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Atlas Coelestis

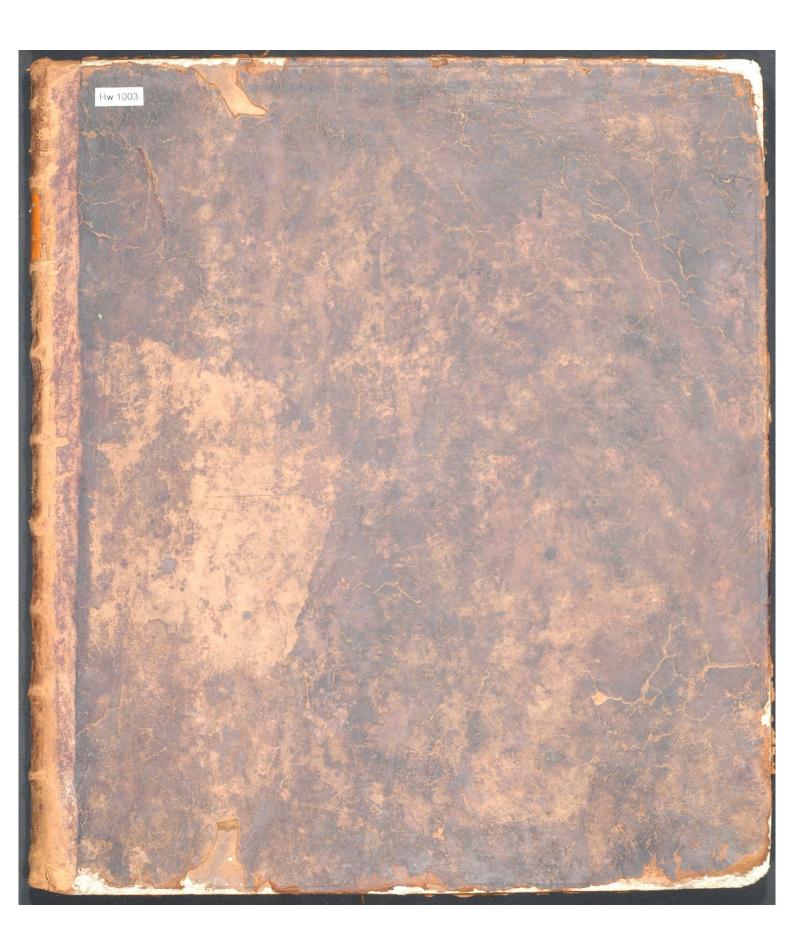
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Flamsteed, John

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JOHANNES FLAMSTEEDIUS Derbiensis Aftronomiae Professor Regius. Anno autus 74 Objet Decom 31 1719

ATLAS COELESTIS.

By the late Reverend

Mr. JOHN FLAMSTEED,

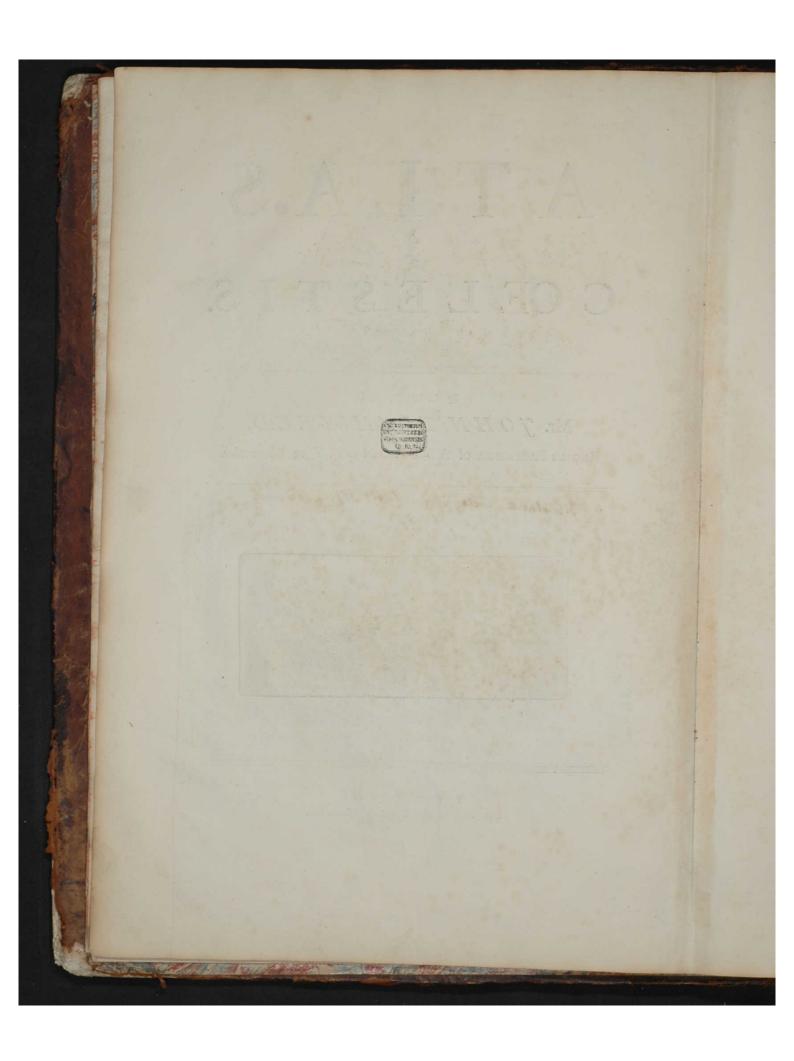
REGIUS PROFESSOR Of ASTRONOMY at Greenwich.

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L O N D O N:

PRINTED in the YEAR M.DCC.LIII.



To His Most Sacred Majesty

GEORGE II.

King of Great Britain, France, and Ireland, &c.

THIS

ATLAS COELESTIS,

OF

The late Rev. Mr. FLAMSTEED,

Regius Professor of ASTRONOMY,

AT

The Royal OBSERVATORY at Greenwich,

Is, with the greatest Submission, Dedicated,

By His Majesty's most Humble,

Most Dutiful, and most Obedient

Subjects and Servants,

MARGARET FLAMSTEED,
JAMES HODGSON.





O render the *indefatigable Labours* of Mr. Flamsteed as useful and beneficial to Mankind as may be, as well as to compleat the *Work* already publish'd, it has been judg'd very necessary by his Executors to carry on, and perfect the following Sheets, which contain all the *Constellations* visible in our *Hemisphere*, wherein the *ancient Figures* themselves are restor'd, and the Stars laid down in their

proper Places, with the greatest Exactness from his last corrected Ca-

The Motives that induc'd Mr. Flamsteed to set about this Work, the Progress that he made in it during his Life-time, and the Methods that he made Use of for constructing the Charts, which render them far more useful than any yet extant, will best appear by the Account that he himself has lest behind him; wherein he tells us, That having about the Year 1700 compleated the Calculation of the Places of the Fixed Stars, he set himself to form Maps of the Constellations, in which he found it necessary wholly to depart from Bayer, of whom Hevelius himself complain'd, but without mentioning any Particulars; and this led him into a strict Enquiry to find out who those Astronomers were that first constructed Maps of the Constellations, and especially by whom the Stars were reduced into those Forms into which they are disposed in Ptolomy's Catalogue, (of which there is no Account given that can be relied on) for from what Ptolomy himself relates in the 4th Chapter of his 7th Book of his Almagess, it is evident, that those Images or Figures were older than HIPPARCHUS'S Time, where he says, 'That we employ not the same Figures of the Constellations that those before us did, as neither did they of those before them, but frequently make Use of others that more truly represent the Forms for which they are drawn; for Instance, those Stars which Hipparchus places on the Virgin's Shoulder,

Shoulder, we place on her Side, because their Distances from the 6 Head appear too great for the Diffance from the Head to the Shoulder,

in his Sign of Virgo; and thereby making those Stars to be on the Sides, the Figure will be agreeable and proper, which it would not, if

those Stars were placed upon the Shoulders.

The Chaldean Observations were made in the 82d Year, 227d yaxadis corresponding with the 519th Year of Nabonassar, or 229 Years before Christ, wherein mention is made of the Stars in the Southern Shoulder of the VIRGIN, or the Northermost in the Front of the Scorpion, in an Appulse of Mars to that Star, which Appulse was observed in the 476th Year of Nabonassar, or 271 Years before Christ.

TYMOCHARIS and ARISTILLUS are still ancienter than the Chaldeans, who lived about 300 Years before Christ, and observed the Appulses of the Moon to the Fixed Stars about 295 Years before Christ, or Year of the World 3709, and again in the 283d Year before Chrift, or Year of the World 3721, at which Time it is plain from what Ptolomy fays, that the Ancients had Figures or Maps of the Constellations, with the

Stars Places defigned on them.

ARATUS the Poet, (who wrote of the Rifing and Setting of the Stars, flourish'd about the 125th Olympiad, or about 276 Years before Chriss) was, if not Cotemporary, yet but little later than Ty-mocharis and Arishillus, and certainly older than the Chaldean Obfervers of the Appules: From whose Poem 'tis confirm'd, that the Greeks had Figures of the Constellations; but from whom they had derived them, or how they came by them, is no where to be learnt.

From the aforementioned Place in Ptolomy it is evident, that by those before him he meant Hipparchus and his Followers, and by those Elder than the Chaldean or Greek Astronomers who slourished before Hipparchus's Time, he meant those Astronomers who first of all made Observations of the Appulses of the Planets to the Fixed Stars; from the Translation of which we have an Account of an Observation in the Northermost Star in the Front of Scorpio, made in the 476th Year of Nabonassar, or 276 Years before Christ; and likewise of another in the Southermost Shoulder of Virgo, made in the 519th Year of Nabonassar, or 229 Years before Christ: But Tymocharis and Aristillus, whose Observations are also transmitted to us by Ptolomy, mention Stars of many other Constellations; whereby it is evident, That they had formed Figures of them in their Time, about three hundred Years before our Saviour; which is all the Account we have from Ptolomy.

From Ptolomy's Time to Ours the Names that he made Use of, have been continued by the ingenious and learned Men of all Nations; the Arabians always used his Forms and Names of the Constellations; the old Latin Catalogues of the Fixed Stars use the fame;

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Use of, have all Nations; the Constele the fame; COPER-

COPERNICUS'S Catalogue (the first we have in good Latin) and Tycho Brahe's use the same; so do the Catalogues publish'd in the German, Italian, Spanish, Portugueze, French and English Languages: All the Observations of the Ancients and Moderns make Use of Ptolomy's Forms of the Constellations and Names of the Stars, fo that there is a Necessity of adhering to them, that we may not render the old Observations unintelligible, by altering or departing from

Tycho Brahe died in the Year 1601, two Years after BAYER publish'd his Uranometria, wherein he gives us Maps of all the Constellations: His Figures are tolerable, and the Stars rightly laid down according to their Places in Tycho's Catalogue, and many other fmall Stars are added which it hath not: These, 'tis probable, he inserted upon his own bare View, by comparing them with the Fixed Stars inferted in his Maps from Tycho's Catalogue, whose Nomenclatura is the same; but having drawn all his Human Figures, except Bootes, Andromeda, and Virgo, with their Backs towards us, those Stars, which all before him place in the Right Shoulders, Sides, Hands, Legs or Feet, fall in the Left, and the contrary in his Figures; with which therefore whosever goes about to examine the antient Ob-fervations, or the Catalogues of the Fixed Stars, printed or publish'd in any Language, will find himself much perplexed, if he be not before-hand apprized of this.

The Reason probably of Bayer's Fault was, that finding the Word co κώτω and co μεταφείου often in Ptolemy's Catalogue, and confulting the Greek Lexicons for the Sense of them, he found constantly 167@ render'd by Dorfum, and μεταφείνοι by Interscapilium, and therefore concluded, that *Interfeapilium* was the *Space* betwixt the Shoulder-Blades on the Back; and wherever he met with either of these Words in the Description of any Constellation, except *Virgo* and Andromeda, he drew it with the Back towards us, whereby he makes all those Stars that Ptolemy (and the Antients, and all fince them to himself) placed in Right Shoulders, Arms, Sides, Legs, and Feet, &c. of their Forms or Figures to stand on their Left, whereby he

renders the oldest Observations False or Nonsense.

To remedy this Fault, when he mentions any eminent Fixed Star to be in dextro Humero, or dextra Tibia, he adds alias in Sinistra, &c. which indeed feems to excuse the Fault, but being done but feldom, will perplex those that make Use of his Maps, and render them useless.

Had Bayer but drawn the Map of Sagittary, or any other of the Human Forms, fo that the Stars placed in the Right Hands, Shoulders, Sides and Feet of Ptolemy's Catalogue might stand on the same in his Figures, he would have feen that they would all have their Faces towards us, and thereby would have learn'd, that in Ptolemy's Greek, the vir@ fignifies the Crates Corporis, or the Ribs, and that

the usraceiros, the Space betwixt the Shoulders, not only on the Back, but also on the Fore Part of the Body, or Upper Part of the Breast, and there would then have been no Incongruity between His Figures. and the Ancients Descriptions; for not only Ptolomy but Homer himself uses those Words in a more comprehensive Sense than the Lexicons commonly allow.

Nevertheles, in most of the Maps of the Fixed Stars that have been Engraved since those of Bayer, the Forms are taken from him, and

have the fame Faults with his.

The Learned WILLIAM SKIKARD, Professor of the Oriental Languages and the Mathematicks at Tubing in Germany, Published his Astroscopium at Nordlingen in the Year 1655, where, in Page 44, he takes Notice of this Fault of Bayer's, and of the Confusion it causes in the Denomination of the Stars, and tells us, That others before him have complained, that very often they made those Stars in the Right Sides, Shoulders, or Hands of his Fingers, which all Ptolomy's Defcriptions placed on the contrary; fo that we are not the first nor only Persons that have taken Notice of these Faults of Bayer's Maps, but others, and those Persons of great Reputation, have done it long

Mr. Skikard takes Notice in the Beginning of his little Treatife, that Globes are unfit for representing the Constellations of the Heavens by Figures pasted on them; and that whosoever would Learn the Stars by comparing the Figures on them with the Heavens, must find themselves very much perplexed, because those Reprefentations are supposed to be made on the Outside of the Globe, or to the Eye placed beyond it, whereas we view the Stars disposed in the Constellations from our Earth as the Center of a Concave Sphere wherein they are fixed, and therefore their Appearances to us must be the Reverse of what appears on the Convex of the Globe, fo that Globes are no Ways proper to represent the Heavens

upon. He farther takes Notice in Page 43, that Planifpheres or Stereographical Projections are not convenient, because in them the Degrees near the Middle or Center are much less than the Degrees near the Limb or Outfides of the Projection, and thereby the Figures therein represented

will be distorted.

To remedy which Inconveniency, Mr. Flamsteed thought nothing fo necessary as a new Method of Projection, wherein all the Parallels of Declination might be equidiffant flreight Lines, and the Degrees of Longitude in every Parallel might be every where Proportional to the Sines of their Distances from the next Pole, and equal in the same to one

The Maps indeed thus described, will not answer to any of the usual Orthographical, or Stereographical Projections of the Sphere, in which is supposed a fixed Position of the Eye, whereas in these there is no such Supposition;

Supposition; but nevertheless they are derived from the Globe, as the others are, and that much more properly than the Projections generally made Use of in Maps of the Earth, or particular Countries, above which, and the forementioned Projections of the Sphere,

This will have peculiar Advantages.

And for the better Understanding of which, conceive the Globe or Sphere to be compaffed about with an infinite Number of equally

fine Thrids, all exactly parallel to the Equator.

Let all the Circles usually drawn upon the Globe, as the Equator, the Ecliptick, the Meridians, &c. be supposed drawn and divided, and let the Constellations also be Formed upon them, and the Store hald down in this case.

the Stars laid down in their proper Places.

Let also the Meridian passing through the Middle of any Constellation be conceived drawn on the Globe, and covered with a fine Thrid, with as many of the adjacent Circles as you think convenient.

Conceive the Thrids on which the Constellation is painted to be cut off from the Surface of the Globe, and that which paffes thro' the Middle, being extended streight on the Middle of some Paper, or perfectly plain Superficies, let the Rest be placed on it at Right Angles to the Middle Meridian, but reverted, or so as those Parts of them which stood to the Right Hand of it on the Globe may fland to the Left on the faid Plane, and the Contrary.

So will you have the Piëlure of the Conflellation Projected up-

on it, in which the Parallels of Declination will be fireight Lines, and their Distances exactly equal, the same as they are on the Globe, as will also the Distances and Differences of the Right Ascensions of any two Stars that are equally distant from the Pole,

or have the same Declination from the Equator.

But the Meridians will become Compound Curves of the same Nature, and having the fame Properties with that which Dr. Wallis

in his Treatife de Cycloide calls Curva Sinuum.

The Circles of Longitude, and Parallels of Latitude may be inscribed on the same Chart, by the Help of such Tables as shew the Declination and Right Ascension corresponding to every Degree of Longitude with every Degree of Latitude; for thereby Points may be found on the Paper or Chart, through which every Circle of Longitude or Parallel of Latitude will pass, thro' which Points, if Lines be Traced with an even Hand, they will represent the Circles or Parallels required.

Having therefore refolved upon this as a proper Method of Projection, and being no Ways liable to the Inconveniences that attended the aforemention'd ones, He began to form his Maps of the Constellations, in which, as his Catalogue contained twice as many Stars as Bayer's or Hevelius's, he thought it requisite to allow four Tenths of an Inch for each Degree, and determined to make the Figures of the Stars less than Bayer's, in Order to gain more Room,

Room, and then caused the Charts to be prepared, and the Stars laid down in their proper Places; after which the Images were drawn on them according to the Descriptions given in Ptolomy's Catalogue, (which have been used by all after him without Variation, 'till Bayer formed them anew, and spoiled them) that thereby the ancient Figures of the Constellations, that were made Use of by Ptolomy and his Predecessors, might be restored, and no longer spoiled by Innovators.

The Maps therefore being thus prepared, and all drawn upon large Imperial Paper, admit of many more Stars than belong to that particular Constellation for which the particular Map is drawn. In those of the Zodiack, besides the Stars of that Sign for which the Map was design'd, not only the principal Stars of the two contiguous Signs are laid down, but all the Stars in the Northern and Southern Constellations that come within the Compass of the

Map are inferted.

But in the Maps of those Constellations that are without the Limits of the Zodiack, not any one Star is omitted that can be

comprehended within it.

As there was no Necessity for drawing distinct Maps for every particular Constellation as well as for the Signs of the Zodiack, as Bayer and Hevelius have done; and fince the Size of the Paper would allow of it, he judged it more convenient so to continuous them, that two or more of the Constellations might be comprized in one Map, which would considerably diminish their Number, without any Disadvantage to the Constellations themselves, and by this Means some of the smaller Ones, as Lyra, Sagitta, Lacerta, are found entire in two or three several Maps. But Hydra, which extends to above 80 Degrees of Right Ascension, and being likewise very near the Equator where the Degrees are widest, could not be comprehended within one single Sheet, and as it would have been very inconvenient to have altered the Scale for this single Constellation, it was much better to enlarge it to another Half Sheet, so that besides the Constellations of Crater, and Corvus, it contains that of Sextans entire, and most of the Stars in Virgo: But tho Ursa Major contains more than 80 Degrees of Right Ascension, yet by being near the North Pole, the Degrees are so much contracted that the whole Constellation is comprized within one single Map.

The fame Projection and Scale is used in all except the Polar Maps, where it would not be so very convenient, and therefore the common Stereographick Projection on the Plane of the Equator was thought most proper and commodious, and liable to the least Distortion, by chusing such a Scale of Semi-Tangents that the Degrees of Polar Distance would be very near equal with those in the other Maps, decreasing a little near the Pole, and encreasing

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cept the Polar and therefore of the Equator le to the least that the Dewith those in and encreasing towards

towards the Limb; the Center or Pole being fo difposed that the four Constellations URSA MINOR, DRACO, CEPHEUS, and CASSIOPEA, might be conveniently contained within a Map of the same Form and Size with the other, all appearing in their right Postures, and not in the least distorted, but as well as if they had been drawn in fingle and feparate Maps.

For the foremention'd Reason the same Kind of Projection was made Use of in the two Hemispheres, where the Arctick and Antarctick Poles are made the Centers of the Projection, and these, as well as the other Maps, were prepared anew, and the Stars laid down by Mr. Abraham Sharp, who having Leifure and Time upon his Hands, readily offer'd himself for this Service.

And fince the Maps are all drawn by one particular Scale, will not be difficult, even by Inspection, to pronounce nearly the mutual Distances of the Fixed Stars themselves, and to judge of the Comparative Magnitudes even of the Confletlations, which cannot be done by those which are formed by different Scales; and as the PARALLELS of DECLINATION are streight Lines equidistant and parallel to each other, and to the Equator, and drawn to every fingle Degree of Declination or Diffance from the Pole, each Degree being equal to four Tenths of an Inch, the Declination of every Star may be very nearly determined by Inspection; but if the Distance of any one of their Centers from the nearest Parallel of Declination be applied to the graduated Meridians on each Side of the Chart, the Quantity of its Declination may be much more exactly determined.

And again, as the Meridians themselves are drawn to every fifth Degree of Right Ascension; the Right Ascension itself, of any Star may be had by Inspection only, and as the Lengths of the several Parallels of Declination are as the Circumserences of the several Parallels of Declination are as the Circumserences of the several Parallels of Declination are as the Circumserences of the several Parallels of Declination are as the Circumserences of the several Parallels of Declination are as the Circumserences of the several Parallels of Declination are as the Circumserences of the several Parallels of Declination are as the Circumserences of the several Parallels of Declination are as the Circumserences of the several Parallels of Declination are as the Circumserences of the several Parallels of Declination are as the Circumserences of the several Parallels of Declination are as the Circumserences of the several Parallels of Declination are as the Circumserences of the several Parallels of Declination are as the Circumserences of the several Parallels of Declination are as the Circumserences of the several Parallels of Declination are as the Circumserences of the several Parallels of Declination are as the Circumserences of the several Parallels of Declination are as the Circumserences of the several Parallels of Declination are as the Circumserences of the several Parallels of Declination are as the Circumserences of the several Parallels of Declination are as the Circumserences of the several Parallels of Declination are as the Circumserences of the several Parallels of Declination are as the Circumserences of the several Parallels of Declination are as the Circumserences of the Several Parallels of Declination are as the Circumserences of the Several Parallels of Declination are as the Circumserences of the Several Parallels of Declination are as the Circumserences of the Several Parallel veral Parallels they represent on the Globe itself, and these being as their respective Diameters, which are as the Sines of the respective Distances from the Pole; if the Breadth of one or more Degrees upon the Equator be made equal to the Sine of 90 Degrees upon a Sector, the Sine of a Degree answering to its Distance from the Pole, or the Complement of its Declination, which is expressed in every Map by the Divisions on each Side of the Maps, will give the Length of one or the like Number of Degrees in that Parallel, whence the Right Ascension of any Star may be more exactly de-

termined.

And again, as the ECLIPTICK itself is drawn in every Chart through which it passes, being divided into single Degrees, as also the Circles of Longitude, and Parallels of Latitude to every fifth Degree, the Latitudes and Longitudes of each particular Star may be had by Inspection.

And

And as each of these Charts are Tangent Planes to that Point of the Globe which corresponds with the Center, or Middle Point of the Chart, if held up, fo that it may answer to its correspondent Part in the Heavens, each particular Star will thereby correspondent with the Star it represents in the Heavens, whence People, who are not well versed in the Knowledge of the Stars, will soon be enabled to know them, which is not fo easily to be attained by the Coelestial Maps hitherto published, which being made to represent the Convex Side of the Heavens, the Spectator must either suppose himself placed above the Stars, or else carry his Imagination so far as to conceive the Stars which are placed on the Right Side of the Figure of those Maps to be viewed on the Left Side in the Heavens, and likewise the Stars that are on the Left Side in those Maps, to be viewed on the Right Side in the Heavens, and that the Planets or Stars which feem to move from East to West, or from the Left to the Right by their Diurnal Motion, when they are placed right before him must move upon those Maps on the Contrary, that is, from West to East, or from the Right to the Left: And as the Planets themselves in their Revolutions thro' their Orbs appear to move from West to East, or from the Right to the Left, must here be traced on the Contrary, from East to West, or fixed to the Right, a Thing that to Persons not very well skilled in these Matters, will create very often some Difficulty.

And as the Ecliptick, and its several Parallels of Latitude are all

And as the Ecliptick, and its feveral Parallels of Latitude are all drawn by the same Scale, it contributes very much to the readier Discovering of what Stars, the Moon, or any of the Planets will Pass by, or Cover in any of their Revolutions through their Orbs, and the Parallels of Declination being all drawn as before, it may be discovered at Sight what Stars will Transit the Meridian at, or near the same Altitude with the Moon, or any other Planet or fixed Star; and in as much as in this Case they are all subject to the same Refraction, and the Errors of the Instrument made Use of (if any there be) being alike in all, does not a little Contribute to the readier finding the Declination of any unknown Star, or the Moon, or any other Planet at that Time, by getting rid of some Uncertainties that otherwise Observations of this Kind

would be liable to.

And that the Reader may be the better enabled to know the Names of the several Stars, and distinguish them one from the other, there are Letters annexed to the principal Stars in each Map, which refer to the Catalogue printed in the third Volume of the Historia Calestis, where, in the proper Constellations, he will find against the Referential Letters, the Name, Right Ascension, Declination, Latitude, Longitude, as well as Magnitude of each particular Star.

C n Pafi N E V

As Works of this Nature meet with but very few Encouragers, and as a great Part of the Historia Calestis, as well as this Book, t Planes to that Point of nter, or Middle Point of have been carried on at the fole Expence of the Executors, they infwer to its correspondent were unwilling to proceed in one 'till the other was publish'd, which, will thereby correspond together with the Difficulties and Delays that usually attend Perwhence People, who are Stars, will foon be enaformances of this Kind, has been the Reason why it has not appeared fooner abroad; but as neither Pains nor Expence have been wantfily to be attained by the ing to render it as compleat as poslible, there is Reason to hope that it will meet with a suitable Reception from the generous, canbeing made to represent ectator must either suppose did, and unprejudic'd Part of Mankind. ry his Imagination fo far d on the Right Side d on the Left Side in the

And lastly, as the principal View of the Royal Founder of the Observatory was to obtain a good Catalogue of the fixed Stars, so it must be justly acknowledged that Mr. FLAMSTEED has fully accomplished that great End, having left behind him one of the largest and compleatest Catalogues that ever the World was enrich'd with, from which these Charts are deduced, containing almost double the Number of the Stars in that of Hevelius's, to the Honour of the British Nation, and the lasting Reputation of the AUTHOR; a Work that will render his Name famous to the latest Posterity, and perpetuate his Memory 'till Time shall be no more.



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