenths, the infufficiency of meafuring by time is
obvious. In regard to the declination, it is alfo no lefs evident,
that it is much more accurate to take an angle, which may be
had true to 2 or 3° at moft, than to meafure its tangent, which
in ftars of the fecond clafs is generally no more than 2, 3, or
4″ of a degree, and can never exceed five. I do not fo much
as mention the ftars of the firft clafs: they muft certainly, as
to fenfe, pafs the meridian at the fame inftant of time. Their
diftance has even eluded the attacks of my fmalleft filk-thread
micrometer armed with an excellent power of 460; but I fhall
foon apply my laft new inftrument to them *, not without hopes
of fuccefs. Now, though I have hitherto not been able to
exprefs the diftance of the ftars of the firft clafs, otherwife
than by the proportion it bears to their apparent diameters, I
think it a very great point gained, that one of my inftruments at
leaft (viz. the crofs-hair micrometer) has laid hold of them:
for their angle of pofition, I think, is within a very fmall quan-
tity as well determined as it is in thofe of the fecond clafs.
This fimple but moft ufeful inftrument can, by actual meafure,

* For a defcription of which fee p. 163.

discover

difcover beyond a doubt a motion in two ftars that are very clofe together, though it fhould amount to no more than a tenth part of a fecond of a degree, provided that motion be in fuch a direction that the effect of it be thrown upon the angle of pofition; wherein, with fome of the ftars of the firft clafs, it would occafion an alteration of 10, 20, 30, or more degrees.

I have marked all thofe ftars in my catalogue which have been obferved by Mr. MAYER and other aftronomers with an afterifk (*) affixed to the number that they may be known; thofe with the mark of a dagger (†) have been obferved by different aftronomers before Mr. MAYER. Among the ftars which are not marked, will be found feveral that have been obferved by Mr. MAYER; but, on comparing them together, it will be feen, that they are obfervations of different fmall ftars; for inftance, Mr. MAYER (Act. Acad. vol. IV. p. 296.) obferved a fmall ftar near Rigel at the diftance of $1'\,0'',5$ Æ in time, and $2'\,55'',2$ in difference of declination north preceding Rigel. In my fecond clafs (the 34th ftar) we alfo find Rigel; but the fmall ftar I have obferved is one which has not been feen by Mr. MAYER, and is at a diftance of no more than $6'\,27''$. Pofition 68° 12' fouth preceding; and fo on with other ftars.

I have ufed the expreffion *double-ftar* in a few inftances of the fixth clafs in rather an extended fignification: the example of FLAMSTEAD, however, will fufficiently authorize my application of the term. I preferred that expreffion to any other, fuch as Comes, Companion, or Satellite; becaufe, in my opinion, it is much too foon to form any theories of fmall ftars revolving round large ones, and therefore I thought it advifeable carefully to avoid any expreffion that might convey that idea. I am

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very well perfuaded, FLAMSTEAD, who firft ufed the word
Comes, meant it only in a figurative fenfe.

I fhall not fail to take the firft opportunity of looking out
for thofe of Mr. MAYER's double-ftars which I have not in
my catalogue, amounting to 31 ; and alfo for one I find men-
tioned in *La Connoiffance des Temps* for 1783, difcovered by Mr.
MESSIER.