

RESULTS

OF

ASTRONOMICAL OBSERVATIONS

MADE DURING THE YEARS 1834, 5, 6, 7, 8,

AT THE CAPE OF GOOD HOPE;

BEING THE COMPLETION OF A TELESCOPIC SURVEY OF THE
WHOLE SURFACE OF THE VISIBLE HEAVENS,

COMMENCED IN 1825,

BY

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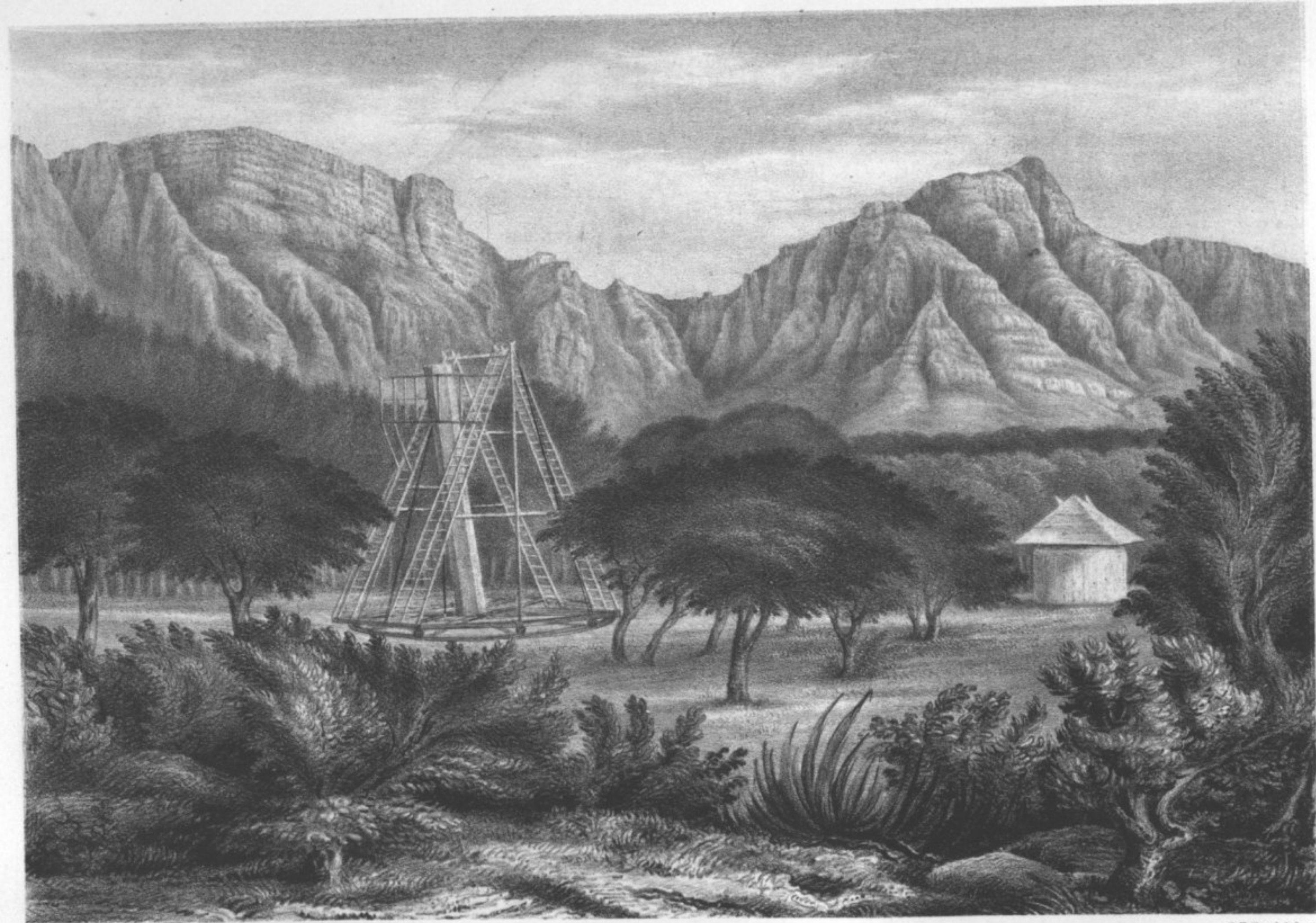
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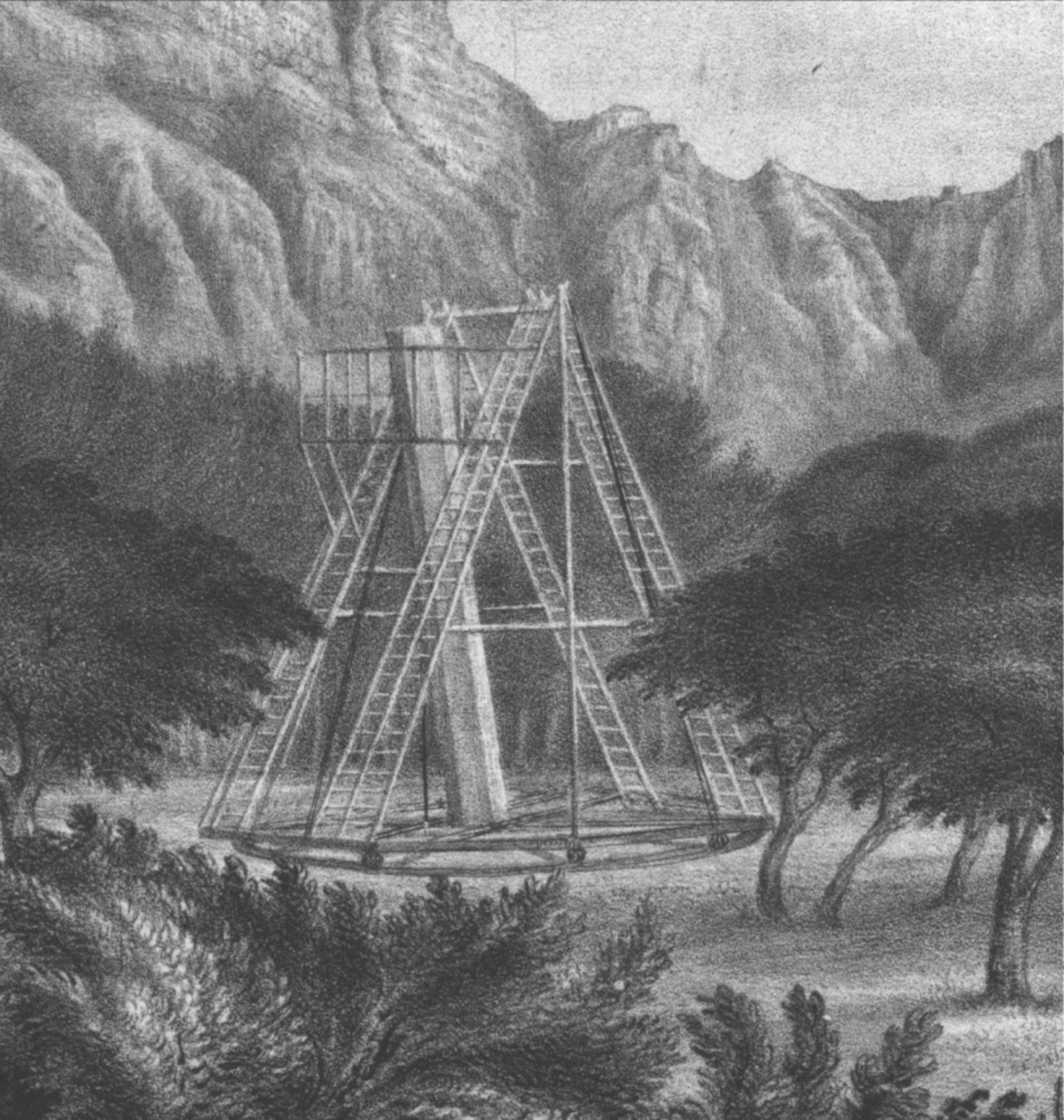
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SITE OF THE TWENTY FEET REFLECTOR AT FELDHAUSEN,

Cape of Good Hope. Sep^r 1834.

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INTRODUCTION.

(i.) THE work which is now presented to the astronomical public, completes a review of the sidereal heavens, which I commenced about the year 1825, proposing to myself, at that time, no further object than a re-examination of the nebulae and clusters of stars discovered by my Father in his "Sweeps of the Heavens," and described by him in three catalogues presented to the Royal Society, and published by that illustrious body in their Transactions for the years 1786, 1789, and 1802. This re-examination occupied about eight years, and its results were presented to the Royal Society in the year 1833, in the form of a catalogue, arranged in order of Right Ascension, and published in their Transactions for the same year. In this work are recorded observations of 2306 nebulae and clusters, of which 1781 are identical with objects occurring, either in my Father's catalogues, in the small but interesting collection published by Messier in the *Mémoires de l'Académie des Sciences* for 1771, and the *Connaissance des Temps* for 1783, 1784; and in M. Struve's catalogue of double stars: the remaining 525 are new. Besides these more especial objects of pursuit, however, a great number of double stars, of all classes and orders, were noticed and described, and their places taken, to the amount, altogether, of between three and four thousand, the observations of which, being reduced and arranged in order of Right Ascension, have been, from time to time, published by the Royal Astronomical Society of London, in six catalogues, which will be found in the 2nd, 3rd, 4th, 6th, and 9th volumes of their Transactions.

(ii.) Having so far succeeded to my wish (the places of the objects thus determined proving, on the whole, satisfactory), and having by this practice

acquired sufficient mastery of the instrument employed (a reflecting telescope of 18 $\frac{1}{2}$ inches clear aperture, and 20-feet focus, on my Father's construction), and of the delicate process of polishing the specula; being, moreover, strongly invited by the peculiar interest of the subject, and the wonderful nature of the objects which presented themselves in the course of its prosecution, I resolved to attempt the completion of a survey of the whole surface of the heavens, and for this purpose to transport into the other hemisphere the same instrument which had been employed in this, so as to give a unity to the results of both portions of the survey, and to render them comparable with each other.

(iii.) Accordingly, having placed the instrument in question, as well as an equatorially mounted achromatic telescope of five inches aperture, and seven feet focal length, by Tulley, which had served me for the measurement of double stars in England, together with such other astronomical apparatus as I possessed, in a fitting condition for the work, and taken every precaution, by secure packing, to insure their safe arrival in an effective state, at their destination, they were conveyed (principally by water carriage) to London, and there shipped on board the *Mount Stewart Elphinstone*, an East India Company's ship, — Richardson, Esq. Commander, in which, having taken passage for myself and family for the Cape of Good Hope, we joined company at Portsmouth, and sailing thence on the 13th November, 1833, arrived, by the blessing of Providence, safely in Table Bay, on the 15th January, 1834, and landed the next morning, after a pleasant voyage, diversified by few nautical incidents, and without seeing land in the interim. It was most fortunate that, availing himself of a very brief opportunity afforded by a favourable change of wind, our captain put to sea when he did, as we subsequently heard that, immediately after our leaving Portsmouth, and getting out to sea, an awful hurricane had occurred from the S. W. (of which we experienced nothing), followed by a series of south-west gales, which prevented any vessel sailing for six weeks. In effect, the first arrival from England, after our own, was that of the *Claudine*, on the 4th of April, with letters dated January 1st.

(iv.) Having disembarked the instruments without accident, and placed them, temporarily, in one of the Government storehouses (being permitted to do so through the obliging kindness of W. Petrie, Esq. Deputy Commissary General of the Colony), my next care was to look out for a comfortable residence in a locality suitable for their erection. This I was fortunate enough speedily to find at

the mansion of a Dutch proprietor, W. A. Schonberg, Esq., bearing the name of Feldhuysen, or Feldhausen, about six miles from Cape Town, in the direction of Wynberg, a spot charmingly situated on the last gentle slope at the base of the Table Mountain, on its eastern side, well sheltered from dust, and, as far as possible from wind, by an exuberant growth of oak and fir timber; far enough removed from the mountain to be, for the most part, out of the reach of annoyance from the clouds which form so copiously over and around its summit, yet not so far as to lose the advantage of the reaction of its mural precipices against the south-east winds which prevail with great violence during the finer and clearer months, but which seldom *blow home* to the rock on this side, being, as it were, gradually heaved up by a mass of comparatively quiescent air imprisoned at the root of the precipice, and so gliding up an inclined plane to the summit on the windward side, while they rush perpendicularly down on the leeward with tremendous violence like a cataract, sweeping the face of the cliffs towards Cape Town, which they fill (as well as the valley in which it stands) with dust and uproar, chiefly during the night. This residence needing some repairs, and being, in fact, not then actually vacant, a temporary residence was secured, at a convenient distance, in a tenement belonging to — Borchers, Esq., of Cape Town, called Welterfrieden, whence I could superintend the erection of the instruments, which was forthwith commenced, and pushed forward with such effect, that on the 22nd of February I was enabled to gratify my curiosity by a view of α Crucis, the nebula about η Argus, and some other remarkable objects, in the 20-foot reflector; and, on the night of the 5th of March, to commence a regular course of sweeping.

(v.) Shortly after, the erection of a building was commenced to receive the equatorial instrument, which, so soon as the walls were settled, and the pier, which was of brick, laid in Roman cement, consolidated, was placed on its supports, and being surmounted by a revolving roof of a peculiar construction (See Art. 158), contrived by myself, and constructed in England for the purpose, was brought into approximate adjustment; and on the 2nd of May, a series of micrometrical measures of southern double stars was commenced by the measurement of α Centauri, the chief among them. I ought to observe that, on unpacking this and the other instruments and apparatus, not a single article was found to have sustained injury.

(vi.) The Frontispiece to this volume exhibits the Reflector, and the building

containing the Equatorial, in their enclosure, a kind of orchard, surrounded on all sides by trees, but commanding a tolerably near approach to both the southern, eastern, and northern horizon. To the west, the nearer vicinity of the trees, though cutting off much of the sky, yet afforded a valuable protection from the fury of the north-west gales which prevail in the winter months. Nor was it without some regret on this account, that the removal of a portion of this friendly shelter was resolved on to afford a view of the comets of Encke and Halley, when so situated as to require it. The exact geographical site of Feldhausen was found by trigonometrical measurement (See Appendix E), to be $2^{\circ} 53'.55''$ south, and $0^m 4'.11$ west of that of the Royal Observatory of the Cape, that is to say, in Lat. $33^{\circ} 58' 56''.55$, Long. $22^h 46^m 9'.11$ from Greenwich. Its altitude above the site of that building was ascertained by barometrical observation to be 112.23 feet, or about 142 feet above the mean sea-level of Table Bay (See Appendix B).

(vii.) As I have mentioned the Royal Observatory of the Cape, I must take this distinct and early opportunity to acknowledge my many and great obligations to my excellent friend, Thomas Maclear, Esq., its director, whose ardent love for the science to which he has devoted himself, seconded by talent of no common order, by resource which no difficulties exhaust, and by activity which no exertion wearies, has secured, and continues to secure, for the noble establishment under his direction, a reputation of the highest rank, and for himself, the best titles to the gratitude of his country, and the approbation of the government he serves. To his kindness I am indebted for much and most valuable aid in fixing, with all the precision which the fine instruments under his command could afford, the Right Ascensions of a great many stars of which a knowledge was indispensable in the reduction of my sweeps, and which I neither could obtain with sufficient exactness from the existing catalogues, nor had any means of ascertaining for myself, unless by entering upon an express course of observation for that very purpose, such as formed no part of my original design, and for which a much superior transit to that I had brought out with me would have been requisite. Previous to leaving England, I had procured a MS. list of the stars of the Brisbane Catalogue, then preparing for publication, containing the places of between seven and eight thousand southern stars, and on this Catalogue, when it should appear, I had confidently reckoned for as many well determined zero stars as I could possibly need, the system of observing I pro-

posed to follow being entirely differential. With the Polar distances of that catalogue, I seldom had much occasion to find fault; but as respects the Right Ascensions, I experienced less satisfaction in its use. On mentioning this circumstance to Mr. Maclear, he, with ready alacrity, at once offered to determine this important element, by direct observation, for as many zero stars as I might require, thus rescuing me from a very serious difficulty. I need hardly add that I gladly availed myself of, and drew largely on his kindness; and the results of his observations in the cases of about 670 stars, fixed by two or three observations of each, have proved a most material assistance to me in the reduction of my sweeps. Nor was this the only instance of useful and effective aid rendered me from the same quarter.

(viii.) Previous to quitting England, I had engaged the services of an attendant for the purpose of working the sweeping, and other mechanical movements, of the Reflector during the observations, and executing any necessary repairs. John Stone, the person so engaged, to the useful, and, indeed, indispensable qualifications of a ready mechanic, whether in wood or iron work, joined that of experience in this particular employment, having performed that office for me during a considerable portion of my review of the northern heavens, with undeviating steadiness and regularity, as he continued to do during the whole of that of the southern, without once absenting himself from his duty. This indispensable manual aid excepted, it is right to mention that the whole of the observations, as well as the entire work of reducing, arranging, and preparing them for the press, has been executed by myself. The repolishing of the reflectors, it will of course be understood, could be delegated to no other person.

(ix.) Of these I was provided with three, viz., one made by my Father, and used by him in his 20-feet sweeps, and other observations; one made by myself, under his inspection and instructions; and one which I ground and figured subsequently, but which was cast at the same time, and from the same metal as that last mentioned. They are each $18\frac{1}{4}$ inches of clear diameter of polished surface, and all, so far as I am able to judge, equally reflective when freshly polished, and in every respect similar in their performance. One of them (the first completed, of the two newer ones above mentioned) is about two inches longer in focus than the others, a difference which, the figure being otherwise good, it has not been thought worth while to correct.

(x.) The operation of repolishing was performed whenever needed, the whole of the requisite apparatus being brought for the purpose. It was very much more frequently required than in England; and it may be regarded as fortunate that I did not, as at first proposed (relying on the possession of three perfect metals), leave the apparatus in question behind. Being apprehensive that in a climate so much warmer, difficulties would arise in hitting the proper temper of the polishing material, slight imperfections of surface, induced by exposure, were for a while tolerated; but, confidence in this respect once restored, and practice continually improving, I soon became fastidious, and on detection of the slightest dimness on any part of the surface, the metal was at once remanded to the polisher.

(xi.) And here, perhaps, I may be allowed a digression on a point of the utmost importance in the use of reflecting specula, viz., the mode of supporting the metal in its case. This, in my own practice, is provided for as follows:—between the back of the case and the mirror are interposed six or eight thicknesses of coarse woollen baize, or blanketing, of even texture, and quite free from knots, stitched together at the edges to prevent any hard substance from getting between them. On this bed the metal is laid flat, and being shaken into a concentric situation, as respects the rim of the case, two supports formed of strips of similar woollen stuff, many times doubled, occupying about 30° each of the circumference of the case, are introduced, so as to leave an arc of about 40° unoccupied, opposite the point which is intended to be placed lowermost in the tube. The case being then raised into an inclined position by the other handle, and slightly shaken, the mirror takes its own free bearing on these supports, which by their elasticity obviate the possibility of any lateral compression which might go to the extent of seriously disfiguring the metallic surface, were the whole vertical pressure of the mirror confined to a hard point near the bottom, or even distributed over two or three metallic bearings in the circumference.

(xii.) Simple, and indeed homely as this mode of bedding the speculum may appear, it is, I am satisfied, as effectual (it certainly is quite as little costly and cumbersome) as any which can be contrived. The uniform support of a reflector over its whole extent, is a point of the last importance to its optical performance. *A distortion of figure by flexure, which in the object-glass of a refracting telescope would produce no appreciably injurious effect, would be utterly fatal to distinct vision in a reflecting one.* This will be made apparent if we con-

sider the different modes in which the convergence of the rays is effected by reflexion at a curved metallic surface, and by refraction through one or more glass lenses. In the former case, the whole deviation of the ray from its original direction is effected at one surface, and, in amount, is equal to twice the inclination of that surface to a perpendicular on the original direction. Any alteration, therefore, which flexure may produce on the inclination of the surface (supposed originally parabolic) of a speculum to its axis, at a given point, will produce an angular deviation of the reflected ray from its proper course to a double amount. And the lateral aberration produced by such deviation will be expressed by that double amount of angular flexure, multiplied by the focal distance, and is, therefore, the more injurious the greater is the focal length. On the other hand, in the case of a refracting telescope, the deviation of a ray is effected by the prismaticity of the medium, or media, of which the object-glass consists, at the points where the ray penetrates them, and is independent of the absolute inclination of either separate surface to the axis. In consequence, however, this inclination may change by flexure in any one of the lenses of which the object-glass consists, yet, so long as both surfaces of the lens bend alike, which they cannot but do in any conceivable case of flexure short of fracture, the effective prismatic angle at that point, and consequently, also, the inclination of the transmitted ray to the axis remains absolutely unaltered, and the whole amount of lateral aberration produced is that which arises from the bodily displacement of the transmitting portion of the lens in a direction to or from the focus by the effect of the flexure, a displacement which, in itself utterly inappreciable, is still farther reduced in its effect to produce *lateral* aberration, that it comes to be multiplied by a fraction whose numerator at the maximum is the semi-aperture of the object-glass, and whose denominator is the focal length of it.

(xiii.) This inequality of proportion between the two cases is still farther augmented by the lightness of glass compared with metal, which (surface for surface, and rigidity for rigidity) makes the absolute flexure of a given thickness of glass much less than of an equal thickness of metal. And it is very fortunate that all these conditions hold good; for since there is no possibility of supporting a transparent substance against flexure, without stopping the light, this cause alone (had it acted to the extent it does in reflectors) would long since have banished large object-glasses from practical use. A speculum (I speak from

experience) of the dimensions and thickness used in my sweeps, is *totally spoiled* by supporting it on three metallic points at the circumference, when directed to the zenith. The image of every considerable star becomes triangular, throwing out long flaring caustics at the angles. On one occasion, I supported a mirror simply against a flat board, at about 45° elevation from the horizon. In this state its performance was tolerably good; but on stretching a thin packthread vertically down the middle of the board, so as to bring the weight to rest on this as on one axis, the images of stars were elongated, in a horizontal direction, to a preposterous extent, and all distinct vision utterly destroyed by the division of the mirror into two lobes, each retaining something of its parabolic figure, separated by a vertical band, in a state of distortion, and of no figure at all.

(xiv.) Springs are sometimes used by opticians at the back of a small mirror, for the purpose of keeping it home to the rim of its case. They are usually three in number, and so far as mere support of the mirror is concerned, they act as three non-elastic supports would do, *i. e.* disadvantageously. More numerous and weaker springs distributed over the whole of the back of the case would seem to be preferable, but they ought to be so weak that *all* should be *much* compressed and brought into full action by the pressure. And even then, if the metal be confined in its case by a rim in front, a spring-pressure upward, which in a horizontal position of the surface would barely sustain it in contact with the rim, will urge it, when placed vertically against the rim, with a force equal to the whole weight of the metal applied over its surface in a direction perpendicular thereto, and will tend therefore to distort it in that position, to the very same amount, but in an opposite direction, that it would have been distorted by gravity in the other position, had the springs been absent, and the support been given by a metallic ring at the circumference of the back.

(xv.) Nothing, therefore, is gained, so far as obviating flexure is concerned, by a distribution of elastic support, *so long as the mirror is pressed against a rim in front*. To make such a mode of support effective, the metal must be free to rise and fall, and the friction on the lower circumference must be counteracted, either by resting it in a circular iron chair, provided with exterior rollers, or otherwise equably supporting the lower portion of its edge, so as to allow of its shifting forwards or backwards without sensible friction; as, for instance, by suspending the metal from the upper side of its case, in a jointed frame, composed

of two semicircles of steel loosely riveted at the extremities of their common, horizontal diameter, to admit of free play at the joint, the lower semicircle being thin, and lined with velvet or flannel to ensure equal pressure against the lower edge of the metal; the upper stronger, and increasing gradually in stiffness towards the top, by which the whole should be suspended on a hinge-pin.*

(xvi.) As an experiment, I constructed a case, having the back of stout wood set over with ninety steel springs, of such strength as to be all of them pressed nearly into contact with the wood by the weight of the mirror laid horizontally on them, and distributed with as much uniformity as possible in their points of bearing over the whole surface of the back, the face being left entirely unconfined. So supported, the performance of the mirror was good at all altitudes, but by no means better than when bedded on woollen cloths, as above described, nor, indeed, equal to it; and, in fact, when we consider that each fibre of wool is a delicate coiled spring of almost perfect elasticity, it is clear that no artificial arrangement of metallic springs we can make, can attain the perfection of such a natural one (if we may so apply the term), either in uniformity of distribution, or in delicacy of application. This consideration led me to abandon the use of a spring case, after making a very few sweeps with it, and re-adopt, in its stead, the woollen-bedding which had been laid aside to make way for what proved to be, in effect, no substantial improvement on it. It is essential, however, that a great many thicknesses of the baize or blanket employed, should be used, *by which only the effect of flexure in the wooden back itself of the case can be eliminated.* And to keep up the elasticity of the fibre, it should be occasionally taken out and beaten.†

(xvii.) A serious, indeed a fatal objection, would appear to lie against the use of flexible, elastic, or any kind of moveable support for the mirror^x in the fluctuations liable to be caused by it in the line of collimation when the inclination

* This was written while ignorant of the very ingenious contrivance by which Lord Rosse affords an equable, or nearly equable support to his large reflector. Comparative trial of the several methods can alone decide, in any proposed case, which is the most effectual.

† The following memorandum occurs in sweep 687 :—

"The mirror, though a capital one, has, for the last three nights, given distorted images with its full aperture, which appear horned and tailed. To-night, before the sweep, I took it out, and carefully smoothed, shook up, and remade its bed. *Now*, nothing can be finer. It lies at its ease, and equally supported all over, and all the appendages are clean gone."

of the mirror to the horizon is varied, and which must inevitably take place if there be either the least friction of the lower edge on its support, or anything short of mathematical exactness in the distribution of the pressure. But this objection is completely obviated in my mode of observation, by the use of an interior collimating telescope, as described in *Phil. Trans.* 1833, p. 488. The collimator used in the greater part of these observations differed only from that there described, 1st, in being a more powerful telescope (*viz.*, an achromatic of four feet focal length, with a good object-glass, $2\frac{3}{4}$ in. aperture), and, 2nd, in. having the plane speculum placed, not as there described, between the object-glass and its focus, but beyond the focus (in which the collimating cross is fixed), so as to illuminate that cross by the light of a lamp external to the tube of the large reflector, collected by a lens upon the cross, both great improvements in practice.

(xviii.) Sweeping (for so I shall continue to denominate the system of observation in zones of 3° breadth in Polar distance in search of new objects), was prosecuted, in the absence of the moon, on all occasions when weather permitted, and the definition of the stars was such as to render it worth while to do so. And this leads me to speak of the climate of the Cape as regards its favourableness or unfavourableness for astronomical observation. In the hot season (from October to March), and especially during the hotter months of that season, the nights are for the most part, superb, at least in all the flat region at a few miles distance from the mountains; but in their immediate vicinity, the south-east wind (then generally prevalent) frequently brings with it a belt of cloud extending many miles from the hills, and cutting off the view of the sky. This (which is sometimes called a black south-easter) comes on often at night, and lasts several nights in succession. Very often, too, when no such impediment exists, the excessive heat and dryness of the sandy plains gives rise to a disturbance of the optical tranquillity of the air, so as to destroy, or much impair, distinct vision, and that frequently in a very singular manner. In some cases, the images of the stars are violently dilated, and converted into ill-defined nebulous balls, or puffs, of 10 or 15" or more in diameter.* In others, they form soft, quiet, round pellets

* During the conjunction of Saturn and γ Virginis, at the end of March, 1834, both were seen in the same field of the 20-feet reflector, in such a state of indefiniteness, that but for the greater quantity and different colour of the light of Saturn, it could not have been told which was the planet, and which the star. Yet, to all appearance, the night would have been judged a fine one.

of 3 or 4" diameter, very unlike the "spurious discs" which they present when best defined, and rather resembling planetary nebulae. In other cases, again, the structure, as it were, of these pellets is disclosed, and they are seen to arise from an infinitely rapid vibratory movement of the central point, in all possible directions, while, on a few occasions, the appearances have been exceedingly perplexing and singular, and such as there is difficulty in accounting for on any optical principle whatever.*

(xix.) Even in the hottest season, however, nights of admirable definition occur, especially looking southwards. But, what is not a little remarkable, in the very hottest *days*, looking *northwards* over the burning tract intervening between Feldhausen and Table, or Saldanha Bay, the most admirable and tranquil definition of the solar spots, and other phenomena of the sun's disc, is by no means unfrequent. In such cases, I presume the strongly heated stratum of air incumbent on the surface of the soil, is swept off by the south-east wind blowing from False to Table Bay, before it ascends high enough to interfere with the visual ray. To how high a temperature the soil is occasionally heated, will be seen in Appendix (C).

(xx.) During the autumnal months of May, June, and July, when the weather is generally cool, and the nights cold, hot winds frequently set in from the north, usually in the night; at first moderate, and alternating with cold gusts from the opposite quarter, but rapidly gaining the prevalence, till, in a few hours, they attain the violence of a hard gale and glowing oven-like heat.† Thus they con-

* The discs ill defined and agitated points, surrounded with distant halos. Where thrown out of focus *inwards*, the images, instead of circular discs, would present large central *vacuities*, absolutely void of light, round which a turban-fashioned phenomenon, in a constant state of vorticose motion, was seen. Occasionally, the image so thrown out of focus takes the form of a narrow circular arc, with a terminal concentration; when thrown out of focus *outwards*, a vivid central point, surrounded with an extensive circular area of light. The phenomena have manifestly a reference to the state of the air in the tube of the telescope, and at its aperture, and would seem to indicate the existence of a cone of heated air projecting beyond the aperture of the tube. The tube of a reflector being necessarily open at the mouth, ascending and descending currents of hot and cold air (usually rotating spirally) become established, and are very prejudicial to distinct vision. The remedy is obvious; viz., to dispense with a *tube* altogether, substituting for it a light, strong, inflexible framework of cast or wrought iron. In refracting telescopes, in which the air is completely enclosed, its circulation is not nearly so offensive.

† I annex the readings of a thermometer on the night of July, 1834, on the desk, in the open air, in the gallery of the 20-feet reflector. Minimum before midnight 40°.4. At midnight, the hot wind

tinue to blow, frequently for thirty-six or forty-eight hours, becoming at length cool, and finally settling into rain. Now it is not a little remarkable, that however unfavourable to vision this conflict of hot and cold currents is at the coming on of such a gale, no sooner does it become established than the images become concentrated, and settle down not unfrequently into excellent definition.

(xxi.) It is, however, in the cooler months, from May to October inclusive, and more especially in June and July, that the finest opportunities occur. The state of the air in these months, as regards definition, is habitually good, and imperfect vision is rather the exception than the rule. The best nights occur after the heavy rains which fall at this season have ceased for a day or two; and on these occasions, the tranquillity of the images, and sharpness of vision is such, that hardly any limit is set to magnifying power but what the aberrations of the specula necessitate.*

set in, after a brief conflict, of the nature described in the text; the thermometer instantly rose to 50°. At

^h	^m	[°]	^h	^m	[°]	^h	^m	[°]
1	39	A.M. it stood at 64.0	2	3	A.M. it stood at 69.0	2	38	A.M. it stood at 69.4
1	53	" " 68.7	2	10	" " 70.4	2	47	" " 71.0
1	59	" " 65.0	2	18	" " 70.0	3	18	" " 68.0
2	1	" " 68.1	2	22	" " 71.0			

Minimum before sunrise next morning, 60.0

* On such occasions, optical phenomena, of extraordinary splendour, are produced by intercepting the light of a bright star, by diaphragms pierced in regular patterns, and extending over the whole aperture of the telescope, such, for example, as large sheets of card-board or zinc, pierced by machinery (which gives perfect regularity), either with circular holes, uniformly disposed, or with any regular and not too complicated pattern. The appearances so produced (which strike every one who witnesses them with surprise and delight), though they may be seen whenever the air is in a moderately good state, are infinitely enhanced in their beauty by the perfect tranquillity which prevails on such occasions as these. They depend on the optical law of interferences; and many beautiful examples of their explanation on that principle, fully worked out in detail, will be found in M. Scherzer's treatise, "*Die Beugungserscheinungen aus den Fundamentalgesetzen der Undulations-theorie analytisch entwickelt*," &c. (Manheim, 1835).

The "triangular aperture," or diaphragm which admits the light through an opening concentric with the speculum in the form of an equilateral triangle, to whose use as a means of separating close double stars continual reference will be found in the following pages, affords an elegant example of this theory, in the sharpness of the central disc which it produces, and the absence of all appendages other than six perfectly straight delicate rays running off at angles of 60° from the disc. In a letter addressed, Dec. 24, 1834, to the late Captain B. Hall, of which I retain a copy, I find an observation of Canopus, with such an aperture, and a magnifying power of 1200, thus described:—"The disc is

(xxii.) Among the irregular and accidental optical effects of peculiar atmospheric conditions incident to the climate, there are one or two which seem deserving of especial notice. The first is that phenomenon which, when it occurs, I have designated by the epithet, the "nebulous haze." Its effect is to convert every star of the 9th magnitude and upwards, into a "nebulous star," meaning thereby a well-defined star, with a faint, nebulous photosphere of greater or less extent, according to the brightness of the star, surrounding it. This phenomenon occurs in a perfectly clear sky, free from the slightest suspicion of cloud. It comes on very suddenly and unexpectedly, and goes off as suddenly, lasting sometimes only a few minutes; at others, longer. Thus, in sweep 500, Oct. 5, 1834, it commenced at 22^h 4^m ST, when a star 7 m was observed to be surrounded with it, having come on quite suddenly, and continued to affect all the brighter stars until 22^h 54^m, when it was quite gone, being described as extraordinary in intensity, and very troublesome during its continuance. From this time till 0^h 27^m, all was clear, when it suddenly came on again, "in an instant. A star 7 m was quite free, but on drawing it back" (after it had left the field for re-examination), "it was found to be completely involved," the sky continuing all the while pure, so far as the naked eye could discern. — Again, in sweep 598, June 18, 1835, we have "15^h 37^m ST. A nebulous haze came on in an instant, extending to stars 9 m; yet the sky is as clear as ever, and the calm unbroken.—"15^h 44^m—(a star 6 m in the field). The nebulous haze is gone; it did not last two minutes."—"16^h 23^m. The nebulous haze came on again in a moment." Such remarks might lead to a suspicion of dew upon the eye-piece, or the breath of the observer settling on the glass; but repeated examination (the phenomenon being very common) has satisfied me that such is not the cause, but that it is really of atmospheric origin. Similar nebulous affections occur in our English climate; but it is their much greater frequency, and the suddenness of their appearance and disappearance, which forms so remarkable a feature at the Cape.

an exact circle, and the six rays which such an aperture always gives, are perfectly straight, delicate, brilliant lines, like brightly illuminated threads, running far out beyond the field of view, and (what is singular) capable of being followed, like real appendages to the star, long after the star itself had left the field. In examining stars to see if they are close double, I always apply the triangular aperture. It reduces the discs to hardly more than a third of their size, and gives them a clearness and perfection incredible without trial."

(xxiii.) Another peculiarity which has frequently given rise to remark, is the opacity of cloud, as compared with what prevails in England. My Sweeping Registers, at Slough, are full of instances of double stars with small companions, clusters, &c. seen through cloud of considerable apparent density to the unassisted eye. Of this I have elsewhere stated remarkable instances. It was my usual practice there to continue sweeping during moderately-clouded intervals, for the sake of securing at least such new double stars as might occur, or obtaining micrometric measures of known ones placed on the working list. Such advantage could seldom be taken of clouded intervals at Feldhausen, and from the whole tenor of my experience of that locality, the impression remains of a very decided difference, in this respect, between the two stations.

(xxiv.) Meteorological observations of the barometer, thermometers, wet and dry, the actinometer, &c., with the usual record of weather, were made on the appointed *term-days*, or days of equinox and solstice; at first during thirty-six hours, subsequently, during twenty-four only, from hour to hour. These, however, are only valuable when taken in conjunction with others of the same kind; and having already been published in the pages of the *Athenæum*, and elsewhere, and received as much discussion as they have appeared to need, in a report which I had the honour to communicate to the British Association, for the advancement of science, and which has been published by that body, it has been thought unnecessary to reprint them.

(xxv.) It was, however, my intention to have placed on record, in this volume, the results of a great mass of Actinometric observation made since the year 1824 (at which epoch my attention was first directed to that method of ascertaining the intensity of solar radiation, which may not inaptly be termed dynamical, in contradistinction to the usual statical method by the observation of blackened thermometers, photometers, &c.) In addition to these, between five and six hundred sets of such observations obtained at the Cape, would, I supposed, have afforded valuable climatological data, and led to conclusions otherwise important. Unfortunately, the necessity of a correction by a variable factor depending on the temperature attained by the liquid enclosed in the cylinder of the instrument, had not been foreseen and provided for in any of these observations, and only became apparent when the omission was beyond remedy, viz., when the results were drawn out, and ready for press. They are, therefore, suppressed for the

present, leaving it to future examination to determine whether among them there may not be a portion, made under such circumstances, or registered in such a manner as to admit of the temperature and, therefore, the correction in question being ascertained and applied, and providing against a similar evil in future by a simple and easily applied addition to the instrument itself.

(xxvi.) The principles upon which the reduction of the observations made with the reflector is executed, are explained at large in the Appendix to my Catalogue of northern nebulae, Phil. Trans. 1833, p. 482, et seq., and need not here be repeated. Only as respects the precession in Right Ascension, a slight change is introduced. That correction depending both on the Right Ascension and Polar distance of the object, would introduce, if attempted to be included in the general system of interpolation there adopted, a term of double entry which, however, since the zone swept is of small breadth, not exceeding 3° , may be resolved into two; the one a term of single entry, depending only on the time and expressing the precession for a constant polar distance, that of the middle of the zone; the other a correction of this for objects occurring out of the middle of the zone. This latter portion is a term of double entry; but it is necessarily of very small magnitude, seldom exceeding a few tenths of a second of time. In the system of reduction adopted in my former catalogue, this term is simply neglected; or the precession is regarded as the same throughout the breadth of the zone. Thus it becomes a mere function of the time of observation, and merges in the general correction for the time, to be interpolated as there explained. In the reduction of the present series of observations, this did not appear admissible, and it became necessary, therefore, to proceed somewhat differently, making a special exception of the precession in Right Ascension. This was done as follows: all the Right Ascensions of the zero stars were brought up to the beginning of the year nearest to the date of the observation, and the process, in its original form, followed out, as if to reduce the observations of the sweep to that epoch. The reduction (R) in this case, consists of two terms (A) and (B), of single entry, the former a function of the time, the latter of the polar distance. To bring these to the common epoch (1830) adopted throughout, the precession is thrown into the form $P + p$, where P is the precession for the middle of the zone, and p is the small correction to be applied to P to obtain the precession for any other point

out of the middle. Of these, P , being a function of the time, merges in A , and is added to, and so included in it; and p is calculated by a small table, of double entry, and applied to each star according to its proper amount and sign.

(xxvii.) Great and unavoidable delay having occurred in the publication of these pages, an opportunity has been afforded for a careful revision of the Catalogues subsequent to their printing off. In the course of this a considerable list of *corrigenda* has been accumulated, partly arising from error of the press, partly of copying, and partly of calculation. A few nebulae and double stars also, which are not included in the Catalogues, having escaped the process of arrangement by which they were constructed, have been discovered in the sweeping journals, as well as some additional observations of others which are so included. These are appended accordingly to the list of *corrigenda*. Some errors which vitiate the letter-press are also noticed. They are few, and for the most part trivial, with the exception of two very obnoxious ones which the reader is requested to bear in mind, or correct for himself. In page 299, the major semiaxis of the orbit of γ Virginis is stated at $9''.69$, whereas it ought to be $3''.58$; and in page 368, equation (A), the numerical coefficient in the value of μ , instead of 3.1514 , should be 2744.7 .

(xxviii.) It remains to say something as to the mode of introducing this work into the world. To the munificent destination of his Grace the late Duke of Northumberland, of a large sum, in aid of its publication, it owes its appearance as a single and separate work, instead of a series of unconnected memoirs, scattered over the volumes of academical bodies. The lamented decease of that illustrious nobleman prevented his witnessing its final completion. His liberal intentions, however, have been fully carried out by the worthy successor to his titles and his spirit; whose kind and gracious interest in it, I should be wanting in all proper feeling, were I to omit this opportunity of acknowledging.

CHAPTER I.

OF THE NEBULÆ OF THE SOUTHERN HEMISPHERE.

OBSERVATIONS OF NEBULÆ AND CLUSTERS OF STARS TAKEN IN THE COURSE OF SWEEPING WITH THE TWENTY-FEET REFLECTOR.

I.—INTRODUCTION TO THE CATALOGUE OF NEBULÆ.

(1) THE Catalogue of Southern Nebulæ, which forms the subject of this chapter, is similar, in every particular of its arrangement and construction, to my Catalogue of Northern Nebulæ and Clusters, published in the Transactions of the Royal Society, for 1833, and is reduced to the same epoch (1830-0), for the purpose of facilitating the union of the two catalogues into one general one. Like that Catalogue, it presents, assembled in one view, the reduced results of all the observations of each object which have occurred in the regular course of sweeping, in which either its place has been taken (however roughly), or in which any particular in its appearance or physical character has been noted; *without any selection of good, or suppression of discordant observations whatever.* To that work I shall, therefore, refer for the explanation, should any appear to be needed, of its arrangement, and of the purport of the several columns of which it consists. In effect, however, these sufficiently explain themselves, with exception of the abbreviations employed in the descriptions and columns of Synonyms, which it is necessary to repeat for the convenience of the reader, to whom they would otherwise be unintelligible without perpetual reference to another volume, which he might not have at hand. The dates of the several sweeps referred to in this and my former catalogues, will be found synoptically arranged in the table immediately appended to the catalogue now in question.

(2) North Polar distances are preferred to south, though most of the objects in the Catalogue are situated in the southern hemisphere, for the sake of uniformity, and for the maintenance of a general rule in applying precession; and for a similar reason Polar distance is preferred to declination, not merely because by so doing the signs + and - (fertile sources of mistake) are avoided, but also because all doubt or hesitation as to the sense in which the above-mentioned element is to be applied is thereby totally precluded, considerations of such moment as ought, I think, to lead to the universal disuse of declinations, and the adoption of North polar distances in their stead, in all astronomical catalogues henceforward to be published. It ought also to be mentioned that the "sweeps" referred to in the last column, as

those in which the observations occur, are numbered forward in continuation of my series of northern sweeps made at Slough; so that the Cape series (consisting of 382 sweeps) commences with sweep 429, and terminates with sweep 810. The general reference numbers in the first column are, in like manner, continued onward from No. 2307, the "omitted" nebula added after the 2306 regularly entered in order of R. A., in the Northern Catalogue.

The following is the system of abbreviations adopted:—

1. In the column of Synonyms—

The roman and arabic numerals (as I.45) occurring together, refer to the classes and numbers of nebulae and clusters discovered by my Father, and published in his catalogues:

The letter B, followed by a number, refers to the "Brisbane Catalogue" of Stars, by the general number of that catalogue:

M, so followed, to Messier's Catalogue of Nebulae:

Δ, " to Mr. Dunlop's do. do., published in the Transactions of the Royal Society, for 1828:

h, followed by a number, to my Northern Catalogue.

(2.) In the column of Descriptions and Remarks—

B	denotes	Bright.
b	—	brighter.
br	—	broad.
c	—	considerably.
Cl or cl	—	cluster.
comp	—	compressed.
D	—	double star.
d	—	diameter, distance.
E	—	extended, elongated, or elliptic.
e	—	extremely.
ee	—	excessively.
F	—	Faint.
f	—	following.
fig	—	figure.
g	—	gradually.
i or irr	—	irregular.
L	—	large.

l	denotes	long, or a little.
M	—	in the middle.
m	—	much.
N	—	nebula.
neb	—	nebulous; nebulosity.
n	—	north.
p	—	pretty (not very); preceding.
pos	—	angle of position.
R	—	round.
r	—	resolvable.
S	—	small.
s	—	south, suddenly.
st	—	stars.
sc	—	scattered.
v	—	very.
vv	—	very very (exceedingly).

- * Star.
- ⊕ Globular cluster.
- Planetary nebula.
- c Moon above the horizon.
- c c Moon very troublesome.

(3) In order to fix in the reader's mind the appearances represented by such combinations, occurring in the description of a nebula, as gbM (gradually brighter in the middle), psbM (pretty suddenly a little brighter in the middle), &c.; it will suffice to refer to the explanatory plate (Pl. IX. Phil. Trans. vol. for 1833), and to the accompanying table of explanations,

p. 494, of the same volume, in which, however, an important erratum exists (viz., in the explanations of figures 16, 17, and 18, in which the abbreviations pmbM, mbM, and vmbM, are, by mistake, printed instead of the correct ones descriptive of those figures which are psbM, sbM, and vsbM, respectively).

(4) As an example of the use of these abbreviations in the description of a nebula, the following is taken from the preface to the Northern Catalogue above referred to.

"vB; vL; IE; vgpmbM; 50" l; 45" br; pos 29°·3 by microm. a * 9m. 45° np, dist. 80", which expanded runs thus:—"Very bright; very large; a little extended; very gradually pretty much brighter in the middle; 50" long; 45" broad; angle of position (reckoned from the north and from a meridian in the direction north, following, south, preceding) measured 29°·3 by the micrometer. A star of the ninth magnitude is situated 45° north preceding the centre of the nebula and at a distance from it of 80" (both by estimation)." *Measured angles are always marked as above in degrees and decimals. Estimated ones without decimals.*

(5) It will of course be readily understood that very great differences will occur in the descriptions of one and the same nebula taken on different nights, and under different atmospheric circumstances, as well as in different states of the mirror and the eye: nor will it at all startle one accustomed to the observation of nebulae to see such an object described at one time as F; S; R (faint, small, round), and at another as B; pL; pmE; r; (bright; pretty large; pretty much extended; resolvable), &c. It is from a collection of all these descriptions that the true or final description has to be made out, in doing which it is to be recollected that the higher observed degrees of brightness, size, and extension are to be preferred in general to the lower ones, since atmospheric and other deteriorating causes always act in derogation of these qualities. For it appears to be a general law in the constitution of "extended" nebulae, that their interior or brighter strata are more nearly spherical than their exterior or fainter; their ellipticity diminishing as we proceed from without inwards, a character, so far, in favour of a rotation on an axis, in the manner of a body whose component parts have such an amount of mutual connexion as to admit of such a mode of rotation, and of the exertion of some degree of pressure one on another. It by no means, however, follows, that such a mode of rotation can be regarded as demonstrated by the general phenomenon in question, since a system of internal movements among an assemblage of bodies perfectly disconnected, and acting on each other solely by attractive forces exerted at a distance, is at least conceivable, by which the same appearances to a remote spectator would be produced.

(6) The number of nebulae and clusters comprised in the catalogue here presented, is 1708. Of these eighty-nine are identical with objects previously observed by myself at Slough, and which occur, in consequence, in my Northern Catalogue. In these cases it has been preferred to number them onwards, regularly in succession, as if now for the first time observed, rather than interrupt the succession by breaks or by the re-insertion of earlier numbers. The letter *h*, with its accompanying number in the column of synonyms, will point out the places in the former catalogue of such of these as occur there for the first time; and a reference to that catalogue being made will readily identify such others as have previously been described by my Father, or by Messier.

(7) Of the objects remaining, 135 are nebulae and clusters of my Father's catalogues, now, for the first time, reobserved; 9 are Messier's, 5 of which are identical with objects catalogued

by Mr. Dunlop; and 206 others have also been identified, with more or less certainty (indicated by the absence or presence of the sign ?), with objects observed by Mr. Dunlop, and described in his Catalogue of Nebulae. The rest of the 629 objects, comprised in that catalogue, have escaped my observation; and as I am not conscious of any such negligence in the act of sweeping as could give rise to so large a defalcation, but, on the contrary, by entering them on my working lists (at least, until the general inutility of doing so, and loss of valuable time in fruitless search, thereby caused, ~~it~~ became apparent), took the usual precautions to ensure their rediscovery; and as I am, moreover, of opinion that my examination of the southern circumpolar region will be found, on the whole, to have been an effective one, I cannot help concluding that, at least in the majority of those cases, a want of sufficient light or defining power in the instrument* used by Mr. Dunlop, has been the cause of his setting down objects as nebulae where none really exist. That this is the case, in many instances, I have convinced myself by careful and persevering search over and around the places indicated in his catalogue.

II.—REMARKS ON THE CATALOGUE.

Of the degree of precision attributable to the places of the objects it comprises.

(8) A great number of the objects described in the following catalogue rely on single observations for the determination of their places. On this point a remark applies similar to that made on the same subject in my Northern Catalogue. To have secured two or more observations of each recorded nebula, would have required the whole surface of the heavens to have been swept at least four times over, on the system of observation pursued, viz., twice for discovery, and twice for verification and precise determination. In going a second time over the same ground, or even a third, in the richer regions of the heavens, it would have been very unadvisable to have arrested the sweeping process at each nebula detected in the first course of sweeps for the purpose of reobserving it; since, by so doing, the escape of every other object of interest (whether nebula, cluster, or double star), situated in the same zone, and within two or three minutes in right ascension, or even more, if the object reobserved were in any way interesting, would have been infallibly insured. With such an instrument as that which I employed, the place of an object cannot be determined with precision otherwise than by including it in a zone with sufficient zero stars to form a connected series: and to have carried out this process with that especial view (however desirable a thing in itself) would have required at least two, and probably three years of additional observation. As it was, it proved difficult, and, in fact, was not entirely accomplished, to go clearly twice over every part of the surface of the hemisphere; and, in consequence, anything approaching to such a systematic

* A 9-inch Newtonian reflector, of 9 feet focal length, which, in point of light, would correspond to about one-eighth of that used in my sweeps. That such was its construction, I conclude from the mention of the *large mirror* in Philosophical Transactions, 1823, p. 113.

revision and reobservation of individuals was quite out of the question, unless in the case of objects of peculiar interest, which it would have been wrong not to have reobserved; or in those cases where, in crowded regions, it became absolutely necessary to multiply observations to avoid confounding together different individuals. Indeed, in the case of the two nubeculæ, and especially in that of the Nubecula Major, it was found necessary (such is their richness) to abandon the system of observing in zones of 3° in breadth, and to break them up into single degrees, so as to afford longer intervals between the transits; by which alone the observation of all their component nebula could be satisfactorily secured. However where, owing to the occurrence of important objects in a zone, it was thought advisable to go over it more than twice the opportunity of reobservation was of course seized, if tolerably certain that by so doing there were no risk of missing a nebula previously unobserved.

(9) Under these circumstances it is of course interesting to have some means of satisfying ourselves what confidence is due to a single observation of place. And this is afforded by the arrangement of the catalogue itself, in which the results of all the individual observations of each object, reduced independently and in almost every case (of necessity) by a different series of zero stars are confronted together. Without going into calculations on the theory of probabilities, it will be tolerably evident to any one who may cast his eyes over the columns of R A, and N P D, that, if we put aside loose objects such as large clusters of stars without any remarkable star centrally situated as a point of reference; or large ill-defined or irregularly shaped nebula; as well as observations marked as imperfect (by the sign \pm); cases are comparatively rare in which two observations of the same object differ by a whole minute in N P D, or by a quantity in R A, which, when converted into space according to the rule for convergence of meridians will give the same amount of discordance in the direction of the parallel. For the great majority of objects, therefore, the line of collimation of a telescope, pointed according to the mean of the observations recorded (when more than one), will strike upon a point of the heavens within the visible area of the nebula observed, even though its angular diameter should not exceed a single minute of a degree.

(10) In the cases of single observations, mistakes of reading and of reduction are the most dangerous, and to these the results of such observations are of course always more or less liable. I have every reason to hope that such mistakes have been very unfrequent. Whenever the smallest ground for suspicion has occurred, the reductions have been carefully re-examined. It was my intention to have gone over the whole of the reductions twice, and the work has been partly done, but I found myself unequal to the task of completing it. However, in order to form a notion on some better ground than mere general impression of the probable frequency of such mistakes, after drawing out in order of R A the fair copy of the reduced catalogue, I proceeded to compare the places of such nebula and other well-defined objects common to both the Northern and Southern Catalogues as have their places determined only by one observation in the latter. This afforded sixty-five comparisons in R A, and sixty-eight in N P D, in the course of which the errors detected in reading and reduction were as follows:—

Errors of reduction {	In the Southern Catalogue	0
	In the Northern Catalogue	1

Errors of reading { 1^m of Chronometer in R A	1
{ 1^s in N P D	2
Mistakes of wire in observations of R A	0

The error of reduction thus detected affects the R A of the nebula h. 1540 of the Northern Catalogue which, in place of $13^h 0^m 30^s \cdot 4$, should be $13^h 0^m 50^s \cdot 4$.—The chronometer readings are liable to an occasional error of 1^m when the second hand stands between 50^s and 60^s ; and the minute so erroneously read is almost certain to be in excess. It is therefore a useful precaution, in looking out for a nebula or other object, whose place is settled only by a single observation, to presume the possibility of such an error, and to have the eye at the eye-piece a full minute before the registered time. The effect of an erroneous degree in Polar distance is much worse; as it necessarily causes the loss of the observation; but in all the above compared cases the instrument having been set to the places of the nebulae by the working lists previously prepared, the *degree* has probably been read and registered more negligently than in the case of an unknown object, the attention having been concentrated on the minutes and seconds. I may further observe that, in the very great number of cases where the same unknown nebula has been swept over several times, instances of misreading such as those above considered appear to have been very rare. In such cases they detect themselves, and though of course in registering them, in the catalogue form adopted, they have always been corrected when discovered, yet the fact of such correction being made is, in every instance, expressly noticed in the column of Remarks. Much care also has been taken to examine the catalogue for cases where two nebulae occurring in different sweeps, and otherwise agreeing both in description and place, differ by a single minute of time in R A, or by a single degree in N P D (for in the system of observing adopted, a misreading of 2^s is hardly possible). In such cases there necessarily arises a suspicion of identity which, when it occurs, is also noticed in the remarks annexed.

(11) Correcting these mistakes of reading, the actual discordances found to subsist between the two Catalogues run as follows:—

Discordances in R A.			Discordances in N P D.		
s	but not exceeding	s	Above $0'$	but not exceeding	$20'$ — 34
Above $0\cdot0$		$1\cdot0$ — 32	" $20'$	" "	$40'$ — 20
" $1\cdot0$	" "	$2\cdot0$ — 14	" $40'$	" "	$60'$ — 5
" $2\cdot0$	" "	$3\cdot0$ — 11	" $60'$	" "	$80'$ — 5
" $3\cdot0$	" "	$4\cdot0$ — 8	" $80'$	" "	$90'$ — 4
" $4\cdot0$	" "	— 0	" $90'$	" "	— 0
		65			68

(12) Although the number of observations thus compared is not large, yet it suffices to afford a reasonable presumption (taking the error at half the discordance) that the place of a well-defined nebula, determined by a single observation, will seldom be found in error to the extent of $30''$ of space in the direction of the parallel, or of $45''$ in that of the meridian. The entry of a known and expected nebula to which the telescope has been set into the field of view bisected by the horizontal wire is a thing of no uncommon occurrence.

Explanation of the figures referred to in the Catalogue of Southern Nebulæ and clusters, with more detailed descriptions and monographs of some of the most remarkable nebulae of the Southern Hemisphere.

(13) Fig. 1, Plate II.; M. 17=h. 2008; R A 18^h 11^m N P D. 106° 15'. This very remarkable object is figured in my Northern Catalogue (fig. 35), but owing to the deficiency of Micrometrical measures for laying down the stars, its form is far from accurately expressed in that representation. In particular the large horse-shoe-shaped arc which forms so striking and conspicuous an appendage to the bright oblique streak observed by Messier at its preceding termination, is there represented too much elongated in a vertical direction and as bearing altogether too large a proportion to that streak, and to the total magnitude of the object. The nebulous diffusion too, at the preceding end of that arc, forming the preceding angle and base line of the capital Greek *omega* (Ω) to which the general figure of the nebula has been likened, is now so little conspicuous as to induce a suspicion that some real change may have taken place in the relative brightness of this portion compared with the rest of the nebula; seeing that a figure of it made on the 25th of June, 1837 (on which occasion other details presently to be noticed were well seen, and for the first time distinctly delineated), expresses no such diffusion, but represents the arc as breaking off before it even attains fully to the group of small stars at the preceding angle of the Omega. Neither is the smaller of the two nebulous knots at its following angle close adjoining to the small star there situated so conspicuous as to have attracted particular notice either on that occasion, or on the 13th August, 1835, when a pretty elaborate drawing was made of all the then known parts of the nebula, and a number of measures taken with the twenty-feet position micrometer with a view to the construction of a correct monograph of it.

(14) Under these circumstances the argument⁵ for a real change in the nebula might seem to have considerable weight. Nevertheless they are weakened or destroyed by a contrary testimony entitled to much reliance. Mr. Mason, a young and ardent astronomer, a native of the United States of America, whose premature death is the more to be regretted, as he was (so far as I am aware) the only other recent observer who has given himself, with the assiduity which the subject requires, to the exact delineation of nebulae, and whose figures I find at all satisfactory, expressly states (Mem. American Phil. Soc. vol. vii. Art. xiii. p. 177) that both the nebulous knots were well seen by himself and his coadjutor Mr. Smith, on the 1st August, 1839, i. e. two years subsequent to the date of my last drawing. Mr. Mason also declares the upper and larger knot to be irresolvable by his telescope (a reflector of 12 inches aperture and 14 feet focal length constructed by himself). In this particular my observations of 1835 and 1837, so far agree that its resolvability is not mentioned in words or indicated in the diagrams made on those occasions. And, with respect to the diffusion of the nebula among the group of stars at the preceding angle and along the base-line of the Omega, it is represented as tolerably conspicuous in his figure—for which reason, and because it was decidedly noticed as a feature in my earlier observations, I have retained both it and the lesser knot in my present figure, considering the negative evidence of their having escaped delineation on those two nights as outweighed by the positive testimony in favour of their

existence both at an earlier and a later epoch. Neither Mr. Mason however, nor any other observer,* appears to have had the least suspicion of the existence of the fainter horse-shoe arc attached to the *following* extremity of Messier's streak. It was seen on both the nights in question, but only delineated in its true form and magnitude on the latter. It merits, however, a more particular attention than I was then able to bestow on it, as it is possible that yet other convolutions may exist. I should observe that the three stars which mark its extremity are *not* micrometrically laid down.

(15) The stars visible in this nebula are for the most part too small to admit of their differences of R A and N P D being taken with the equatorial micrometer conveniently. Accordingly only three or four have been so laid down. The more conspicuous of the remaining ones down to the 12th, and one or two of smaller magnitudes have been determined by triangulation from these by angles of position taken with the 20 feet position micrometer. Several of these angles were measured in England, the rest at the Cape, on the 13th August, 1835. No reason existing for preference, the means of all the observed positions belonging to the same pairs of stars were adopted, and the whole system of angles projected on a chart

* Dr. Lamont, in his Academical Thesis on Nebulae, read before the Bavarian Academy, Aug. 25, 1837, has given a figure of this nebula, accompanied with a description. In this figure the nebulous effusion at the preceding angle, and along the preceding base line of the Omega, is represented as very conspicuous; indeed much more so than I can persuade myself it was his intention it should appear—the engraver having probably overdone it. However, it justifies my retaining it. He has not given any indication of the additional loop at the following end of Messier's branch. He also remarks, as Mr. Mason has done, on the irresolvability of the insulated knot; and, as observed in the text, I am not disposed to insist on its being resolvable. He accounts, however, for my having considered it as such, by the existence of two very minute stars in it. These have escaped my notice. I ought here to observe, that Dr. Lamont appears to have misconceived my meaning in that part of the description of this nebula, appended to my Northern Catalogue, where it is said that, "With a view to a more exact representation of this curious nebula" (*more exact, that is to say, than the figure there given*), "I have at different times taken micrometrical measures of the relative places of the stars in and near it, by which, when laid down as in a chart, its limits may be traced and identified, as I hope soon to have a better opportunity to do," &c. Dr. L. interprets this passage to mean, that the figure in that catalogue was based upon a series of micrometrical measures, whereas he finds material discordances between that figure and his own (no doubt accurate) measurements. But this is neither the purport of the passage cited, nor its plain grammatical sense. A few, but very rude and imperfect micrometric measures, no doubt were used in constructing that figure; but for the most part it is a mere eye draft, and, as now appears, considerably distorted. Though not relevant to the immediate subject, I will take this opportunity (as another may not occur) to notice a point of some interest, which has arisen on a comparison of Dr. Lamont's figure and description of the Planetary Nebula h. 2037, with my own observations. According to Dr. L., that nebula has two small stars η , one upon the very edge, the other removed from it by $\frac{1}{2}$ of the diameter of the nebula. The former is the star observed and described by me in my catalogue, but it is there called η , whereas, on referring to the original observation, I find the figures to be 15, the five being obscurely written over a 1 as a correction. No engraving was made of this nebula, but in both the sweeps where it was observed diagrams were made, which agree in representing this star, *not*, as in Dr. Lamont's figure, *precisely* on the edge, but at a distance from it about $\frac{1}{2}$, or $\frac{3}{4}$ at most, of the diameter. The other star was not marked on either occasion. Being considerably more distant, it was passed over among the "many other stars in the field." My reason for drawing attention to this point is that, from all the circumstances of the case, there can be very little doubt of a relative motion of the objects *inter se*; and it will be therefore interesting to re-observe them, which I trust Dr. L. will do.

by means of a protractor. Thus, from the equatorially determined stars adopted as a basis of projection others were derived by the intersection of their directions, and from these again others, and so on; using always the best trigonometrical combinations the respective cases would admit, and adjusting cases of discordant intersections as they arose, on an impartial consideration of their merits.* From the stars so laid down by triangulation, others depending only on eye-drafts were then inserted on the chart according to their configurations. Finally, the differences of R A and N P D of the stars of these two latter classes were read off from the chart by the aid of diagonal scales, and the whole entered in a catalogue; which done, the nebula was then worked in upon the chart as carefully as possible according to the united evidence of all the drawings and diagrams at any time procured of it or of any of its parts.

(16) The following is the Catalogue in question, in which the first column contains the number for future reference—the second, letters for more convenient citation, the third the magnitude assigned to the star on a comparison of all the observations neglecting half magnitudes below the 8th. The fourth column contains the difference of right ascension in seconds of time, and the fifth that of North Polar distance in parts of the equatorial wire micrometer, (1000 parts = $4' 0''.4$.) from the chief or Zero star, which in this case is the conspicuous star a little preceding the summit of the brighter horse-shoe. Lastly, the sixth column contains the classes to which the determinations of the stars belong in respect of probable precision; class 1, containing stars determined by differences directly observed with the equatorial; 2, stars projected by triangulation as above described, and 3, stars inserted from eye-drafts. Dots attached (:) denote want of precision.

CATALOGUE OF THE STARS LAID DOWN IN THE DRAWINGS OF M 17 = h. 2008.

No.	Letter.	Magn.	Δ RA from α . Sec. Dec.	Δ NPD from α . Parts.	Class.	No.	Letter.	Magn.	Δ RA from α . Sec. Dec.	Δ NPD from α . Parts.	Class.
1	ρ	14	- 7.1	- 720	2	23	η	10	+15.9	-1530	2,3
2	ϵ	12	- 6.1	- 840	3	24	θ	12	+16.1	-1755	3
3	ξ	17	- 5.3	- 910	3	25	δ	9	+17.2	-1640	2
4	χ	14	- 4.1	- 340	2	26	e	8	+19.3	+1450	2
5	τ	14	- 4.0	- 745	1	27	n	13	+21.0	-1710	3
6	γ	11	- 3.6	- 970	1	28	v	15	+22.0	- 110	3 :
7	c	10	- 1.8	+1215	2	29	w	15	+22.7	- 220	3 :
8	o	13	- 1.2	- 960	2	30	s	13	+27.1	-1180	3 ::
9	π	15	- 1.0	- 825	3	31	b	11	+28.2	+ 560	2
10	λ	11	- 0.9	+ 480	1,2	32	d	14	+28.3	+ 80	3 ::
11	α	9	. 0.0	0	0	33	σ	12	+29.0	- 880	3 ::
12	g	16	. 0.0	- 330	3	34	l	11	+33.9	-1450	3 ::
13	v	13	+ 0.5	- 510	2	35	a	13	+35.2	- 360	2
14	f	9	+ 4.4	+1805	2	36	u	12	+37.2	-1750	3 :
15	μ	13	+ 4.9	- 660	2	37	k	10	+39.8	-1700	2
16	κ	12	+ 6.4	+ 205	2	38	t	14	+40.5	-1330	3 ::
17	λ	13	+ 7.3	- 840	2	39	m	11	+41.4	-1300	3 ::
18	ϵ	11	+ 7.3	- 470	2	40	u	..	+44.9	-1000	3 ::
19	ω	15	+ 7.5	- 630	2	41	h	11	+45.0	- 640	3 ::
20	β	10	+ 8.2	- 275	1	42	p	9	+59.0	+ 325	3 ::
21	ϕ	12	+ 8.6	+ 560	2	43	q	10	+63.6	+ 475	3 ::
22	ψ	16	+12.9	+ 730	3	44	r	11	+67.8	+ 650	3 ::

* When a star is determined, in this mode of proceeding, by three or more intersecting lines which do not meet in a single point, bad trigonometrical combinations must be disregarded, and the centre of gravity of the intersections afforded by the good ones only taken.

Fig. 2, Plate II. H. IV. 41=V. 10, 11, 12=h. 1991. R A. $17^h 52^m$; N P D $113^\circ 1'$.

(17) I have been rather unfortunate in my figures of this nebula. That given in my Northern Catalogue (fig. 80) is not to be taken as more than an attempt, and that a most rude and imperfect one to show the situation of the fine triple star in its centre with respect to the nearer portions of the three principal surrounding nebulous masses. It is stated in the observations recorded in that Catalogue, that a careful drawing made of the nebula was lost, and that the figure there given was constructed from much less elaborate sketches (in fact the rudest imaginable) aided by memory. The drawing from which my present figure is constructed, was the work of a single night only (about the beginning of August 1835, for it bears no date, though the time can be ascertained nearly from other circumstances). No previous micrometrical measurements however having been procured of the stars involved and adjacent, wherewith to prepare a "working skeleton" for laying down the nebula, both nebula and stars were worked in by the unassisted eye, and although a series of angles of position among the principal stars was taken after the completion of the drawing (all single measures), their results when subsequently projected, exhibited some material disagreements from the eye-draft in respect of the situations of several of them inter se, and in one instance (that of the star marked κ in the Catalogue annexed) the situation so projected proved quite irreconcilable with the eye-draft, a discordance which however disappeared on supposing an error of 5° to have been committed in one of the angles of position (from β) by which it had been determined. However as (allowing such an error to have been committed) the angles in question sufficed to fix the relative places of the six chief stars $\alpha \beta \epsilon \eta \theta \kappa$ by direct intersections, and of $\zeta \iota \lambda \rho \nu \phi \chi$, each by a measured position from β combined with undoubted allineations among the other stars, on the whole in a tolerably satisfactory manner, there was little difficulty in inserting the other stars of the eye-draft so as to preserve their configurations, and thence to lay down the nebula upon them without doing violence either to its general aspect, or to any important feature. Had the discordance in question been detected before the final removal of the telescope it would have been easily rectified, but the original drawing having been considered at the time satisfactory, it was put aside and not subsequently re-examined and compared with the nebula itself, a circumstance the more to be regretted as this wonderful object, independent of its intrinsic interest, has also been made a subject of especial and elaborate examination by Mason in his paper already cited, illustrated with a well-executed figure constructed from observations in the year 1839.

(18) On comparing our figures, they will be found to agree in every essential particular allowing for the difference of light between reflectors of 12 and 18 inches aperture, with one rather remarkable exception, viz., in the form of the southern mass of the trifold nebula and the character of the curvature of the three paths or avenues which lead up to the triple star. Mason represents these avenues as free from any abrupt change of direction, the northern and the preceding of them branching out with an easy and graceful bifurcation from the southern: whereas my figure whose correctness in this respect I cannot doubt, gives to the preceding avenue a remarkably sudden and uncouth flexure, like a gnarled branch of an oak, just at its divergence from the other two. The southern nebulous mass, in my figure, has a considerably wider extension towards the preceding side than in Mason's which represents it as

nearly round; but as this portion is very faint there was probably not light enough in his telescope to render the whole visible.* On comparing his stars with mine as laid down from the following catalogue, some will be found to which I have none corresponding (and *vice versa*), and it is not unlikely that many more may have escaped my notice, not for want of power in the telescope to show them, but for want of a sufficiently prolonged and methodical scrutiny specially directed to this point. Such objects in fact cannot be adequately described and figured in a single night. They require repeated examination and breaking up into triangles to be explored in detail, and the near proximity of this in particular to another extensive and complex nebula (Messier's 8th), from which it is distant hardly more than a degree, renders a fuller examination of it desirable, with a view to the possibility of tracing a nebulous connexion between them.

CATALOGUE OF THE STARS LAID DOWN IN THE FIGURE OF H. IV. 41 = h. 1991.

No.	Letter.	Magn.	Δ RA from α in time. Sec. Dec.	Δ NPD from α in Mic. Pts. Parts.	Class.	No.	Letter.	Magn.	Δ RA from α in time. Sec. Dec.	Δ NPD from α in Mic. Pts. Parts.	Class.
1	ϵ	12	- 8.0	- 875	2	15	θ	11	+ 7.1	- 290	2
2	c	15	- 6.9	- 390	3	16	ι	13	+ 7.2	- 2980	2.3
3	ρ	13	- 6.4	- 2230	2.3	17	κ	12	+ 7.6	+ 280	2.3
4	χ	14	- 4.1	- 2460	2.3	18	ζ	11	+ 7.6	- 1000	2.3
5	α	15	- 4.1	+ 300	2.3	19	ϕ	13	+ 7.6	- 1490	3
6	γ	8	- 0.4	+ 50	3	20	β	6.7	+ 8.8	- 1845	2
7	b	15	- 0.3	- 830	3	21	π	13	+ 9.0	- 1430	3
8	α	6.7	0.0	0	3	22	σ	13	+ 9.0	- 3180	3
9	δ	13	+ 0.1	- 25	3	23	τ	13	+ 11.7	- 3340	3
10	ν	13	+ 1.8	- 360	3	24	η	11	+ 11.9	- 450	2
11	ψ	13	+ 2.9	- 535	3	25	λ	12	+ 14.4	+ 540	2.3
12	ξ	13	+ 4.3	- 1510	3	26	υ	13	+ 21.5	- 2400	2.3
13	μ	13	+ 6.6	- 115	3	27	ϕ	13	+ 22.8	- 2970	2.3
14	ω	14	+ 7.0	+ 1230	3						

Fig. 3, Pl. II. V. 30; C Orionis; R A $5^h 27^m$; N P D $94^\circ 57'$.

(19) Although I have not succeeded in tracing any nebulous connexion between this nebula and the great one about θ Orionis, yet as their distance is not much more than half a degree, it not improbably forms part of one great nebulous system extending southwards through and beyond that nebula as far as ι Orionis up to which star a pretty conspicuous branch of the great nebula runs. More powerful telescopes than mine must decide this point. Meanwhile, as this nebula has never before been figured, and offers much that is remarkable in its form and relation to the involved stars, I have bestowed some care in getting at least a tolerably correct representation of it. My figure is constructed from two drawings made on the 5th of November, 1834, and the 29th January, 1835, and from a series of equatorial differences of R A and N P D of the principal stars involved in it (those of Class 1, in the accompanying Catalogue)

* A mistake of importance, as it enlarges the apparent scale of his figure in the direction of the meridian, has been committed by Mr. Mason's engraver. The parallels of declination in both the figures of this nebula which are marked $22^\circ 45'$, ought to have been marked $22^\circ 50'$. The places of his stars being determined by numerous and elaborate micrometrical measures, are no doubt more correct than mine.

obtained on the 7th and 9th January, 1835, which, though less numerous than might have been desired, have afforded a sufficient basis of reference for laying down the others from the means of readings taken on both the eye-drafts which agree sufficiently well with each other to claim for the stars marked as of class 2, a degree of exactness not inferior to what would have been afforded by direct measures with the position micrometer.

CATALOGUE OF THE STARS LAID DOWN IN THE DRAWING OF V. 30.

No.	Letter.	Mag.	Δ RA from a. Sec. Dec.	Δ NPD from a. Parts.	Class.	No.	Letter.	Mag.	Δ RA from a. Sec. Dec.	Δ NPD from a. Parts.	Class.
1	ϵ	10	-28.8	-1055	2	14	μ	12	-0.2	+725	2
2	ξ	13	-19.5	-842	2	15	α	6	0.0	-	2
3	ρ	14	-19.5	-238	2	16	σ	13	+1.9	-752	2
4	γ	8	-18.8	-1560	1	17	τ	14	+2.3	-818	2
5	λ	12	-17.6	-1735	2	18	ν	14	+4.6	-1308	2
6	θ	10	-9.3	+359	1	19	ν	13	+6.0	+1505	2
7	κ	11	-9.0	-1265	2	20	ϵ	10	+8.1	+969	1
8	η	10	-7.7	-2198	2	21	ψ	15	+3.6	-1702	2
9	ζ	10	-7.2	-2295	2	22	ϵ	9	+10.5	-65	1,2
10	α	16	-6.5	-1050	2	23	β	7	+16.8	+244	1
11	b	16	-5.1	-1210	2	24	χ	15	+19.0	-2140	2
12	π	13	-1.5	+155	2	25	φ	14	+23.8	+28	2
13	σ	14	-1.0	-1595	2	26	ω	..	+40.0	+45	2

The stars η and ζ form the double star Σ . 746; α is identical with c^1 Orionis = A S C. 680; and β with c^2 Orionis = V. 154. Piazzi. Just beyond the limit of the figure occurs the star V. 144 Piazzi, whose differences in R A and N P D from α are $-59'.5$ and -436 Pts.

Fig. 4, Pl. II. 30 (Bode) Doradus, = Lac 449. Neb. = B. 1038 = Δ . 142 = h. 2941.

R A $5^h 40^m$: N P D $159^\circ 11'$

(20) This is one of the most singular and extraordinary objects which the heavens present, and derives no small addition to its intrinsic interest from its situation, which is among the thickest of the nebulae and clustering groups of the greater Nubecula, of whose total area it occupies about one five-hundredth part. For these reasons, as well as because its real nature has been completely misunderstood, and its magnified appearance so strangely misrepresented in the only figure which I am aware to have been made of it as to convey an entirely erroneous impression both of its form and structure; I have taken great pains to give as nearly as possible a perfect representation of it as it appeared in the twenty feet reflector on a great many occasions, but more especially on the 29th November, 1834, when a "very careful drawing" was made of it by the eye alone, unaided by any micrometrical measures; and on the 21st and 22nd December, 1835, when the nebula was worked in from the telescope on a "skeleton" previously prepared by an approximate reduction of the micrometrical measures of its principal stars, forming a chart, with a system of triangles, for its reception and for that of minute stars not susceptible of micrometric measurement, or not considered as of sufficient importance to be so measured. This is the only mode in which correct monographs can be executed of nebulae of this kind which consist of complicated windings and ill-defined members obliterated by the smallest illumination of

the field of view; and in which the small stars, when very numerous, can be mapped down with tolerable precision.

(21) The following catalogue contains all the stars which I have been able distinctly to perceive within the area occupied by the nebula and nearly adjacent to it. Owing to the

CATALOGUE OF THE STARS LAID DOWN IN THE MONOGRAPH OF THE NEBULA
h. 2941 = 30 (BODE) DORADUS, &c.

No.	Letter.	Mag.	x Co-ord. from α in parall. Sec. Dec.	y Co-ord. from α in merid. Sec. Dec.	Class.	No.	Letter.	Mag.	x Co-ord. from α in parall. Sec. Dec.	y Co-ord. from α in merid. Sec. Dec.	Class.
1		13	-382.0	-260.0	2	54	ξ	12	-19.3	-395.1	2
2		14	-367.0	-209.0	3	55		13	-16.0	+133.5	1
3		..	-363.5	+238.5	3	56	σ	14	-11.4	-284.4	2
4		..	-358.0	-185.0	3	57		17	-10.3	-186.2	2
5		15	-355.5	+133.3	3	58		13	-9.8	-6.9	3
6		14	-353.0	+61.7	3	59		14	-9.4	-266.7	3
7		14	-345.0	+101.3	1	60	ζ	10.11	-6.7	-52.1	1
8		..	-338.9	-143.0	3	61		12	-4.2	-68.9	2
9	ψ	14	-331.0	+264.0	3	62		14	-2.8	-339.6	2.3
10		14	-326.8	+121.9	3	63		16	-2.5	-6.0	2
11		..	-325.0	-222.0	2	64		15	-0.7	+13.5	2
12	χ	12	-298.1	+284.0	3	65		13	-0.5	-22.0	2
13		11	-295.5	-92.8	1	66	α		0.0	0.0	1
14	ϕ	12	-292.5	+198.5	1	67		14	+4.7	-60.0	2.3
15		15	-289.5	-278.6	3	68		12	+7.0	-334.5	2
16	ϵ	11	-289.1	-39.1	1	69		14	+9.7	-8.7	2
17		14	-287.7	+204.3	2.3	70		13	+16.3	-15.2	2
18		16	-280.8	+26.9	2	71		12	+21.0	+20.0	2
19		14	-264.5	+231.5	3	72		14	+41.4	+44.0	2
20		10.11	-264.2	-584.3	2	73		17	+44.0	-16.5	2.3
21		17	-264.2	+262.0	3	74	δ	10.11	+45.2	-239.0	1
22	ω	12	-262.0	+247.0	3	75		17	+47.3	-1.0	2.3
23		16	-261.0	+184.5	3	76		17	+54.0	+17.0	3
24		15	-248.5	+236.9	3	77	γ	10.11	+55.1	+122.8	1
25		15	-239.2	+173.5	3	78		12	+67.8	-542.2	2
26		16	-237.1	+394.1	3	79		15	+70.2	-135.9	3
27		15	-233.8	+155.2	3	80		12	+76.9	+91.7	2
28		15	-176.2	-2.5	3	81	λ	11.12	+79.5	+1.0	1
29	β	10	-174.0	+22.9	1	82		17	+88.8	-524.2	3
30		15	-165.1	+36.2	2.3	83		15	+90.0	+66.6	2.3
31	θ	11.12	-158.0	-294.2	2	84		17	+95.8	-505.2	3
32		14	-154.5	-5.1	3	85		17	+100.8	-542.2	3
33	ρ'	13	-152.4	-123.8	2	86	σ	12	+112.7	-110.2	2
34	ρ''	13	-151.4	-129.8	1	87		10.11	+127.0	+424.0	2
35	ρ'''	13	-149.3	-119.8	2	88	ν	12	+146.8	-240.8	1
36	π	14	-147.6	+115.5	2	89		16	+152.8	-232.8	3
37	ρ''''	13	-142.9	-127.8	2	90		17	+163.8	-402.7	2.3
38		15	-133.4	-147.3	3	91	μ	12	+197.7	+16.0	1
39		..	-125.0	-489.0	2	92		15	+198.8	+340.1	3
40		16	-124.5	-3.1	3	93		..	+227.0	+481.0	3
41		17	-121.0	+291.0	3	94	τ	14	+230.0	-10.0	2
42	κ	12	-103.6	-56.1	2	95		17	+246.5	+190.0	2
43		15	-100.5	+78.7	2	96		12	+246.8	+315.1	1
44		..	-83.6	-465.5	3	97	υ	15	+255.7	-47.5	2
45	η	11.12	-75.0	-288.0	1	98		13	+271.8	-330.7	2.3
46		16	-42.3	-84.8	2	99		10.11	+280.0	-557.0	2
47		13	-37.2	-68.9	2.3	100		13	+283.8	-343.7	3
48		13	-32.4	-2.9	2	101		16	+301.0	+349.4	2.3
49		17	-32.0	+222.0	2	102		13	+310.8	+328.9	2
50		14	-30.4	-278.5	2	103		13	+317.3	+341.9	2
51		18	-26.5	-122.0	2	104		17	+322.5	+330.1	2.3
52		13	-24.0	-56.5	2.3	105		17	+373.6	+193.4	2.3
53		13	-22.8	-162.4	3						

convergence of the meridians so near the pole, they are laid down in the figure, and entered in the catalogue, not according to differences of R A and polar distance expressed as usual in time and in parts of the equatorial micrometer—but according to the values x and y of rectangular co-ordinates measured on the parallel and meridian passing through the central star, and both expressed in seconds of absolute angular measure.

(22) The first class of stars in this catalogue comprises those which have been determined by the combination of direct measures of differences of R A and N P D taken with the equatorial with angular measures of position taken with the 20 feet micrometer, or by such only of the latter description of measures as I consider on the whole, from their number and satisfactory coincidence of their results, equal in weight to such direct determinations. The second class contains stars determined by the projection of angles of position only but less numerous and accurate than those of class 1, or in which angles of position not alone sufficient for determining the co-ordinates have been combined either with observed differences of R A, or with distances obtained from configurations with stars of class 1, capable of affording a considerable degree of exactness. Class 3, contains stars inserted on the "skeleton" by the eye, and whose co-ordinates therefore will be more or less exact according to their situation, whether favourable or unfavourable for good configurations. Some of these which, owing either to the employment of a measured angle or to some other favourable circumstance, appear to claim a higher degree of confidence, are indicated by 2.3 in the column of classes.

(23) The stars thus scattered over the area occupied by this nebula may or may not be systematically connected with it, either as an individual object, or as part of the vast and complex system which constitutes the Nubecula. In respect of their arrangement there is nothing to distinguish them from those which occupy the rest of the area covered by the nubecula, in which every variety of condensation and mode of distribution is to be met with. The nebula itself (as seen in the 20 feet reflector) is of the milky or irresolvable kind—quite as free from any mottling or incipient stellar appearance as any other nebula which I can remember to have examined with that instrument. Its situation in the Nubecula is immediately adjacent to two large and rich clusters (h. 2922. and h. 2931.). Mr. Dunlop remarks that "the 30 Doradus is surrounded by a number of nebulae of considerable magnitudes, 9 or 10 in number, with the 30 Doradus in the centre," of which nebulae he gives a figured representation. For what objects these can be intended I am quite at a loss to conjecture, unless they be the brighter portions of the nebulous convolutions seen without their connecting embranchments. But with this supposition their relative situations, intensities, and magnitudes in the figure alluded to, so far as I am able to judge, appear irreconcilable.

Fig. 1, Plate I. Messier. 8 = h. 3722; R.A. $17^h 53^m 27^s$; N P D. $114^\circ 21' 16''$.

(24) This fine and complicated nebula is, as already remarked, a near neighbour of H. IV. 41, and is also closely adjacent to, and partly intermixed with, the cluster h. 3725, which follows the chief star in the nebula (9 Sagittarii) about 1^m in R A, nearly on the same parallel. It is also preceded about 4^m of time by a large and loose, but very rich cluster (h. 3717) about

a quarter of a degree to the south; so that its neighbourhood is in a high degree rich and interesting. Its brighter portion may be described as consisting of three pretty distinct streaks, or masses of nebula of a milky or irresolvable character, arched together at their northern extremities so as to form some resemblance to the arches of an italic letter *m* very obliquely written, and this is the aspect under which it strikes the eye on a cursory view. On closer attention these streaks are seen to be connected and run into each other below (or to the south) by branches and projections of fainter light, and to form three distinct basins, insulating oval spaces, one entirely, the others comparatively dark. Northwards, a great effusion of faint nebula runs out, insulating a larger and more ill-defined basin of great extent and irregular form which in some measure communicates with the best-defined and darker of the three oval spaces already spoken of. The preceding and brighter of the three streaks is very remarkably distinguished by a vivid and abrupt concentration of its light to a kind of elongated nucleus, just following a star (*n*, No. 36 of the accompanying catalogue) and so near it that on a careless view it might be regarded as having that star for its centre of condensation. But with moderate attention this is seen not to be the case. The proper nucleus is decidedly not stellar, and resembles much more that of the nebula in Andromeda than any other I can call to mind as a term of comparison. The whole area occupied by this nebula, taking in all the convolutions I have been able to trace, is about one-fifth of a square degree.

(25) In delineating this object every attention has been paid to exactness. As the stars in it are numerous and many of them conspicuous in the equatorial, the relative places of these were in the first instance ascertained by between 400 and 500 differential observations of R. A. and N. P. D. taken with that instrument on the 6th, 11th, 12th, and 15th of September 1836, and the 13th and 26th of July 1837. From these measures skeleton charts were then constructed, and being divided into convenient triangles, the nebula was worked in upon them and the smaller stars inserted within the triangles on the nights of September 4th and 5th, and October 3rd, 1837, and on one previous occasion, about the same time, but of which the date is not specially recorded. On the 6th September 1836, also, a series of angles of position among the principal stars were also taken with the 20 feet micrometer. From the whole evidence thus afforded, and by the collation of a diagram (not of much value) made in sweep 474, the figure of the nebula now presented to the public, and the subjoined catalogue of stars observed in it have been constructed. In all these figures of nebulae I have held it unadvisable to disfigure the engraving with letters or numbers pointing out the stars. It is easy for any one who may wish to go into any minute comparison of them with the actual objects to take up the places of the stars on tracing paper, and then by affixing to them their proper references by the catalogue to form a skeleton chart adapted for his purpose. I should observe that in this catalogue and figure only such portion of the cluster VI. 13, as is intermingled with the nebula is included: neither has attention been paid to the mapping down of stars out of the area occupied by it or closely adjacent.

The stars A, D, and X of the catalogue are identified respectively with A S C. 2074 (9 Sagittarii), A S C. 2078, and A S C. 2067 (7 Sagittarii).

CATALOGUE OF THE STARS TO ACCOMPANY THE MONOGRAPH OF THE NEBULA M. 8 = h. 3722

RA OF THE STAR A (= 9 SAGITTARI) 17° 53' 27.2" NPD 114° 21' 16".

No.	Letter.	Magn.	Δ RA in time from A. Sec. Dec.	Δ NPD in Parts from A. Parts.	Class.	No.	Letter.	Magn.	Δ RA in time from A. Sec. Dec.	Δ NPD in Parts from A. Parts.	Class.	No.	Letter.	Magn.	Δ RA in time from A. Sec. Dec.	Δ NPD in Parts from A. Parts.	Class.
1	X	6	-60.97	-1262	1	63		15	+ 6.4	-2040	3	125	C	16	+32.7	+1410	3
2	r	10	-58.92	-378	1	64		16	+ 7.8	+1520	3	126		8	+33.05	+404	1
3		12	-57.5	-920	1	65	R	13	+ 8.62	+1235	1	127		11	+33.09	+190	2
4	u	12	-54.15	-630	2	66	h	13	+ 9.0	+ 500	2	128	c	12	+34.0	+1700	3
5		13	-48.5	-350	3	67		15	+ 9.2	-1405	3	129		14	+34.4	+580	3
6		13	-43.2	-690	3	68		12	+ 9.4	+1500	3	130		11	+35.35	+984	1
7	η	12	-48.00	+ 302	2	69	w	14	+ 9.4	-1560	3	131		10.11	+35.44	+54	1
8		12	-45.8	-1527	3	70		15	+ 9.7	-2430	3	132	e	15	+35.6	-2590	3
9		12	-45.3	+ 597	3	71		15	+10.7	+1640	3	133		16	+36.0	-620	3
10		15	-38.0	-1480	3	72		13	+11.5	+ 290	3	134		16	+36.1	-590	3
11		12	-36.83	+ 961	2	73	k	13	+11.7	-2810	3	135		13	+36.9	-3050	3
12		12	-34.4	-2025	3	74	f	14	+13.6	+ 190	3	137	N	12	+37.72	-607	2
13		16	-32.5	-270	3	75		13	+15.25	-380	2	138	g	12	+37.8	-1920	3
14		17	-30.0	+ 820	3	76	z	12	+15.6	-525	3	139		10.11	+39.1	+285	3
15		12	-29.83	+1082	3	77	a	12	+15.9	-1890	3	140	K	10.11	+40.07	+427	1
16	q	11	-29.65	+ 68	1	78		13	+16.3	-2330	3	141		11	+40.2	+340	3
17	e	12	-29.14	+1519	3	79		15	+16.5	-1265	3	142		8	+41.0	-3050	3
18		19	-29.0	-490	1	80		14	+16.7	-500	3	143	s	11	+41.96	+135	1
19	π	11	-28.78	-1845	1	81	β	14	+17.6	+ 525	3	144	L	11	+42.0	-661	2
20		12	-28.2	-1137	3	82		13	+17.6	-380	3	146	W	14	+42.1	-3110	3
21		12	-26.3	-2000	3	83		14	+17.7	-2465	3	147		14	+42.2	-355	3
22		12	-26.2	-150	3	84		13	+18.2	-220	3	148		15	+42.4	-2105	3
23		17	-26.1	-620	3	85		16	+18.4	-980	3	149	F	9	+43.02	+1341	1
24		14	-26.0	+ 250	3	86		14	+18.7	+ 740	3	150	H	9	+43.85	-407	1
25		16	-25.7	+ 790	3	87		11	+18.83	+ 34	1	151		15	+44.7	-780	3
26		12	-25.6	-2150	3	88	Q	13	+19.5	-1290	3	152		13	+45.3	-90	3
27	m	12	-24.08	+ 326	1	89	J	12	+19.75	-979	2	153	T	12	+46.2	+390	3
28		14	-24.0	-2050	3	90	P	11	+20.14	+ 49	1	154		11	+46.31	+684	1
29	λ	13	-23.2	+1310	3	91		16	+22.0	-890	3	155		12	+46.5	-520	3
30		14	-23.1	-130	3	92		12	+22.0	-2105	3	156	S	12	+47.27	+328	1
31	ϵ	12	-23.0	+2150	3	93		12	+22.1	-1320	3	157	G'	10	+49.0	-150	3
32		15	-22.1	+2900	3	94	O	11	+22.29	+ 467	1	158	G	10	+49.16	-123	1
33		15	-21.5	+2915	3	95	γ	10	+22.53	-1751	1	159		15	+49.4	-765	3
34	l	12	-20.42	+ 851	1	96	ζ	13	+23.05	+1757	1	160		15	+50.8	+580	3
35	n	11	-19.95	+ 272	1	98	γ	12	+23.2	-1805	3	161	v	11	+51.12	-707	1
36		15	-9.1	+2640	3	99	γ	13	+23.6	-1660	3	162	μ	11	+51.8	-2040	3
37	P	12	-8.76	+1972	1	100		14	+23.6	-1245	3	163		13	+52.3	+1390	3
38		16	-8.1	-810	3	101		8	+23.61	-2040	1	164		15	+54.7	+1200	3
39	r	12	-7.39	+ 107	1	102	t	16	+23.8	+1930	3	165	V	11	+54.78	+1723	1
40	x	12	-6.2	+ 15	3	103		14	+24.3	+2510	3	166		12	+56.2	-1590	3
41		11	-5.07	-1178	3	104	q	12	+25.2	-1070	3	167		12	+56.5	-850	3
42	y	11	-5.0	+2360	3	106		15	+25.3	-1160	3	168	ρ	12	+57.6	+1010	3
43		15	-1.6	+2695	3	107	σ	13	+26.05	+2098	2	169	ϕ	11	+61.0	-891	2
44		16	-1.2	+2520	3	108		16	+26.2	+1900	3	170		15	+61.4	+1215	3
45		14	-1.1	+2750	3	109		14	+27.5	+ 855	3	171		12	+61.8	+670	3
46		13	-0.9	-150	3	110		13	+28.0	-1765	3	172	w	12	+61.9	-459	1
47		13	-0.9	-90	3	111	M	11	+28.87	-55	1	173		15	+62.4	+1217	3
48		16	0	-90	3	112	e	12	+29.0	-1921	2	174	w'	13	+62.5	-439	3
49	A	16	+ 0.1	+2525	3	113		16	+29.4	+1715	3	175		14	+63.3	+715	3
50		16	+ 1.1	-1050	3	114	E	10	+29.55	+1183	1	176		14	+65.3	-125	3
51		15	+ 1.4	+1500	3	115		12	+29.6	+ 450	3	177	U	11	+66.13	+1485	1
52		16	+ 1.5	+1100	3	116	b	11	+29.9	+ 157	2	178		12	+69.4	-750	3
53		15	+ 2.0	+ 345	3	117		15	+30.0	-1600	3	179		13	+70.8	+890	3
54		15	+ 2.1	+390	3	118		11	+31.48	-15	1	180	ψ	11	+71.3	+160	3
55		17	+ 3.7	+1250	3	119	d	11	+31.62	-135	1	181		15	+71.3	+505	3
56		14	+ 4.8	-722	3	120	v	13	+31.66	+1577	3	182		14	+77.1	+760	3
57	B	7	+ 5.0	+1010	3	121		16	+31.8	-1335	3	183		11	+77.2	-1315	3
58		13	+ 5.0	+ 460	3	122		12	+32.1	-1690	3	184	D	6	+77.75	+618	1
59	X	15	+ 6.0	-1050	3	123		12	+32.3	+ 280	3	185		13	+81.0	+265	3
60		13	+ 6.4	+1895	3	124		15	+32.4	-1400	3	186					

Fig. 2, Pl. I. h. 3435 = κ Crucis. R A, $12^{\text{h}} 43^{\text{m}} 36^{\text{s}}$, N P D $149^{\circ} 25' 31''$ = Lac. 1110 (Neb.) = Δ 301 = B 4225.

(26) Though set down by Lacaille as nebulous, and on that authority entered as a nebula in Bode's Catalogue, no nebula is perceptible in any part of the extent of this cluster, which though neither a large nor a rich one, is yet an extremely brilliant and beautiful object when viewed through an instrument of sufficient aperture to show distinctly the very different colours of its constituent stars, which give it the effect of a superb piece of fancy jewellery. The area occupied by it is about one-forty-eighth part of a square degree, within which area I have laid down, partly from micrometric measurements (as regards the large stars) and partly from intertriangulation by the eye (as respects the small ones), the stars (110 in number) of the following catalogue.

CATALOGUE OF THE STARS LAID DOWN IN THE CLUSTER h. 3435 ABOUT κ CRUCIS.

No.	Letter.	Magn.	Δ RA from α in time. Sec. Dec.	Δ NPD from α in Mic. Pts. Parts.	Class.	No.	Letter.	Magn.	Δ RA from α in time. Sec. Dec.	Δ NPD from α in Mic. Pts. Parts.	Class.	No.	Letter.	Magn.	Δ RA from α in time. Sec. Dec.	Δ NPD from α in Mic. Pts. Parts.	Class.
1	π	10	-27.5	-69.5	21	38		11	+7.6	-42.1	3	75	v^2	11	+24.4	-65.3	2
2		12	-19.1	-84.0	3	39		14	+8.6	-64.3	3	76	ϵ	10	+24.7	+28.2	1
3		14	-14.2	-59.5	3	40		14	+9.2	-64.6	3	77	ζ	9	+24.8	-56	1
4		12	-14.1	-46.8	3	41		13	+9.6	-73.4	3	78		12	+25.1	-55.8	3
5		15	-13.2	-35.1	3	42		14	+10.6	-73.5	3	79		14	+25.7	-80.0	3
6		15	-12.3	-100.2	3	43		11	+11.0	-121.1	3	80	β	7	+26.3	-71.8	1
7		12	-12.1	-69.5	3	44		14	+11.2	-116.8	3	81	θ	14	+26.5	-28.3	3
8		13	-8.6	-113.0	3	45		16	+12.2	-32.7	3	82		10	+26.7	-87.4	2
9		15	-8.5	-93.8	3	46	ω	11	+12.3	-33.4	2	83		14	+26.8	-79.7	3
10		14	-6.3	-73.0	3	47		14	+12.5	-38.4	3	84		13	+27.0	-106.0	3
11	κ	10	-6.0	-146.8	21	48	ξ	11	+13.2	-104.4	3	85		13	+27.6	-35.7	3
12		13	-4.7	-110.0	3	49		15	+13.4	-46.3	3	86		16	+27.8	+10.4	3
13		15	-4.0	-26.5	3	50		15	+13.9	-49.3	3	87		14	+27.8	-107.3	3
14		14	-4.0	-91.0	3	51		14	+14.2	-23.7	3	88		13	+27.9	+7.8	3
15		15	-3.2	-26.0	3	52	δ	8	+15.3	-43.0	1	89		12	+28.6	-94.9	3
16		13	-2.3	-62.0	3	53		13	+15.4	-8.5	3	90		14	+28.6	-41.6	3
17	μ	11	-1.5	-87.9	1	54		14	+15.9	-76.4	3	91		12	+29.0	-57.5	3
18		13	-1.1	-49.0	3	55		14	+16.0	-49.0	3	92		11	+29.4	-65.6	3
19		15	-0.2	-104.3	3	56	ϕ	10	+16.3	-37.4	1	93		11	+29.6	-45.2	3
20	α	7	0	0	1	57		13	+16.3	+5	3	94		11	+30.2	-72.6	3
21		13	+0.4	+21.1	3	58		12	+16.7	-71.7	3	95		14	+30.4	-92.6	3
22		15	+0.6	-85.4	3	59	σ	11	+16.7	-100.3	2	96		13	+32.9	-48.4	3
23		13	+0.8	-101.0	3	60		14	+17.8	-92.5	3	97		13	+33.7	-42.6	3
24		12	+2.6	+10.5	3	61		13	+17.9	-72.4	3	98		15	+34.5	-72.6	3
25		11	+2.7	-44.8	3	62		15	+18.0	-9.9	3	99		10	+34.7	-13.1	1
26		11	+2.8	-66.2	3	63	ϵ	9	+18.9	-31.3	1	100	ρ	12	+35.9	-9.5	2
27	ν	11	+3.0	-81.3	1	64	α	13	+19.0	-39.0	3	101	χ	7.8	+36.9	-106	1
28		14	+3.1	-130.0	3	65		13	+19.5	-74.0	3	102	γ	16	+37.3	-72.0	3
29		13	+3.3	-20.8	3	66		13	+20.5	-28.4	3	103		16	+38.7	-114.3	3
30		15	+3.6	-61.0	3	67		15	+21.2	-103.7	3	104		15	+40.1	-112.1	3
31		12	+3.7	+14.0	3	68		14	+21.4	-109.3	3	105		15	+42.0	-116.5	3
32		11	+3.8	-56.6	3	69		13	+21.4	-32.5	3	106		12	+43.8	-90.3	2
33		12	+3.9	-2.6	3	70		11	+21.7	-67.5	3	107	σ	12	+46.0	-58.3	3
34		14	+4.0	-79.0	3	71		15	+22.7	-36.6	3	108		14	+47.3	-64.8	3
35		15	+4.4	-120.0	3	72	η	9	+23.8	-112.1	1	109		11	+51.5	-58.5	2
36		14	+4.7	-71.2	3	73	v^1	11	+24.0	-64.4	2	110	τ	11			
37		14	+4.8	-36.6	3	74		12	+24.4	-22	3						

(27) Colour is conspicuous in the following stars of the above catalogue:—

α Greenish-white.	δ Green.	ϕ Blue-green.
β Greenish-white.	ϵ Red.	a Ruddy.
γ Greenish-white.	ζ Green.	

The stars of Class 1, have been determined by equatorial differences of R A and N P D. Those of Class 2, by angular measures or good allineations combined with an observed difference of R A and those of Class 3, on a simple reading off of the places as inserted by the eye within the triangle of a prepared skeleton. The Δ N P D of the star π (No. 1) may be 8 or 10" in error, owing to a probable mistake in reading, in one of the equatorial measures of position.

Plate III. figs. 1, 2, 3, 4, 5, 6.

(28) The six figures on this plate are all delineated on a uniform scale, the area included in each being 9' 30" in the vertical direction or that of the meridian, and 11' in that of the parallel, or about one-fiftieth of a square degree. The first of them (fig. 1,) represents Lacaille's nebula 47 Toucani of Bode's Catalogue, or No. 2322 in mine, resolved into stars as described in the observations above recorded, and as seen on a great many other occasions. The contrast between the rose-coloured light of the interior and the white of the exterior portions cannot, of course, be represented in an engraving, but of the phenomenon itself, I have no doubt. The double star on the south preceding edge of the more condensed portion has probably no connexion with the cluster.

(29) The law of condensation of this cluster is remarkable. Three distinct stages or steps of degradation are noticeable; the density at any point of the diameter being proportional to the ordinate of a curve whose form is that of the annexed figure, in which the diameter of the central elevated portion corresponds to 13.5 of right ascension. Its figure is round, and not elliptic,—(at least not *so* elliptic) as described and figured by Mr. Dunlop. I will not take upon myself to say that the extreme outlying stars which extend to 10' or 12' on all sides from the centre may not show some tendency to elongation in one direction rather than another; but as regards all its interior portion, on the very frequent occasions on which I have viewed it myself and shown it to others, I have always considered its appropriate designation to be a *globular cluster*, nor has any remark to the contrary made by those who have examined it in my presence led me to regard this character as doubtful. I am more particular than I otherwise should be in noticing this discrepancy, because all my experience has led me to conclude that the globular form is much more generally accompanied with perfect resolution into stars than the elliptical. Indeed I can hardly call to mind an instance of an elliptical nebula of any considerable size and brightness*



* The oval nebula M. 1 = h. 337, near ζ Tauri, is barely resolvable in the twenty feet reflector; and if I am correctly informed, the three feet speculum of Lord Rosse suffices for its complete resolution. The great nebula of Andromeda, however, as also the first of my Father's 5th class (h. 61), discovered by Miss

which the power of the 20 feet reflector suffices so to resolve; while examples on the other side, of *globular* clusters perfectly resolved, without any remaining suspicion of unresolved nebulousness are innumerable. Between these two characters then, (ellipticity of form and difficulty of resolution) there undoubtedly exists some physical connexion. Possibly the conditions of dynamical equilibrium in a sphere may be compatible with larger intervals and greater separate magnitudes than in an ellipsoid—a subject on which more hereafter. It deserves also to be noticed that in very elliptic nebulae which have a spherical centre, (as in M. 65 = h. 854) a “resolvable” or mottled character often distinguishes the central portion, while the branches exhibit nothing of the kind.

(30) The remaining five figures of this plate represent fields of view (or at least so much of the circular field of 15' in diameter as can be included in the rectangular area of each figure) in the Nubecula Major. They are for the most part eye-drafts assisted as to the proportions of the parts in copying for the engraver by a few measured angles. The original drafts were made with much care, not in the course of sweeping, but in observations devoted especially to that purpose, on the full scale, or very nearly so, on which they are engraved, in order to illustrate the strange and anomalous variety of structure which subsists in that system. In addition to the descriptions appended in the catalogue to the observed places of the several nebulae of which these respective groups consist, there are some other particulars which require notice, as follow.

(31) Fig. 4, Plate III.—The single observation of ζ 523, No. 50, would appear to have been somewhat hurried owing to the quick succession of objects, and the stars referred to as mixed with the group may be either the two stellar nuclei of the brighter nebulae in the upper group taken for stars, or may refer to the stars intermingled with those in the lower and the intermediate ones. The nebulous mass which this figure is principally intended to represent, consists of at least 8 nebular nuclei, four of which are much more conspicuous than the others, and in hazy weather, or with an inferior telescopic power, appear as four distinct nebulae forming a trapezium, for which reason their places as derived from the drawing by measurement on a scale have been inserted in this catalogue.

(32) Fig. 5, Plate III.—The two brighter portions of the principal nebula (the “triple nebula” of the descriptions) have somewhat of a mottled or resolvable character which is not alluded to in the sweeps—probably for want of time for the eye to grow accustomed to the object.

(33) Fig. 6, Plate III.—The “Binuclear nebula,” as it is called in the descriptions, “at the southern end of an arc-formed cluster,” consists in reality of four nuclei, (one of them very faint) feebly united by very faint nebula. The fourth is, however, almost detached. The long attention bestowed on this nebula has also led to the detection of another very faint nebula, (that which follows the double star in the lower part of the figure) h. 2810 which had been overlooked in all the sweeps, and is entered in the catalogue on the evidence of this figure.

(34) Besides these more elaborately delineated groups, three other groups in the

C. Herschel, by far the most conspicuous among elliptic nebulae, have hitherto, so far as I am aware, resisted every power which has been applied to them.

Nubecula Major, are also represented in Plate IV. Figs. 7, 9, and Plate VI. Fig. 20, from diagrams made in the course of sweeping and without the same pretensions to exactness which the foregoing possess, though tending to give a very good idea of the objects they represent, as well as further to elucidate the peculiar character of the Nubecula.

(35) Plate IV. Fig. 1, h. 2552.—This curious object belongs to the class of *Annular nebulae with centres*, a class consisting so far as we at present know of only three individuals, viz. this and the two extraordinary objects M. 51, and M. 64, represented in figures 25 and 27, of my Northern Catalogue, between which the nebula now under consideration holds a kind of middle place. Although the nebulous ellipse into which the annulus is obliquely projected is incomplete at the extremities of its longer axis, yet its general form cannot be mistaken. The central mass is much more concentrated than that of M. 51, and resembles more nearly that of M. 64, which latter, it is further to be remarked, has for its nucleus either a double star or some resolvable group putting on that appearance, while our present object is expressly stated to have a resolvable nucleus.

(36) Plate IV. Fig. 2, h. 3501 is a very problematic object, and must be regarded at present as forming a genus apart, since it evidently differs from mere "double nebulae," not only in the singular relation of its two halves to each other, (having each a well and an ill-defined side, their sharply terminated edges being turned towards each other and exactly parallel) but also by the intervention of the delicate nebulous streak intermediate between them and lying in exactly the same general direction. It may perhaps be considered that the nebulae V. 24 and I. 43, (figs. 37 and 50, of my Northern Catalogue) offer some analogy of structure to this; but if so it is a very remote one, the nebulae constituting these objects being in both instances very unequal in size and brightness, and being individually merely elongated nebulae of the ordinary type, which these are not. On the other hand we have, in the completely resolved cluster, Plate V. Fig. 5, an object which, removed to such a distance as to appear nebulous, would present a considerable approach to it in point of general aspect.

(37) Plate IV. Figs. 3 and 6, h. 3239 and 2370, are objects evidently analogous, and may be termed "falcated nebulae," the falcated form, however, being much less marked in the latter than the former, the train forming a less conspicuous appendage. Each has a double star (or a resolvable nucleus putting on that appearance) in its head or more condensed part. It should be observed that the stars in fig. 3, are put in without any attempt at individual delineation. This fine nebula occurs in a very rich part of the milky way, in that wonderfully superb region which ushers in the great nebula about η Argus.

(38) Plate IV. Fig. 4; h. 3075 is an object altogether unique. The resemblance to a "bust or silhouette profile," though really obvious, is perhaps somewhat exaggerated (as all such fancied resemblances are sure to be) though involuntarily, in the drawing. It is described by my Father, as "a broad extended nebulosity forming a parallelogram with a ray southwards." He does not make any mention of the stars in it (see his Catalogue, V. 21.).

(39) Plate IV. Fig. 5, h. 3523.—This is Bode's 185 Centauri, observed by Lacaille, and remarked by him as nebulous. The reader will not fail to compare it with V. 43,

figured in my Northern Catalogue (fig. 55), to which it bears a perfect analogy. They are the two finest specimens of their class—that of *large, faint, oval nebulae with small, bright, exceedingly condensed, oval nuclei*. And it will not escape notice, on comparison of the figures, that in both cases the nucleus appears to contain within it a still smaller round kernel. The minute scrutiny of these objects with instruments of larger aperture and high magnifying powers, would be in the highest degree interesting and instructive. The situation of 185 Centauri, is however too low for very satisfactory observation in these latitudes.

(40) Plate IV. fig. 7 = h. 2859, &c., fig. 8 = h. 2315, and Plate V. fig. 10 = h. 2359,—represent nebulae of irregular forms having a tendency to several centres of condensation; in the case of fig. 7 but little conspicuous—in that of fig. 8 (otherwise remarkable for its extravagant length and crooked shape) much more so, while in Pl. V. fig. 10, the formation of separate nuclei is decided, the intermediate faint nebula barely sufficing to mark them as forming a connected system. We may conjecture, though to us and probably to a remote posterity, it can be no more than conjecture, that such groups as Pl. IV. fig. 9 = h. 2923, &c. fig. 10 = h. 3324, &c. and fig. 11 = h. 3908, &c., may, in the progress of indefinite ages, have resulted from a process of internal segregation from nebulae which once occupied the whole of their intermediate space, but which has at length been completely absorbed from among them, and it is only by placing on record, as early and as precisely as possible, such instances as the above, that any chance, however slender, of exchanging conjecture for knowledge can be looked for. The group IV. fig. 10, is certainly a very remarkable and interesting one by reason of the variety of nebulous forms it exhibits in so small a compass; and as it occurs in a region which, though rich in clusters of distinct stars, is nearly devoid of nebulae of any of these particular forms, the probability of their systematic connexion amounts almost to certainty.

(41) Where the milky way crosses the 18th hour of right ascension, and over a great many degrees of its extent in polar distance in the region occupied by the tail of Scorpio the continuity of it is singularly broken, and many parts of its borders are so sharply defined as to present a pretty distinct outline so as to divide the field of view into a part with and another without milky way. In these spots the component stars are usually very small, so as in some cases to put on the appearance of a barely *resolvable* nebula. In figures 1, 2, 3, Plate V. characteristic specimens of these appearances are represented from rough diagrams made at the time of their occurrence.

(42) Plate V. fig. 4, 5, 6 = h. 3641, 3707, 3644, are clusters of stars in which only general character is attempted to be expressed from the sweeping diagrams. They are of no peculiar interest otherwise than as they may elucidate (as in the case of fig. 5) certain aspects of nebulae which may by possibility be supposed to originate in such clusters more abundant in stars and removed to such a distance as to appear nebulous.

(43) Plate V. fig. 7 = h. 3504 is the noble globular cluster ω Centauri, beyond all comparison the richest and largest object of the kind in the heavens. The stars are literally innumerable, and as their total light when received by the naked eye affects it hardly more than a star of the 5th or 5-4th magnitude, the minuteness of each may be imagined: it must however be recollected that as the total area over which the stars are diffused is very considerable (not less than a quarter of a square degree), the resultant impression on the sensorium is doubtless thereby much enfeebled, and that the same quantity of light concentrated on a single point of the retina would very probably exceed in effect a star of the 3rd magnitude.

On a consideration of all the sweeping descriptions, as well as from a great many occasional inspections of this superb object, I incline to attribute the appearance of two sizes of stars of which mention is made to little groups and knots of stars of the smaller size lying so nearly in the same visual line as to run together by the aberrations of the eye and telescope; and not to a real inequality.* This explanation of an appearance often noticed in the descriptions of such clusters, is corroborated in this instance by the distribution of these apparently larger stars in rings or mesh-like patterns, chiefly about the centre where the stars are most crowded. An attempt has been made to imitate this appearance in the drawing, but partly from the difficulty of its execution, partly from defect of engraving, the plate fails to convey a just idea of it. Two such rings on an oval crossed by a kind of bridge is especially conspicuous in the central part.

(44) Plate V. fig. 9 = h. 3221, fig. 11 = h. 2621. Pl. VI. fig. 19 = h. 2327.—These figures exhibit elliptic nebulae normal in their character—that is to say, in which, as the condensation increases towards the middle, the ellipticity of the strata diminishes, or in which the interior and denser portions are obviously more nearly spherical than the exterior and rarer. A great number of such nebulae, of every variety of ellipticity and central condensation are figured in my Northern Catalogue. Regarding the spherical as only a particular case of the elliptic form, and a stellar nucleus as only the extreme stage of condensation, at least nine-tenths of the whole nebulous contents of the heavens will be found to belong to this class—so that, as regards a law and a structure, the induction which refers them as a class to the operation of similar causes, and assumes the prevalence within them of similar dynamical conditions, is most full and satisfactory. To abstain altogether from speculation as to what may be the nature of those causes and conditions, and to refuse all attempts to reconcile the phenomena of so large and so definite a class of cosmical existences with mechanical laws taken in their most general acceptance, would be to err on the side of excessive caution, and unphilosophical timidity. The time is clearly arrived for attempting to form some conception at least of the *possibility* of such a system being either held in a state of permanent equilibrium, or of progressing through a series of regular and normal changes, resulting either in periodical restorations of a former state, or in some final consummation.

(45) The remarkable object h. 3145, represented in Plate V. fig. 12, is by no means referable to this normal class. It is expressly described as brightest, not in the middle of its length, but at one end. Neither is its figure elliptical, but broader at the faint than at the bright extremity, the bounding lines being nearly rectilinear. It is a very faint and delicate object, and I regret not having obtained more than one observation of it.

(46) Plate V. fig. 8 = h. 3154, and VI. 5, 6, 7, 8, 9 = h. 3248, 3675, 3610, 3594, 3228, represent *planetary nebulae*, a class of especial interest, and of which, considering their general rarity, the southern heavens have afforded a rather unexpectedly large harvest. Those only are here delineated which have either accompanying stars, or which are distinguished by some peculiarity, as Pl. VI. fig. 5 = h. 3248, which has a slight *chevelure* or nebulous haze exterior to its large oval disc; VI. fig. 9 = h. 3228, which has a star or a small disc near its

* The perfect roundness of the disc of γ *Virginis* under a magnifying power too low for its resolution, noticed both by CAPTAIN SMYTH and myself (see the details further on), affords an excellent illustration of this explanation.

centre; or V. fig. 8 = h. 3154, situated in the midst of a cluster of stars, with which it contrasts singularly, and with which, if it have no connexion, it is strange that the very same combination should be *fortuitously* repeated in the case of M. 46+H. IV. 39 (not here figured), and a near approach to it in h. 3100, h. 3101, observed in sweep 771, as in the field with a cluster of the 7th class.

(47) A most remarkable peculiarity of the planetary nebula, Pl. VI. fig. 5 = h. 3248, but which cannot be represented in an engraving, is its very decided though pale blue colour, which is noticed in three out of the four observations recorded in the sweeps. This and the beautiful planetary nebula h. 3365, in which the blue colour is much more striking and intense, are the only objects of that colour in the heavens so situated as to admit of no suspicion of contrast with a red star influencing the eye. It is true that in the latter instance a considerably bright red star is near, and *may* be brought into the same field of view,—and that its presence greatly enhances the tint of the nebula. But the star is remote enough to be easily excluded, and the nebula does not cease thereby to appear of a fine blue colour.

(48) Plate VI. fig. 10 = h. 3548, and fig. 11 = h. 2775, are nebulae, *centrally* involving double stars. Central superposition must undoubtedly be held strong presumptive evidence of physical connexion. The nucleus of M. 64 is strongly suspected to be a close double star. In fig. 30 of my Northern Catalogue is represented a very remarkable example, h. 2002, of this combination of a double star with an oval nebula—the direction of the two stars of the double star being also that of elongation of the nebula. Struve in his Dorpat Catalogue, No. 2332, has adduced a similar example. The nebula h. 2858, R A, $5^h 26^m$, N P D $156^\circ 44'$ is again another case in point, as would also h. 3122, R A, $8^h 14^m$ N P D $125^\circ 41'$, were it quite certain that one of the stars is anything more than the nucleus of an ordinary nebula which has upon it an accidental star. No such supposition applies to h. 3548, in which both the stars are sharply defined, and of the 10th magnitude, and have been repeatedly made the subjects of micrometrical measurement.

(49) Plate VI. fig. 12 = h. 3131, must be considered as adding another to the list (a very sparing one) of “nebulous stars,” as, although the coma is not perfectly round, the situation of the star is precisely at the general centre or point of greatest concentration. There can hardly be a doubt, we may presume, that objects of this class are in no way to be regarded as of an exceptional or abnormal character—but simply as cases where the general law of central condensation is pushed to its extreme, *i. e.* up to a nuclear disc of imperceptible dimensions—in other words, a star.

(50) Plate VI. fig. 13 = h. 3661, fig. 14 = h. 2487, fig. 15 = h. 3541, and V. 11 = h. 2621. —The frequent association of nebulae in pairs forming “double nebulae,” has been dwelt on in the remarks on figures 68 . . . 79, appended to my Northern Catalogue, and need not here be again insisted on. Among the specimens here figured, M. 62 (h. 3661) is interesting both from its being evidently a *double globular cluster*, and by reason of the comparative feebleness of the condensation about the southern centre and the small interval (compared with the total diameter of the object) which separates them.—h. 3541 is only remarkable as being the smallest object of this kind which has yet been observed, and this figure as well as the next (fig. 16) are rather intended as guides to the eye of any future observer who may direct a telescope on this and the very minute single nebula h. 3727,

than to express any peculiarities in the objects.—h. 2621 may be compared with h. 1397 which is represented in fig. 76, of my Northern Catalogue, and which it very strongly resembles. These combinations will not fail to suggest the conception of a globular cluster revolving round a very oblate spheroidal one in the plane of its equator, and in an orbit which, if circular, and seen obliquely, like the central nebula itself, would have a diameter somewhat more than four times that of the latter—a stupendous system doubtless, but of which the reality can hardly be considered improbable.

(51) Plate VI. figs. 17, 18 = h. 2535, R A 3^h 16^m 58^s and h. 3688, R A 17^h 22^m 43^s represent “cometic nebulae” attached to stars. Four such objects are represented in figs. 64, 65, 66, 67 of my Northern Catalogue.

(52) Plate VI. fig. 1 = h. 3514, and fig. 2 = h. 3241.—The first figure in this plate represents an object of a very singular nature—it is an oval nebula pretty well defined, though faint, and deviating widely from the normal characters of such nebulae, so as to approach in some degree to the structure of M. 27, as figured in fig. 26 of my Northern Catalogue. It is true that the disposition of the bright axis is not nearly so symmetrical, nor are its two terminal masses so conspicuous in proportion to the whole size of the object—nor indeed is the axis straight. A general similitude however exists sufficient to warrant their being provisionally classed together, and our class so extended may also take in the small but interesting nebula fig. 2 = h. 3241, where however the axis is wanting to connect the terminal masses, so that possibly this object may be nothing else than a very close double nebula, whose individuals are small and much compressed. For another analogous structure confer Dr. Lamont’s thesis of August 25, 1837. Fig. IV.

(53) Plate VI. figs. 3, 4 = h. 3680 and 3686.—These are ANNULAR NEBULAE, of which (not to speak at present of the very large faint object V. 19) we have already two examples in the northern hemisphere, M. 57 (the annular nebula between β and γ Lyræ) and IV. 13—represented in figures 29 and 48 of my Northern Catalogue. It is not impossible that the real constitution of these bodies may be that of hollow spherical or elliptical shells, of which the borders appear brighter than the interior, by reason of the greater thickness of the luminous matter, or starry stratum, traversed by the visual ray. Certain it is that the interior of M. 57 is very far from totally dark, and that so much light exists within the annuli of IV. 11 and IV. 13, that they are set down by my Father as planetary nebulae, and the latter is even described by him as “of equal light.” The delicate and beautiful annulus h. 3680, appears indeed to be devoid of any interior illumination—but the object is so faint that a nebulosity filling in the centre, and bearing no greater proportion in respect of density to the ring than in the case of M. 57, could not have been perceived. The tenuity of the ring, as well as the feebleness of central illumination, will of course in our hypothesis be proportioned to the thinness of the shell, and the law of degradation of its light will be determined by the ratio of the radii of its inner and outer surfaces, as well as by the law of density of the strata of which it consists. IV. 11 and IV. 13, would therefore seem to have the central hollow smaller in proportion than either of the other two.—V. 19 is probably not a hollow shell, but a real annulus, whose actual dimensions must be indeed enormous, being described by my Father as more than a quarter of a degree in length, which, supposing it *only* as remote as 61 Cygni, would correspond to a real diameter 1300 times exceeding that of the earth’s orbit.

Of the Great Nebula in the Scord-handle of Orion.

(54) It may easily be supposed that in a situation so favourable for viewing this magnificent object as the Cape, where it passes the meridian at an altitude of 60° , with the additional advantages of a sky of perfect purity, and of mirrors in a constant course of repolishing, I should eagerly seize the opportunity to re-examine my earlier delineation of it, with a view to the detection of change, the correction of error, and the observation of further particulars as to its form, extent, and structure which had escaped previous observation. Although considerable pains had been taken with my figure of 1825 (engraved in the 2nd vol. of the *Memoirs of the Astronomical Society*) to express the gradations of light and the general form of the nebula and its principal branches, and although in both these respects that figure, taken altogether, may, I believe, fairly claim to be considered more correct than any other of the same object which has yet appeared,* as well as more exact in many of its details; yet the first glance obtained of it under these more favourable circumstances sufficed to convince me of the necessity of executing a redelineation of it, based upon a micrometric survey and projection of the stars contained within its area, and comprehending a multitude of nebulous branches, convolutions and other details, of whose existence I had never before had the least suspicion. The figure of 1825 was executed without the aid of micrometric measurements, or

* I am aware but of four representations of this nebula which have appeared since 1824,—one by Dr. Lamont, published with his thesis "*Ueber die Nebelflecken*," read at the anniversary sitting of the Bavarian Academy of Sciences; August 25, 1837; and two by Sig. Rondoni, a Roman artist. The former, though rather a coarsely executed figure, and confined solely to the denser part of the nebula, or those regions which I have termed the *Front*, *Occiput*, and *Fauces*, yet contains some valuable particulars respecting the apparent breaking-up of the nebula (especially about the front and occiput) into patches and knots; particulars very unsatisfactorily expressed in my figure of 1824, but in which my observations of 1834 and 1837 fully confirm Dr. Lamont's remarks. In his figure he has (perhaps intentionally) omitted to express the remarkable effusion of the nebula from the "Front" and "Proboscis" into what I have termed the "Subnebulous Region," and he has filled the interior of the trapezium with nebula, a particular in which we disagree decidedly. The two figures of Sig. Rondoni, which are given in the Report of Observations made at the Collegio Romano, by the associated astronomers of the Gregorian University, for the years 1840 and 1841, are perhaps rather to be regarded as curious specimens of lithography than as accurate representations of the nebula (such, at least, as I have ever seen it), which they resemble in fact hardly more than they do one another. Nor should I have thought it necessary to do more than simply mention them, were it not that one of them has been referred to by Mr. Hunt, in his recent work entitled "*Researches on Light*," as an instance of *direct* photographic representation impressed on a lithographic stone *by the light of the nebula itself*. Were this the case, the high authority which a self-impressed picture would claim must necessarily lead to the absolute rejection both of Dr. Lamont's and my own figures, or else to the conclusion of changes both in the nebula itself, and in the situations, relative brightnesses, and nebulous appendages of the stars adjacent to it, of a very extraordinary and capricious kind. In fact, however, the inscription on the margin of Sig. Rondoni's figure simply expresses (as I understand it) that his original drawing (probably an eye-draft) was subsequently transferred to a surface of stone by a photographic process. I purposely avoid all comment on the remarks which accompany these two representations, leaving astronomers to form their own judgment on them. The other representation above alluded to is that of Sig. Devisio himself, in the year 1839, printed in the *Annals of the Collegio Romano* for 1838, which, though much less inaccurate in many respects than Sig. Rondoni's, is by no means free from objection on that score.

at best of very rude and imperfect ones, which, in an object of such extent, must of course afford much room for distortion and want of due proportion in the magnitudes of particular parts. Nor had I at that time the same command of polish and figure in the specula which subsequent practice has conferred, so that imperfections in both were tolerated, from a degree of timidity in applying the remedy, which were not considered endurable at a more advanced period.

(55) Accordingly a series of equatorial observations of differences of R A and N P D was set on foot with a view to furnishing the requisite data for the construction of working skeletons to be divided into triangles and so filled in with the nebulous details, and telescopic stars, to be ultimately transferred to a general drawing, and catalogued in order of right ascension, according to a regular and systematic mode of proceeding. These differences were obtained chiefly on the nights of December 18, 19, 1834; December 17, 19, 22, 1836; and February 18, October 21, 23, November 5, 14, 15, 16, 24, 1837. One set of observations of this nature had previously been procured in England in 1831, and 1832, and a few differences of right ascension as early as 1825, with the 20 feet reflector. From the assemblage of these differential measures consisting altogether of upwards of 300 differences of R A, and nearly as many (270) of Polar distance, the details of which it is unnecessary to give, the relative situations of those stars which are marked in the annexed Catalogue as of the first class were concluded, with as much precision as can be considered requisite for such a purpose.

(56) By the aid of the measures of December, 1834, and the English series alluded to, the first skeleton was laid down and filled in on the 4th and 29th January, 1835, and on the 27th December, 1836, and a number of curious and interesting particulars noticed and delineated, of which more in their proper place, but it was not till the end of 1837 that the accumulation of the micrometric measures had enabled me to lay down with some precision a set of skeletons, four in number, extending over the whole nebulous area intended to be included in the drawing. These were completed and filled in on the 19th, 23rd, 24th, and 30th November, and on the 1st and 2nd of December, 1837, on the former of which nights also a set of micrometrical position-angles were procured for the purpose of ascertaining the situation of two small but important stars (marked L and l in the annexed Catalogue), critically situated on the Messierian Branch (as I have taken the liberty to call it) of the nebula, and which had escaped observation in the equatorial, owing to their minuteness.

(57) The triangles of all the skeletons were examined seriatim, and all the stars visible in them even to the smallest magnitudes scrupulously laid down, at least in those regions on which the principal interest excited by the object is naturally concentrated. It must however be observed that in the denser portions of the nebula, so bright is the diffused light, that it is extremely difficult to fix attention on such minute points, and that glimpses are often caught and lost again in a manner which renders it impossible to say positively that a star has or has not been seen. No star however has been laid down in my triangles and entered in the Catalogue, but such of whose existence I am certain, from repeated and distinct views; though I can hardly doubt that some of the glimpses above referred to have been caused by stars really existing. The suspected star marked x in my old figure, in the middle of the "nebula oblongata" as there laid down, certainly does not exist. The nebula was lastly carefully worked in on each triangle, bestowing especial regard on its configuration with respect to every star in its area.

(58) The mode of "reading off the skeletons" so as to obtain from them the most probable right ascensions and polar distances of the unknown stars laid down in them, requires some explanation. The places of the "skeleton stars" (those of the first class in the Catalogue) finally adopted not being precisely those used for laying down the skeletons, but having been subsequently deduced from the observations on a general and careful revision of their whole assemblage—there will necessarily be a discordance to the extent of a few micrometer parts in polar distance, and a few tenths of a second in right ascension between each skeleton and the adopted catalogue, even for those stars which form the angles of the triangles into which it is divided: neither will the amount of this discordance be the same in every part of the same skeleton. Any star then laid down within a triangle whose angles we shall denote by A, B, C, will have its place as referred to a system of *true* meridians and parallels supposed to be drawn across the skeleton, affected by an error (and requiring a contrary correction) determined by and calculable from the errors in R A and P D of A, B, and C, similarly referred to the same system of co-ordinates. Now the stars being laid down within each triangle by the sole judgment of the eye, it is not possible to eliminate the errors of such judgment by any system of calculation—but the errors produced by small displacements of the angles may be reasonably enough supposed to depend on the proximities* of those angles to the point laid down, so that calling the proximity of that point to A, B, and C, respectively a , b , and c the formula

$$\frac{Aa + Bb + Cc}{a + b + c}$$

will express the error of its place either in R A or P D, if A, B, C, represent the errors in those of A, B, C, respectively in the same directions. The proximities in question are sufficiently well determined for the purpose without measurement (which would be intolerably laborious) by the mere judgment of the eye—and when the unknown star lies in or very near one side (as A B) of the triangle, the influence of the opposite angle (C) on the result must be proportionally diminished by assigning to it a less proximity.

(59) On this principle then each skeleton is separately read off. A system of meridians at 10^s of time apart in R A, and of parallels distant from each other by 1000 micrometer parts ($= 240'' \cdot 44 = 4' 0'' \cdot 44$) is carefully drawn, the zero line of each passing through the chief or fiducial star (θ^1 Orionis) and upon this system, by a diagonal scale, the right ascension and polar distances of every star, known and unknown, of the skeleton is read off. The places of the known stars thus read off compared with their catalogued places furnish the corrections required for each of them, and from these by the above formula those to be applied to the readings of the unknown stars are derived. The same process being repeated for all the skeletons, the readings are arranged in order of right ascension, and stars which occur in different skeletons being identified, and the means of their places taken, a catalogue results, as free from error as the nature of the observations will permit. The magnitudes assigned to each star at each observation are in like manner collected and a mean taken which is the magnitude finally adopted. The following is the result of this process for the nebula now under consideration.

* I use the term proximity in a strict sense, to express the reciprocal of the distance ($\frac{1}{D}$)—a form of expression of much convenience in many applications of algebra to geometry and physics.

CATALOGUE OF STARS OBSERVED IN THE NEBULA ABOUT θ ORIONIS.

No.	Letter.	Mag.	$x = \Delta RA$ from α . Sec. Dec.	$y = \Delta NPD$ from α . Parts.	Class.	No.	Letter.	Mag.	$x = \Delta RA$ from α . Sec. Dec.	$y = \Delta NPD$ from α . Parts.	Class.	No.	Letter.	Mag.	$x = \Delta RA$ from α . Sec. Dec.	$y = \Delta NPD$ from α . Parts.	Class.
1	Z	8	-129.2	-599	1	51		17	-6.7	+45	3	101	ζ	7	+10.1	+395	1
2	A	12	-87.9	+2411		52		15	-6.5	+1526	1	102	ϵ	12	+10.4	-209	
3	B	8.9	-81.3	+3291		53	σ	15	-6.2	+1126	1	103	ψ	13	+10.7	+971	3
4	C	9.10	-80.6	+3918		54		15	-6.0	+713	3	104	λ	9	+12.2	+728	1
5	Q	10	-65.5	-55	1	55		16	-5.7	+2003	3	105		15	+12.4	+282	3
6	(-)	10.11	-62.1	-2811		56		16	-5.6	-1658	3	106		12	+13.5	+245	3
7	(-)	10	-61.6	+3422		57		17	-4.6	+8	3	107		14	+13.5	-247	3
8		10	-61.6	+1293	3	58		13	-4.3	+3809	3	108	μ	6.7	+14.4	-1843	1
9		12	-59.5	+3395	3	59		12	-4.3	+4019	3	109		16	+14.4	-1123	3
10	π	11	-57.2	+1018	1	60		15	-2.3	+3200	3	110	η	8	+15.0	+453	1
11	(π)	10.11	-55.5	+3929	1	61		15	-2.3	+4839	3	111	E	10	+15.5	+2417	1
12	R	11	-51.5	-256	1	62		15	-1.8	-1859	3	112		12	+16.9	+1891	3
13		14	-50.5	+226	3	63	γ'	13	-0.7	+3932	3	113	b	9.10	+18.3	-2760	
14		14	-49.0	+239	3	64		13	-0.7	-35	1	114		16	+20.0	-535	3
15		15	-49.0	+1944	3	65	γ	13	-0.7	-36	1	115		16	+21.4	+3382	3
16		12	-47.6	+2376	3	66		16	-0.6	-2097	3	116		18	+23.6	-1601	3
17		14	-47.2	+163	3	67	δ	8	-0.4	-67	1	117	p	16	+24.4	+985	3
18	t	10.11	-46.4	+1050	1	68		15	-0.1	+4844	3	118		16	+24.7	-2875	3
19		14	-44.0	-70	3	69	a	5	0	0	1	119		17	+24.7	-3518	3
20		13	-43.6	+5740	4	70		12	+0.3	-396	3	120	χ	11	+25.1	-819	1
21		13	-41.7	+1335	3	71	a'	14	+0.3	+5	2	121	q	17	+25.4	+1069	2
22		10	-41.0	+1232	3	72	β	7	+0.5	+4644	3	122		16	+25.8	+3086	3
23		8	-40.6	+4990	4	73	B	10	+0.8	-28	1	123	k	12	+25.9	+1215	2
24	(ϵ)	8	-38.8	+4875	4	74		10	+0.8	+3937	1	124	a	11	+26.0	-2450	
25		13	-37.6	-3270	3	75		18	+1.5	-175	3	125		14	+27.6	+3179	3
26		13	-37.1	+809	3	76	γ'	15	+2.1	-692	3	126		13	+27.6	+1335	3
27	r	11	-36.9	+294	1	77		14	+2.2	+4612	3	127	l	15	+27.9	-3150	3
28		14	-36.8	-2639	3	78		18	+2.2	-85	3	128		15	+29.3	-1524	3
29		12	-36.6	+4310	4	79		15	+2.5	-1665	3	129		13	+29.7	-1711	3
30		16	-35.7	-198	3	80	γ''	16	+2.6	-675	3	130		16	+33.4	-1791	3
31	(ϵ)	11	-34.3	-3990	3	81		16	+2.7	+648	3	131		16	+33.5	+2871	3
32	ζ	14	-33.1	-1184	1	82	x	16	+3.2	-901	3	132	(θ)	11	+33.8	+4222	
33		11	-31.6	+416	3	83		16	+3.2	-1756	3	133	a	9.10	+34.5	+1262	1
34	M	8	-29.2	+2729	1	84		14	+3.8	-583	3	134		17	+35.6	+1327	3
35	o	10	-27.0	-1123	1	85	J	10	+3.9	-3520	1	135	A	6.7	+38.2	+3528	1
36		16	-26.3	+147	3	86	v	11	+3.9	-2688	1	136		8	+42.3	-261	1
37	K	10.11	-24.2	+2460	1	87		10	+4.3	-412	1	137		15	+42.4	-1535	3
38		13	-21.2	-61	3	88		17	+4.9	+95	3	138	(β)	11	+42.9	+4093	
39		17	-20.9	-2119	3	89	z	16	+5.6	-686	3	139	(γ)	11	+50.9	+4567	
40	N	7.8	-20.4	+1756	1	90		15	+5.9	+3033	3	140		12	+52.1	-1112	3
41		15	-19.8	+101	3	91		17	+6.5	+238	3	141		16	+52.5	-3528	3
42		15	-19.4	-2883	3	92		15	+6.8	+2798	3	142	(A)	12	+53.8	+1110	
43		15	-19.3	+2026	3	93	e	5	+6.9	+386	1	143	X	5.6	+59.7	+3796	1
44		17	-17.4	-114	3	94		16	+7.6	-3027	3	144		15	+70.0	+5780	4
45	r	11	-16.3	+483	1	95		12	+8.4	+1851	3	145	S	8.9	+71.1	+214	1
46		16	-14.8	-1959	1	96		16	+8.5	-2978	3	146		7.7	+72.3	+5630	4
47		15	-12.3	+1583	3	97		15	+8.7	-3321	3	147	T	11	+76.4	-21	1
48	h	11	-12.1	-2180	3	98		13	+8.9	-3625	3	148	V	9	+81.6	-3888	1
49		7.8	-7.60	-2760	1	99	e	11	+9.3	-3524	3	149	U	10	+82.1	+1204	4
50		14	-10.2	+516	3	100	G	14	+10.1	+548	3	150		10	+83.6	-935	1

NOTE.—The following stars in this Catalogue are identified with stars observed by others:—

34 = M is Bode's 131 Orionis, and is identical with
Messier's star No. 1 in his figure in Mem.
Acad. Sci. 1771.

40 = N is Bode's 132 Ori. = Mess. No. 2.

41 = ϵ is Bode's 134 Ori. = Mess. No. 3.

53 = ϵ is Bode's 135 Ori. = Mess. No. 4.

69 = α is θ Orionis = ASC. 679.

93 = ϵ is θ Orionis = ASC. 681.

101 = ζ is Bode's 141 = Mess. No. 6.

108 = μ is Bode's 143 = Mess. No. 7.

110 = η is Bode's 146 = Mess. No. 8.

135 = A is Bode's 153 = Mess. No. 10.

143 = X is Bode's 155 = Mess. No. 11.

Note also, the star No. 63 in the above catalogue is perhaps two stars; at least in one diagram, without a date, I find another star 14m laid down beside it on the same parallel.

(60) In constructing the figure of the Nebula, Plate VIII.—The stars have been in the first place carefully laid down in their proper places, and with as much regard to their relative magnitudes as might consist with their representation by mere round black dots—every other mode of expressing them, either by annexed numbers or by rays, &c., being objectionable, as tending to confuse the details of the nebula and draw away attention from them. Among the stars so laid down the nebula has been afterwards worked in, from all the evidence of the several skeleton projections, and of other drawings from time to time obtained, compared *inter se*, paying very particular attention to the due expression of all those cases where some well defined portion of its contour, or other remarkable point of it were found to coincide nearly or exactly with one of the stars, so as to establish authentic landmarks, or fiducial points by which at any future time a perceptible shifting of position or change of form in the nebula may be certainly detected. The area of the figure (half a square degree in extent) comprises all the nebulous convolutions and appendages which I have been able to trace, with exception of a faint extension of the terminal effusion of the greater proboscis beyond the star A southwards, which may be traced as far as the double star ϵ Orionis which it involves, and renders nebulous. It is however of little intensity, and offers nothing remarkable enough in respect of form to have made it worth while to enlarge the dimensions of the engraving sufficiently to take in the whole. Northwards, between this nebula and that about C Orionis, as already above remarked in my account of that nebula, no nebulous connexion has been traced. An attentive consideration of our figure and Catalogue will give rise to some remarks which for distinctness we shall arrange under specific heads.

(61) *Of the Trapezium.*—In the Catalogue, the four large stars $\alpha, \beta, \gamma, \delta$ as well as the fifth star γ' discovered by Struve in 1826, are laid down from the "micrometric measures" of that excellent observer, which, no doubt, exceed in accuracy any that I could have expected to procure. It is somewhat remarkable that in his elaborate discussion of the measured dimensions and position of the trapezium and this star in the "*mensuræ micrometricæ stellarum compositarum*," p. 242, no mention is made of the sixth star, (α' Trapezii) though at the date of some of the observations there recorded which come down as low as 1836, its existence could hardly have been unknown to him. This star has been seen by me on several occasions in the 20 feet reflector—viz. on December 25, 1832; November 25, and 29, 1834; January 29, 1835, and December 2, 1837, besides others of which the dates are not specially recorded. On the two last specified occasions micrometric measures were procured of its angular position from α , as compared with that of ϵ taken as a fiducial direction. These measures gave for the angle $\epsilon \alpha \alpha'$ respectively $20^\circ.2$ and $11^\circ.5$, the mean being $15^\circ.8$. If the disagreement of these should appear excessive, it will be recollected that in this case every circumstance which can add difficulty to or create uncertainty in such measurements conspires—extreme inequality, and close proximity of the stars directly compared, the disturbing near neighbourhood of three other very bright stars, unsymmetrically placed with respect to the wires and to each object—and the glare of the surrounding nebula, very different in its effect on the eye from the equable illumination of the field afforded by a lamp. This mean $15^\circ.8$, subtracted from $133^\circ.0$, the true position of ϵ from α gives $117^\circ.2$ for that of α' from the latter. Small as this star is, if the state of the atmosphere be favourable it does not require the full aperture

of 18 inches to render it visible. On the night of November 29, 1834, I find it recorded that "applying the aperture of 12 inches the sixth star α' was finely seen. It is excessively minute, and very close to α , much more so than γ' is to γ , say half the distance, and 14 mag., while $\gamma' = 12$ mag."* This estimate of distance however I consider too small, and in all probability the central distance α' may be reckoned at about $3''$. Appended to this night's observations I also find the following note.—"N.B. In the interior of the trapezium, there exists positively no nebulosity, at least none comparable in intensity to that immediately without it." It may not be irrelevant to add also that on this occasion three measures (220.5 , $215.1 :: 222.8$) were procured of the difference of positions between the lines of direction γ' and α , the mean of which 219° added (as in this case is necessary) to 133.0 the position of α , gives for the position of γ' from γ $352^\circ.5$ which agrees well with M. Struve's position of this star ($353^\circ.6$). Had only half the weight been allowed to the confessedly defective measure 215.5 ,¹ the coincidence would have been almost perfect ($353^\circ.3$). This is also the proper place to notice that the stars *within the trapezium*, marked Nos. 6, 7, 8, by Signor De Vico, as having been observed by him in February 1839, with the Cauchoix refractor of the Collegio Romano, have entirely escaped my notice. On the other hand no indication of the star α' (whose situation, fairly outside of the trapezium admits of no possibility of reconciliation with any of M. De Vico's interior stars) appears in his figure.—("Memoria intorno ad Alcune osservazioni fatte alla specola del Collegio Romano nel corrente anno 1838.")

(62) *Of other small stars near the Trapezium or otherwise remarkably situated, not noticed in my figure of 1824.*—Two exceedingly minute, but undoubted stars, Nos. 75 and 78 of our Catalogue are very remarkably placed on or very near the edge of the nebula at the bottom of the "faucets" or "great sinus." In Dr. Lamont's figure already referred to, a star which may be supposed identical with one of these (No. 75), from its allineations with other stars, is represented as deeply immersed in the nebula. The other seems to have escaped his notice, and so far as I am aware that of every other observer.

(63) I am indebted to my esteemed friend E. Cooper, Esq. late M.P. for Sligo, in Ireland, for several interesting remarks and observations at various times communicated by letter. In the year 1833, March 21, he was so good as to forward me a diagram exhibiting the situations of seven small stars interestingly situated, which had escaped my notice in 1824. Of these, six occur in the foregoing Catalogue, viz. Nos. 41, 44, 91, 100, 114, 117. The seventh, whose catalogued co-ordinates would be $-7^\circ.75$ and $+227$ Parts. Mer., according to the place assigned to it by Mr. Cooper, has escaped my notice, or at least does not occur in the skeletons, so that if seen at all it has been only by transient glimpses. The place of this star is half way, in a strait line, between β (No. 73) and τ (No. 45.)

(64) The star marked x in my figure of 1824, suspected to exist in the middle of the "nebula oblongata" was not seen by Mr. Cooper, and I am now satisfied does not exist. On the other hand I find in his diagram a star very distinctly laid down, but not marked by him

* In the diagram made on this occasion, the letters β and γ are transposed, and the stars γ , γ' are called β , β' . This misnomer is of course rectified in the text.

as a new one, though no such star occurs in my former figure in the exact place of No. 82, in the "maxilla inferior" near the double star $y' y''$. This star I find in only one of my skeletons, and though quite unequivocally marked, it has no magnitude attached, and the letter y is placed adjacent to it, instead of being affixed to the double star $y' y''$, both individuals of which are also laid down, of the same apparent size as that in question. Had it not been therefore for the insertion of this star (though under doubtful circumstances) in Mr. Cooper's diagram, I should have perhaps hesitated to admit it into my Catalogue as I have now done, transferring to it the letter x which remained otherwise unoccupied.

(65) Mr. Cooper suspects the star No. 41, to be double. No. 117 (p of the Catalogue) affords him occasion for a remark of considerable interest and importance, as it goes to prove that the relative situation of the nebula and this star underwent no change in the interval between 1833 and 1837. For he states the star in question to be situated "on the very edge of the stream of light" (meaning the "*proboscis major*") which was also precisely its situation at the later epoch. He makes however no mention of its minute companion q (No. 121).

(66) The two small stars Nos. 51 and 57, near the trapezium, and No. 81, outside of the "Front" towards its rectangular junction with the "occiput" in the faint (and hitherto unnoticed) effusion of the nebula which prolongs the "*Sinus Gentilii*" outwards, have in like manner eluded the scrutiny of all other observers so far as their observations are known to me. Of Nos. 88 and 91, Dr. Lamont has one, and Mr. Cooper the other.

(67) *Of Evidences of change in the Nebula.*—To the reader who has never viewed this object through powerful telescopes, but who is familiar with the various representations which have from time to time been made of it (including my own of 1824), the number and complexity of the various branches and convolutions now first exhibited, and the different aspect under which even the portions best known are now presented, will no doubt tend to convey a strong impression of great and rapid changes undergone by the nebula itself. I am far from participating in any such impression. Comparing only my own drawings made at epochs (1824 and 1837) differing by thirteen years, the disagreements, though confessedly great, are not more so than I am disposed to attribute to inexperience in such delineations (which are really difficult) at an early period—to the far greater care, pains, and time bestowed upon the later drawings—and above all to the advantage of local situation and the very great superiority in respect both of light and defining power in the telescope at the latter over what it possessed at the former epoch, the reasons of which I have already mentioned. These circumstances render it impossible to bring the figures into comparison except in points which could not be influenced by such causes. Now there is only one such particular on which I am at all inclined to insist as evidence of change; viz. in respect of the situation and form of the "nebula oblongata," which my figure of 1824 represents as a tolerably regular oval extended very nearly in a right line, or at most but a very little curved upwards between the two stars χ = No. 120—and κ = No. 136 of the Catalogue. Comparing this with its present appearance as exhibited in Plate VIII. it seems hardly possible to avoid the conclusion of some sensible alteration having taken place. No observer now, I think, looking ever so cursorily at this point of detail, would represent the broken, curved, and unsymmetrical nebula in question (lying, as it does, in its whole extent, clearly out of the line of junction of the two stars above mentioned), as it is represented in the earlier

of the two figures: and to suppose it *seen* as in 1837, and yet *drawn* as in 1824, would argue more negligence than I can believe myself fairly chargeable with.

(68) There is another point on which considerable stress might be laid, were I satisfied that the earlier diagrams on which it turns were done with sufficient care. In 1837, the nebulous spur towards the end of the great proboscis, which terminates at E (No. 111), certainly was neither joined to the proboscis itself, nor directed towards the star A (No. 135), but rather towards a point about one-third of the distance from A (No. 135), to C (No. 126), near to where there is a small star 16m (No. 131). Now I find two diagrams, one of December 25, 1832, the other of November 25, 1834, in which this spur is represented as running directly from A to E, and forming a complete hook, no way disjoined from the proboscis. But the chief attention on the first of these occasions was directed to the magnitudes and situations of the stars, and the hook seems to have been only roughly sketched in as a novelty to be further noticed in future, while on the last it is only very faintly indicated, in a diagram of the stars adjacent to θ Orionis on all sides, preparatory to the formation of a chart intended to take in both ι Orionis on the one side and C Orionis on the other, which was subsequently discontinued.

(69) Still less can we insist, as evidences of change, on such particulars as the curiously notched outline of the "Nebula Mairanni" about the star μ (No. 108), now for the first time represented; or on the intricately rifted and broken state of the frontal and occipital region of the principal nebula. I ought to mention here that (owing no doubt to the difficulty of properly representing on paper and by lamp-light an object of the kind, I find a good deal of disagreement in respect of the number, size, and distribution of the portions into which it may be considered as broken up, not only between my present figure and Dr. Lamont's, but between my own drawings of this part on several nights. But the most material difference between Dr. Lamont's figure and mine consists in the characteristic forms of these portions, which he represents as rounded masses more or less detached from or running into each other and into a general nebulous ground; while in all my later drawings the effect is rather that of a tolerably uniform surface marked with branching rifts or channels, like roads. There is one peculiarity in Dr. Lamont's figure which I can no way reconcile to my own impressions; viz., the strangely different form and magnitude which he assigns to the "Sinus Gentilii," from what I have always found it. This is a point which I trust he will be induced to re-examine.

(70) η Argus and the great Nebula surrounding it.

Plate IX. η Argus = h. 3295 = Δ . 309 = Lac. 963 = Brisb. 3198. R. A. $10^{\circ} 38' 38''$
N. P. D. $148^{\circ} 47'$.

There is perhaps no other sidereal object which unites more points of interest than this. Its situation is very remarkable, being in the midst of one of those rich and brilliant masses, a succession of which curiously contrasted with dark adjacent spaces (called by the old navigators coal-sacks), constitute the milky way in that portion of its course which lies between the Centaur and the main body of Argo. In all this region the stars of the milky way are well separated, and, except within the limits of the nebula, on a perfectly dark ground, and on

an average, of larger magnitudes than in most other regions. Some idea of their numbers may be formed from the following "star-gages," or numbers counted in single fields of view taken without partiality or selection in sweep 543 in the middle of the zone extending from N P D 147° to 150° , which is almost exactly in the parallel of η Argus, viz. :—

R A $9^{\circ} 33'$ —Stars in field	93	R A $10^{\circ} 30'$ —Stars	224
9 50 "	125	11 24 "	250
10 10 "	106	11 35 "	140
10 26 "	144		

The mean of these gages which extend about an hour in R A on either side of the Nebula, is 154, which being the number of stars in a circle $15'$ in diameter gives an average of 3138 to the square degree (in the denser part at $11^{\text{h}} 24^{\text{m}}$, the gage being 250, the number to the square degree would amount to 5093). From this it appears that in these two hours, during which the area of the heavens swept over consisted of $3^{\circ} \times 30^{\circ} \times \sin 148^{\circ} 30' = 47.03$ square degrees, the amazing number of 147,500 stars must have passed under review.

(71) In the midst of this vast stratum of stars occurs the bright star η Argus, an object in itself of no ordinary interest on account of the singular changes its lustre has undergone within the period of authentic astronomy. For while in Halley's Catalogue (constructed in 1677) which is the first which can be entirely depended upon, it is marked as of the 4th magnitude, yet in Lacaille's and the subsequent Catalogues of Brisbane, Johnson, Fallows, and Taylor, it is made to rank as of the second. When first observed by myself in 1834, it appeared as a very large star of the second magnitude, or a very small one of the first, and so it remained without apparent increase or change up to nearly the end of 1837, in November of which year* it was noticed of its usual brightness, or at least without exciting any suspicion of a change. Nor had any such suspicion been excited during a series of photometric comparisons set on foot in the beginning of 1836, and carried on whenever fitting opportunities occurred, with the express object of establishing a scale of southern magnitudes, and in which this star had been frequently compared with others both superior and inferior to it in brightness. In these comparisons its rank was always judged to be superior to that of β Crucis, γ Crucis, β Argus, ϵ Canis, and Pollux, and always inferior to Spica, α Crucis, Antares, and Aldebaran; equal or a little superior to Regulus, and a good match with Fomalhaut. Estimating its magnitude numerically from these data, on a scale in which each magnitude is supposed to be divided into ten degrees or decimals, assigning to Rigel the magnitude 1.0, and to β Argus 2.0, that of η would be 1.4, in the whole interval of time from February 1834 to November 1837.

(72) It was on the 16th December, 1837, that resuming the photometrical comparisons in question, in which, according to regular practice, the brightest stars in sight in whatever part of the heavens were first noticed, and arranged on a list, my astonishment was excited by the appearance of a new candidate for distinction among the very brightest stars of the first

* Leaving off a sweep one night in November, I noticed it rising above some trees in the S.E., on which occasion I remarked to my attendant, that " η Argus was getting up, and that it would soon be time to begin another year's observations on the nebula." This remark was subsequently recalled forcibly to recollection, but the precise date could not be recovered.

magnitude, in a part of the heavens with which being perfectly familiar, I was certain that no such brilliant object had before been seen. After a momentary hesitation, the natural consequence of a phenomenon so utterly unexpected, and referring to a map for its configurations with the other conspicuous stars in the neighbourhood, I became satisfied of its identity with my old acquaintance η Argus. Its light was however nearly tripled. While yet low it equalled Rigel, and when it had attained some altitude was decidedly greater. It was far superior to Achernar. Fomalhaut and α Gruis were at the time not quite so high, and α Crucis much lower, but all were fine and clear, and η Argus would not bear to be lowered to their standard. It very decidedly surpassed Procyon, which was about the same altitude, and was far superior to Aldebaran. It exceeded α Orionis, and the only star (Sirius and Canopus excepted) which could at all be compared with it was Rigel, which, as I have stated already, it somewhat surpassed.

(73) From this time its light continued to increase. On the 28th December it was far superior to Rigel, and could only be compared with α Centauri which it equalled, having the advantage of altitude, but fell somewhat short of it as the altitudes approached equality. The maximum of brightness seems to have been obtained about the 2nd January, 1838, on which night both stars being high and the sky clear and pure, it was judged to be very nearly matched indeed with α Centauri, sometimes the one, sometimes the other being judged brighter, but on the whole α was considered to have some little superiority. After this the light began to fade. Already on the 7th/13th January, α Centauri was unhesitatingly placed above, and Rigel as unhesitatingly below it. On the 20th, it was "visibly diminished—now much less than α Centauri, and not much greater than Rigel. The change is palpable." And on the 22nd, Arcturus (the nearest star in light and colour to α Centauri which the heavens afford) when only 10° high surpassed η , the latter being on the meridian; η was still however superior to β Centauri, α Crucis and Spica, and continued so, (and even superior to Rigel) during the whole of February, nor was it until the 14th April, 1838, that it had so far faded as to bear comparison with Aldebaran, though still somewhat brighter than that star.

(74) Beyond this date I am unable to speak of its further changes from personal observation. It appears however since that time to have made another and a still greater step in advance, and to have surpassed Canopus, and even to have approached Sirius in lustre, the former of which stars I estimate at double, the latter at more than the quadruple of α Centauri, so that Jupiter and Venus may possibly come to have a rival among the fixed stars in Argo, as they have on recorded occasions had in Cassiopeia, Serpentarius, and Aquila. This subsequent increase was first communicated to me in a letter from the Rev. W. S. Mackay, General Assembly's Mission, Calcutta, of which the following is an extract. "To my great surprise I observed in March last (1843), that the star η Argus R A, $10^\circ 39'$ decl. $58^\circ 51'$ S. had become a star of the first magnitude fully as bright as Canopus, and in colour and size (*sic in MS.*)* very much like Arcturus. This has been observed by several other persons to

* A distinction seems here to be taken between the *brightness* and *size* of a star, which I do not understand. Canopus has at least double the light of Arcturus. η Argus belongs to the class of ruddy or yellow stars, as do also α Centauri and Arcturus.

whom I pointed it out. Is the star known as a variable star, or is the change now first observed? α Crucis looked quite dim beside it."

(75) This further remarkable increase in March 1843, to a brightness exceeding that of Canopus, is fully established by a series of comparisons made at my request since December 29, 1842, by my excellent friend Mr. Maclear, at the Cape, from which it appears that on the last mentioned date it was equal to β Centauri, but inferior to α , and that during the first half of January, Procyon and Rigel_x were the stars with which it was most comparable. From this time until March 8, Mr. Maclear's observations were interrupted. On that day "it was particularly brilliant at midnight," and "on the 11th and 14th, it was "much brighter than α Centauri" and Rigel, "and even brighter than Canopus." On the 19th it had become however "less brilliant than on the last three nights," and (as appears by a letter from Mr. Maclear, dated on the 28th) considerably less than Rigel, and even less than α Crucis, though still much greater than α Hydræ. On the 24th it had begun to advance again, as Mr. Maclear states it to have been on that night "decidedly not so brilliant as Canopus," but still "brighter than α Centauri"—and on the 28th again, "still less brilliant." We have here an epoch of great interest, a temporary minimum, with a kind of trepidation or fluttering of light—followed however by another step in advance even yet more extraordinary—for by a subsequent letter dated September 17, 1844. Mr. Maclear referring to these observations, says, "the changes of η Argus are curious, for last April_x twelve months it seemed almost equal to Sirius,—I speak as to date without my notes. Now the star is stationary and scarcely so bright as Canopus." Lastly, on the 3rd January, 1845, Mr. Maclear writes as follows to the Astronomer Royal—"When you see Sir J. Herschel, tell him that η Argus has been for some time rather larger than Canopus, and seems again on the decline."

(76) Since my return to England, the following memorandum has been communicated to me by the late Professor Henderson, from which it would appear that in the interval between Lacaille's observations in 1751, and the period of Mr. Burchell's residence and travels in South Africa, the star had receded from its magnitude as observed by Lacaille (2m or as Bode states it 3m) to the fourth magnitude, as in Halley's time, and again increased to the first, from which however it must once more have retrograded previous to 1834. Mr. Henderson's memorandum runs as follows:—

"Mr. Burchell wrote July 17, 1827, to J. Duncan from St. Paulo, near Rio Janeiro, and said, 'I am curious to know whether any one has hitherto noticed that the star η Navis which is marked as being of the fourth magnitude (*and which was always so when I was in Africa*) is now of the first magnitude, or as large as α Crucis.'" On further inquiry relative to this curious observation, I have been favoured by Professor Johnson with the communication of the following note from Mr. Burchell himself.

"Fulham, 9th June, 1845.

"DEAR SIR.—I regret that I have so long been prevented by illness from complying with the request you made when I had the pleasure of meeting you at Dr. Kidd's. I now find on reference to my journal of Astronomical Transactions under the date of February 1, 1827, when I was at the city of St. Paulo in Brazil, that the star η Navis, marked as a star of the fourth magnitude by Lacaille, [η Halley] then appeared to be of the first and as large

as a *Crucis*: and that there was no star of this magnitude in that part of the heavens when I was in Africa (in 1811—1815): nor, as I believed when I was at Rio de Janeiro (in 1825—1826) as I think it would not have escaped my notice in the latter place. And that on the 20th February, 1828, when I was at the city of Goyaz in Brazil, I measured the angular distance between this star and β *Crucis*, which I found to be $15^{\circ} 20' 19''$, and on the 29th of the same month, its distance from β *Navis*, which was $13^{\circ} 16' 29''$, and made a memorandum that it was then certainly of the second magnitude at least.

"If these memoranda should prove of any use it will give me great pleasure, and I remain,

"Dear Sir,

"Yours very truly,

(signed) "W. M. J. BURCHELL."

"Mr. Johnson, Observatory, Oxford."

(77) A summary of the observed magnitudes will stand as follows:—

Date.	Authority.	Magnitude.	Date.	Authority.	Magnitude.
1677.	Halley.	4	1833. Jan. 2.	Herschel.	7 1, = α <i>Crucis</i> , very nearly = α <i>Centauri</i> .
1751.	Lacaille.	2			
1811-1815.	Burchell.	4			
1822.	Fallows.	2 *	1842. Mar. 19.	Maclear.	2 1, inferior to α <i>Crucis</i> .
1822-1826.	Brisbane.	2			
1827. Feb. 1.	Burchell.	1 = α <i>Crucis</i> .	1843. April.	Maclear.	7 1, nearly equal to <i>Sirius</i> .
1828. Feb. 29.	Burchell.	2..1			
1829-1833.	Johnson.	2	1843. April 11-14.	Mackay.	Fully as bright as <i>Canopus</i> .
1832..1833.	Taylor.	2			
1834..1837.	Herschel.	1..2			

(78) A strange field of speculation is opened by this phenomenon. The temporary stars heretofore recorded, have all become totally extinct. Variable stars so far as they have been carefully attended to, have exhibited periodical alternations in some degree at least regular, of splendour and comparative obscurity. But here we have a star fitfully variable to an astonishing extent, and whose fluctuations are spread over centuries, apparently in no settled period, and with no regularity of progression. What origin can we ascribe to these sudden flashes and relapses? What conclusions are we to draw as to the comfort or habitability of a system depending for its supply of light and heat on so uncertain a source? It is much to be regretted that we are without records of its changes in the intervals between the observations of Halley and Lacaille, and those of Lacaille and Burchell. Its future career will be a subject of high physical interest. To this account I will only add that in the beginning of 1838, the brightness of this star was so great as materially to interfere with

* In Fallow's catalogue the star is mis-lettered σ , but the place is that of η .

the observation of that part of the nebula surrounding it which is situated in its immediate vicinity, and, in particular, almost to obliterate that extremely curious oval or lacuna which forms so conspicuous a feature in the figure of the nebula annexed, and of which, had I not previously secured a correct representation, I should then scarcely have been able to have done so to my own satisfaction.

(79) The accurate representation of this nebula with its included stars has proved a work of very great difficulty and labour, owing to its great extent, its complicated convolutions, and the multitude of stars scattered over it. To say that I have spent several months in the delineation of the nebula, the micrometrical measurement of the co-ordinates of the skeleton stars, the filling in, mapping down, and reading off of the skeletons when prepared, the subsequent reduction and digestion into a catalogue, of the stars so determined, and the execution, final revision, and correction of the drawing and engraving, would, I am sure, be no exaggeration. Frequently, while working at the telescope on these skeletons, a sensation of despair would arise of ever being able to transfer to paper, with even tolerable correctness, their endless details. However, by breaking it up into parts, and executing each part separately, it has been accomplished, and I trust with such exactness as may afford a record capable of being appealed to in future whenever the question of internal changes of the form and situation of the nebulous branches shall be gone into.

(80) The area occupied by the figure Plate IX. of this nebula, extends in right ascension from $-3^{\text{h}} 45^{\text{m}}$ to $+3^{\text{h}} 0^{\text{m}}$ from the principal star, and in polar distance from $-24'$ to $+44'$, comprising in the whole an area of almost exactly a square degree. Of this about four-sevenths are occupied by the nebulous branchings and their included vacuities, and this portion only I have thought it requisite to triangulate and catalogue. The number of stars within this area whose places have been determined is 1203, being at the rate of 2105 to the square degree, from which it would appear either that small stars which would have been conspicuous on a dark ground have escaped notice in the glare of the nebula, or that the nebula itself is situated in a spot somewhat less crowded than the general average of the milky way in its immediate neighbourhood.

(81) In the engraving, those stars only are laid down which are entered in the Catalogue accompanying this description as of the twelfth magnitude and upwards, with exception, first, of such stars as are so situated with respect to some well defined edge or other remarkable feature of the nebula as to serve as marks by which any future change of form in the latter may be certainly recognised:—secondly, of small stars in the immediate neighbourhood of the large one (especially two very minute ones almost close to it, and which the increased light of the large star had completely obliterated before the conclusion of my observations):—thirdly, of the small stars of the clustering groups about the stars O, F, and γ of the Catalogue, and of two remarkable elliptic groups on the parallel of $+6000$ micrometer parts in the engraving:—fourthly, of the small stars immediately adjacent to, and included within, the remarkable oval vacuity which is crossed by the parallel of $+9000$ Pts., and, lastly, of a few others nearly adjacent to larger stars, with which they may be considered to form double stars. To have laid down all the stars observed would have added greatly to the probability of undetected errors in the engraving, without answering any adequate

purpose, the Catalogue being at hand, by which any future observer may satisfy himself whether any particular star he may wish to identify has been seen by me or not.

(82) It would manifestly be impossible by verbal description to give any just idea of the capricious forms and irregular gradations of light affected by the different branches and appendages of this nebula. In this respect the figure must speak for itself. Nor is it easy for language to convey a full impression of the beauty and sublimity of the spectacle it offers when viewed in a sweep, ushered in as it is by so glorious and innumerable a procession of stars, to which it forms a sort of climax, justifying expressions which, though I find them written in my journal in the excitement of the moment, would be thought extravagant if transferred to these pages. In fact, it is impossible for any one with the least spark of astronomical enthusiasm about him to pass soberly in review, with a powerful telescope and in a fine night, that portion of the southern sky which is comprised between 6^h and 13^h of R A, and from 146° to 149° of N P D, such are the variety and interest of the objects he will encounter, and such the dazzling richness of the starry ground on which they are represented to his gaze.*

(83) There are, however, certain features to which it is necessary to refer more particularly in illustration of our figure. It must be observed in the first place, that in no part of its extent does this nebula show any appearance of resolvability into stars, being in this respect analogous to the nebula of Orion. It has therefore nothing in common with the milky way, on the ground of which we see it projected, and may therefore be, and not improbably is, placed at an immeasurable distance behind that stratum.

(84) The whole extent of the nebulosity to the south is somewhat greater than can be included in the figure, but it grows so faint beyond the oval vacuity in the upper part that I have not considered it necessary to trace it beyond that limit. Nor am I quite sure that the south following portion of the area of the figure in which no nebula is represented is in reality absolutely free from it. The interior of the oval above mentioned is perfectly so. It is also nearly devoid of stars, four very minute ones (inserted in their proper places in this figure) Nos. 243, 268, 274, 278, of the Catalogue only having been perceived within it. Great attention has been paid to exactness in the situations of the minute stars Nos. 229, 235, 237, 239, and 309 (ζ) of the Catalogue, which mark out the form of this oval with respect to its borders. The two large stars π and ω on its south following side are fairly immersed in the nebula, as are also No. 225 ($= \mu$) on its south preceding, and Nos. 276 and 297 at its northern extremity.

(85) Close to the great star A, is situated that singular lemniscate-oval vacuity which forms so strange a feature of this nebula. Its area is not entirely devoid of light. A thin

* The first three hours of the zone thus marked out are remarkable for their fine double stars. Among the nebulae which occur from 9^h to 12^h , we have at $9^h 17'$, $147^\circ 36'$, the beautiful planetary nebula h. 3163, a perfect planet in appearance, with an attendant satellite; at $10^h 11'$, $147^\circ 8'$, the falcated nebula h. 3239; at $10^h 38'$, $145^\circ 47'$, η Argus with its nebula; at $10^h 58'$, $147^\circ 49'$, the superb cluster h. 3315; at $11^h 42'$, $146^\circ 14'$, the blue planetary nebula h. 3365, a most exquisite and unique object; and at $12^h 44'$, $149^\circ 26'$, the beautiful cluster of various coloured stars about κ Crucis (h. 3435), figured in Pl. I. fig. 2.

nebulous veil seems as if extended over its northern loop on the preceding side. Four stars, Nos. 686, 603, 589, and 670 ($= [w]$) of the Catalogue are placed precisely on its edges, and will serve as excellent detectors of change in its form, should any occur. The stars Nos. 607, ($= [t]$) 604 ($= [v]$), and 616, though near the edge, are yet fairly immersed in the nebula. On the other hand $[u]$ No. 634, situated in the contraction of the oval towards its middle, though also near the edge, is yet fairly within the vacancy, and so situated that the slightest shifting of the nebulous contour at its preceding side cannot fail to be rendered sensible. In like manner also the exceedingly well defined outline of the nebulous mass in which the cluster and double star O occur (between -50° and -100° in R A, and -1000 and -2000 Pts. in N P D), has its situation admirably identified by the double star v (Nos. 322, 323), which is situated very close to, but yet fairly within, its preceding edge: the edge actually passing between v and an extremely minute star of the seventeenth magnitude (No. 318), and being moreover marked out by the two stars, Nos. 333 and 342, the former of which is precisely on it; as also by the stars No. 311 and No. 299 ($= (\rho)$) the former considerably within, the latter considerably without the nebula, whose edge passes between them, a little nearer to No. 311 than to (ρ) . Similarly the star α , No. 803, and α' , No. 813, one on each side of the remarkable nebulous projection whose co-ordinates are $+25^{\circ}$ and -2500 Pts., afford means of ascertaining any relative movement in this part of it.

(86) In the catalogue of stars occurring in this nebula, hereto subjoined, the letters variously marked and accented which occur in the second column indicate (with a few exceptions of stars otherwise remarkable) those stars which have been used as the summits of triangles into which the nebulous area was divided for the formation of the working skeletons. Among these, such as exceed the 12th magnitude, and some also of that and even of inferior magnitudes have had their places determined by differences of R A and N P D taken with the equatorial. It would merely multiply superfluous figures to state the particulars of these differential measurements. Suffice it to say that upwards of a thousand such differences, viz. 544 in R A, and 474 in N P D, were taken with great care on the nights of the 25th December, 1834; February 24, 1835; April 1, 4, 16, 25, 26, 28, May 5, June 27, 28, 1836; April 27, May 8, 9, 14, 16, 17, 28, and 29, 1837—from which the places of the stars of the 1st class in the Catalogue (138 in number) were derived. On the 28th February, and the 1st and 2nd March, 1834, also a series of angles of position, 90 in number, was taken with the position micrometer of the 20-feet reflector which when projected graphically on a scale sufficiently large to afford the requisite exactness, furnished the co-ordinates of about 50 stars. About 20 of these, not being included already in class 1, or whose co-ordinate in R A only could be determined by differential observations, owing to their faintness not allowing bisection by the declination wires of the equatorial, have the class 2 annexed to them in the Catalogue. Their places are probably correct to $0^{\circ}.7$ of time in R A, and to $6''$ or $7''$ in N P D, judging from the mean errors of such stars determined in this manner as are included in class 1.

(87) Classes 3 and 4, result from the reading off and reduction of the skeleton-diagrams, the stars of class 3 being summits of triangles of the second order, formed by breaking up the larger triangles, whose extent was judged to be too great to allow of a sufficiently precise filling in by eye-draft. Those of class 4 are stars simply mapped down and read off. The former, from the use to which they were to be applied, having been laid down probably with more

deliberate care than the latter, they are classed separately. A few stars of class 3 have their right ascensions differentially observed.

(88) The filling in of the triangles, both as regards the small stars they include, and the course and graduation of the nebula within their respective areas, was performed in the only way in which such an operation is practicable, that is to say by eye-draft, unaided by any process of measurement other than mental comparison with the sides and angles of the triangles. The nature of the process, as well as that of the reading off and correction of the places of the stars so mapped down, has been already described in speaking of the nebula of Orion; but as in this case a much greater number of stars had to be determined, and in consequence the occasions of observation were much more numerous, it frequently happened that only single triangles, or perhaps two or three adjacent ones, could be executed at once, and that in several instances before the data for the construction of complete skeleton charts were accumulated. Thus several triangles came to be mapped down more than once, and when afterwards a series of skeletons of sufficient precision was executed, it was considered advisable, not indeed to reject all the former work, but to go over it *de novo* wherever it seemed likely to be defective. Thus it happened that on the final reading off and assemblage of the places of the stars for the purpose of arranging them in a Catalogue, among the stars not included in classes 1 and 2, 218 were found to have been determined by two such skeleton-readings, 55 by 3, 5 by 4, and 1 by 5. In all such cases, means were taken, unless where good reason was found for rejecting one or more of the readings as influenced by some obvious cause of error; but of this there are few instances, and in the vast majority of cases the deviations even of the extreme readings from the adopted mean were found to be of trifling importance. Taking for instance the extreme deviations in N P D in the 279 cases above enumerated, their numbers and amounts stand classed as follows.

Deviations in Micrometer Parts, of which 50 = 12".		Number of Instances.			
0	and under 10	.	.	.	60
10	" 20	.	.	.	63
20	" 30	.	.	.	54
30	" 40	.	.	.	39
40	" 50	.	.	.	22
50	" 60	.	.	.	16
60	" 70	.	.	.	10
70	" 80	.	.	.	4
80	" 100	.	.	.	3
100	and upwards	.	.	.	8

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(89) To the operation of filling in the triangles, and otherwise delineating the general aspect or minuter particulars of the nebula, the following nights were wholly or partially devoted. February 27, 28, March 1, 2, December 25, 1834; April 15, May 11, June 7, 8, 10, 14, 17, 21, July 8, 1836; April 24, 28, 29, 30, May 1, 4, 6, December 21, 22, 1837. Angles of position were also measured of small companions near the central star in sweeps 432, 433, 434, 435 on the nights of March 14, 16, 31, and April 1, 1834.

(90) The magnitudes assigned to the stars in the Catalogue are means of all which have been found ascribed to them in any recorded observation or diagram. Some, it will be observed, are noted as double. A summary of their angles of position and distances is contained in the following Table.

No. in Catal.	Letter.	Mag.	Angle of Position.	Distance measured or estim.	Δ R.A.	Δ N.P.D.	Epoch.
					Sec. Dec.	Pus. Dec.	
36 } 37 } 45 } 46 }	(g)	10,12	306°.4	5".4 skel.	-0.56	-13.33	1837.65
236 } 238 }	p	10,12	352.8	7".10 skel.	-0.11	-29.26	1837.71
322 } 323 }	S	8,15	s f	skel.	+0.3	+45	1837
354 } 361 }	(v)	13,15	179.8	3 est.	+0.00	+12.48	1837.76
370 } 381 }	Z"	11,12	226.7	15".1 skel.	-1.42	+43.21	1837.48
403 } 404 }	t	11,12	79.5	15".4 skel.	+1.96	-11.75	1837.34
395 } 426 }	O	8,10	150.3	2½ est.	+0.16	+9.46	1837.02
430 } 431 }	8...	8...	309.3	10 est.	-0.97	-26.35	1837.97
434 } 435 }	P	9,15	156.2	11.5 skel.	+0.60	+43.5	1837.34
452 } 453 }	Z'	9,11	236.4	7".8 skel.	-0.84	+17.99	1837.28
455 } 456 }	Z'	9,11	199.3	8".4 skel.	-0.36	+33.03	1837.22
468 } 490 }	K ¹	8, 8	108.0	13.4 meas.	+1.64	+17.22	1836.30
476 } 486 }	K ²	9=9	116.9	2.4 meas.	+0.28	+4.66	1836.89
571 } 575 }	C	8,12	s f	skel.	+3.2	+96	1837
597 } 601 }	(p)	10,17	s f	skel.	+1.3	+30	1837
618 } 619 }	D	8, 9	213.6	17.9 meas.	-1.28	+62.02	1836.91
723 } 728 }	..	11,11	199.4	15".8 skel.	-0.59	+54.30	1837.34
730 } 862 }	Y	8, 9	351.8	6.7 meas.	-0.12	-27.59	1837.03
867 } 918 }	A	1,12 1,13	46.8 32.1	12 est. 14 est.	+1.13 +0.96	-34.17 -49.34	1834.20 Do.
926 } 1013 }	β	8,12	41.6	13.2 skel.	+1.14	-40.91	1837.76
1018 } 1216 }	m				+1.3	-78	1836....
1216 }	a	10,13	35.8	17.8	+1.34	-60.02	1837.97
	θ	8,10	115.2	9.1 meas.	+1.06	+16.12	1836.31

A GENERAL CATALOGUE OF THE STARS

Known to exist in the area occupied by the great Nebula about η Argus, within the limits of Right

Ascension and Polar Distance comprised in the Monograph Chart.

(N.B.—Interlined words refer to the Star immediately above them.)

No.	Letter.	Magn.	Δ RA from η Argus. x	Δ NPD from η Argus. y	Class.	No.	Letter.	Magn.	Δ RA from η Argus. x	Δ NPD from η Argus. y	Class.	No.	Letter.	Magn.	Δ RA from η Argus. x	Δ NPD from η Argus. y	Class.
			Sec. Dec. Micro. Pts.	Sec. Dec. Micro. Pts.					Sec. Dec. Micro. Pts.	Sec. Dec. Micro. Pts.					Sec. Dec. Micro. Pts.	Sec. Dec. Micro. Pts.	
1	L	7	-224.5	+4394	1	62		14	-161.5	+2301	4	125		15	-138.0	+6700	4
2	N	7	-220.6	+35	1	63		14	-161.3	+7889	4	126		15	-137.5	+537	4
3	(h)	11	-209.0	+732	3	64		11	-160.3	+5112	4	127		16	-136.8	+399	4
4	e	12	-205.0	+2403	3	65		13	-159.7	+6143	4	128		16	-136.7	+3992	4
5	(b)	11	-202.8	+233	1	66		12	-158.6	+5248	4	129	(o)	10	-136.6	+3057	1
6		10	-198.7	+5974	4	67		15	-158.5	+4198	4	130		16	-136.3	+4908	4
7		12	-197.0	+5939	4	68		13	-158.5	+7055	4	131		15	-136.2	+6648	4
8		14	-194.0	+574	4	69		14	-158.3	+5032	4	132		16	-136.1	+4282	4
9	(a)	13	-191.9	+1393	3	70		16	-157.5	+8425	4	133		15	-136.0	+6566	4
10		15	-186.5	+3411	1	71		16	-157.4	+7680	4	134		16	-135.8	+4928	4
11		10	-185.1	+3300	4	72		12	-157.1	+4059	4	135		13	-135.4	+5942	4
12	(c)	10	-183.9	+320	1	73		15	-157.1	+2572	4	136	(e)	9	-135.3	+3327	1
13		16	-183.0	+3193	4	74		15	-156.7	+4668	4	137		12	-134.8	+5075	4
14		12	-182.0	+3184	4	75		13	-155.5	+6443	4	138		15	-134.5	+4898	4
15		15	-181.9	+3175	4	76		14	-155.2	+2542	4	139		15	-134.5	+4007	4
16		12	-181.5	+3164	4	77		12	-155.0	+7983	4	140		13	-134.4	+8916	4
17		12	-181.0	+3154	4	78		15	-154.9	+8479	4	141		14	-134.3	+8666	4
18		16	-180.9	+3146	4	79		16	-154.9	+5894	4	142	(f)	10	-133.8	+2842	1
19		14	-180.3	+3130	4	80		16	-153.7	+5690	4	143		15	-133.8	+7794	4
20		10	-179.6	+3120	4	81		14	-153.6	+2284	4	144		14	-133.1	+4908	4
21	r	16	-178.3	+3114	4	82		15	-153.3	+3790	4	145		16	-133.0	+9068	4
22		14	-178.2	+3105	4	83		11	-153.1	+254	3	146		16	-132.6	+8444	4
23		13	-177.7	+3091	4	84	z	15	-152.4	+8134	4	147	(o)	9	-132.2	+7759	1
24		16	-177.1	+3071	4	85		15	-152.1	+8660	4	148		14	-132.1	+1945	4
25		15	-176.1	+3054	4	86		15	-151.3	+6667	4	149		13	-132.1	+8556	4
26		15	-175.7	+3043	4	87		15	-151.2	+4853	4	150		16	-131.7	+9058	4
27		16	-175.5	+3021	4	88		16	-150.8	+5394	4	151		16	-131.5	+7769	4
28	a	9	-175.4	+6931	1	89		13	-150.2	+4853	4	152		15	-131.1	+7799	4
29		16	-175.3	+4100	4	90		13	-150.2	+3793	4	153		13	-130.6	+9068	4
30		15	-175.0	+3480	4	91		13	-150.1	+5058	4	154		14	-130.5	+9288	4
31		15	-174.1	+3342	4	92		12	-150.0	+5360	4	155		16	-130.1	+9153	4
32	(h)	12	-173.6	+3104	1	93		13	-148.6	+6553	4	156		14	-130.1	+5914	4
33	h	9	-172.6	+6831	4	94		16	-148.3	+3350	4	157		14	-129.9	+7292	4
34		13	-172.2	+6811	4	95	w	8	-148.0	+1332	1	158		17	-129.8	+1777	4
35		16	-171.3	+5301	4	96		15	-147.7	+7222	4	159		14	-129.8	+2180	4
36	(s)	9	-171.0	+3362	1	97		15	-147.6	+8010	4	160		14	-129.5	+9273	4
37		13	-170.4	+5375	1	98		11	-147.9	+5393	4	161		15	-129.0	+2813	4
38		13	-169.3	+4294	4	99	y	12	-146.4	+7717	4	162		15	-128.4	+3641	4
39		15	-168.9	+5139	4	100		15	-146.1	+8204	4	163		16	-128.4	+5248	4
40		13	-168.6	+6641	4	101		14	-145.7	+3379	4	164		13	-128.4	+6381	4
41		15	-168.3	+7949	4	102		12	-145.7	+3379	4	165	x	11	-128.4	+3498	3
42		14	-168.2	+5049	4	103		12	-145.6	+2295	4	166		14	-128.2	+8602	4
43		16	-167.8	+3527	4	104		16	-145.5	+8824	4	167		16	-127.8	+8602	4
44		14	-167.7	+5169	4	105		12	-145.5	+7449	4	168		15	-127.7	+7757	4
45		12	-167.6	+4240	4	106		12	-144.7	+5518	4	169		15	-127.1	+5713	4
46	p	10	-167.5	+4269	1	107		14	-144.5	+1217	4	170		15	-126.9	+7198	4
47		12	-167.0	+6836	4	108		16	-144.2	+5607	4	171		15	-126.8	+7138	4
48		13	-166.8	+6701	4	109		12	-144.1	+1340	4	172		16	-126.8	+8856	4
49	(n)	11	-166.6	+8425	1	110		15	-144.1	+8292	4	173		14	-126.5	+8049	4
50		13	-166.4	+3703	1	111		15	-144.0	+2973	4	174		16	-126.3	+5210	4
51		14	-166.3	+5049	4	112		16	-143.6	+2882	1	175		15	-125.9	+3751	4
52		16	-166.3	+5049	4	113		11	-142.6	+4607	4	176		13	-125.7	+6931	4
53		14	-166.3	+5261	4	114		15	-142.5	+1697	4	177		15	-125.2	+2676	4
54		16	-166.1	+3400	4	115	k	13	-142.5	+1697	4	178		13	-125.1	+8683	4
55		14	-165.8	+4800	4	116		10	-142.2	+5421	1	179		14	-124.9	+2043	4
56		13	-165.0	+5166	4	117	z	12	-142.2	+2945	3	180	e	9	-124.7	+5554	1
57		15	-164.3	+7432	4	118		12	-141.4	+2042	4	181	q	10	-124.6	+4531	1
58		11	-163.1	+4800	4	119		16	-140.5	+4275	4	182		16	-124.5	+9197	4
59		13	-163.0	+8355	4	120		12	-139.8	+2015	3	183		—	-124.5	+4955	4
60		13	-162.8	+6736	4	121	v	11	-138.3	+2704	4	184		15	-124.5	+108	4
61		14	-162.4	+6133	4	122		13	-138.6	+3082	4	185		15	-124.2	+7742	4
		16	-161.8	+7402	4	123		14	-138.4	+2771	4	186		14	-123.7	+2234	4
						124		16	-138.2	+4364	4	187		16	-123.5	+4184	4

No.	Letter.	Mag.	ΔR from η Argus. x	ΔNPD from η Argus. y	Class.	No.	Letter.	Mag.	ΔR from η Argus. x	ΔNPD from η Argus. y	Class.	No.	Letter.	Mag.	ΔR from η Argus. x	ΔNPD from η Argus. y	Class.
			Sec. Dec.	Micro. Pts.					Sec. Dec.	Micro. Pts.					Sec. Dec.	Micro. Pts.	
188		—	—123.1	—569.8	4	259		16	—101.7	—194.0	4	327		15	—79.8	+547.3	4
189		12	—122.8	—24.81	4	260		16	—101.5	+59.85	4	328		16	—79.7	+756.4	4
190	ρ	15	—122.1	+669.3	1	261		9	—101.4	+67.57	1	329		14	—79.5	+609.0	4
191		15	—121.7	+411.6	4	262		14	—101.4	—144.6	4	330		14	—78.3	—281.4	4
192		16	—121.5	+977.6	4	263		15	—101.2	+434	4	331		12	—78.2	+783.1	+
193		16	—121.5	+780.9	4	264		16	—101.0	+562.5	4	332		11	—78.0	—205.3	4
194		14	—121.2	+600.0	4	265		16	—100.9	+439.4	4	333		15	—77.8	—120.5	4
195		12	—120.6	+832.7	4	266		14	—100.8	+443.3	4	334		16	—77.7	—320.4	4
196		16	—120.6	+420.3	4	267		12	—100.6	+399.5	4	335		12	—77.6	+716.3	4
197		16	—120.5	+788.2	4	268		16	—100.5	+848.3	4	336		10	—77.2	+297.1	4
198		16	—120.5	+447.1	4	269		16	—100.2	+142.1	4	337	N	17	—76.4	+182.8	4
199		16	—120.4	+444.6	4	270		15	—99.8	+490.0	4	338		16	—76.4	+554.2	4
200	σ	9	—120.2	+512.0	1	271		15	—99.6	+505.8	4	339		15	—76.4	+514.4	4
201		16	—120.2	+435.6	4	272		14	—99.4	+406.5	4	340		17	—76.3	—11.5	4
202		14	—119.9	—38.58	4	273		13	—98.9	+779.0	4	341		14	—76.3	+702.7	4
203		16	—119.9	+976.1	4	274		16	—98.9	+844.8	4	342		16	—76.0	—116.7	4
204		16	—119.6	+357.5	4	275		13	—98.8	+148.3	4	343	n	10	—75.5	+501.6	1
205		11	—119.5	+744.0	4	276		11	—98.4	+795.4	4	344	γ	8	—75.5	+984.3	1
206		15	—118.8	+444.1	4	277		15	—98.2	+67.57	4	345		16	—74.7	+900.0	4
207		16	—118.2	+376.5	4	278		16	—96.4	+892.5	4	346		14	—74.7	—183.3	4
208		15	—117.6	+421.1	4	279		14	—96.1	+455.2	4	347		14	—74.6	+828.0	4
209		16	—117.5	+468.0	4	280		14	—95.9	+687.1	4	348		15	—74.6	+673.9	4
210		44	—117.3	+847.5	4	281		12	—95.3	+294.8	4	349		17	—74.5	—214.3	4
211		12	—117.1	+295.2	4	282	M	11	—95.1	—88.0	1	350		17	—74.5	+335.2	4
212		12	—117.1	+433.5	4	283		16	—95.1	+208.7	4	351		14	—73.9	—273.9	4
213		16	—117.0	+769.7	4	284		15	—94.8	—44.77	4	352		17	—73.8	—30	4
214	η	13	—117.0	+867.0	1	285		14	—94.6	+799.9	4	353	Z''	13	—73.7	+682.4	4
215		16	—116.6	+398.8	4	286		16	—94.6	+513.7	4	354		12	—73.4	+625.2	4
216		16	—116.3	+340.3	4	287		15	—94.1	+119.5	4	355		15	—72.9	+687.3	4
217		15	—116.3	+353	4	288		16	—94.0	+424.1	4	356		16	—72.8	+893.5	4
218		10	—116.2	+593.2	4	289		16	—93.5	+1340	4	357		16	—72.8	—211.8	4
219		13	—116.1	+609.0	4	290		16	—93.5	+1340	4	358		13	—72.2	+659	4
220		14	—116.0	+654.1	4	291		16	—93.4	+530.2	4	359		15	—72.0	+385.1	4
221		46	—115.6	+462.4	4	292		7	—93.0	+977.5	1	360	Z''	14	—72.0	—172.3	4
222		14	—115.4	+829.5	4	293	x	10	—92.4	+621.5	1	361		11	—72.0	+620.9	4
223		15	—114.0	+67.75	4	294		16	—91.7	—287.4	1	362		15	—71.9	+258.1	4
224	μ	15	—113.3	+67.75	4	295		16	—91.0	—178.8	4	363		12	—71.9	+760.1	4
225		14	—112.8	+987.6	4	296		16	—90.6	+612.0	4	364		15	—71.9	+579.6	4
226		15	—112.1	+792.7	4	297		15	—90.3	+678.1	4	365		12	—71.7	+695.7	4
227	ϵ	13	—111.3	+925.3	4	298		15	—90.3	+800.8	4	366		15	—71.5	+885.0	4
228		15	—110.8	+750.0	4	299		11	—89.8	+719	4	367		16	—71.5	—97.2	4
229		16	—110.6	+935.3	4	300	(p)	7	—89.5	+145.6	1	368		14	—71.4	+517.5	4
230		15	—110.2	+682.1	4	301	π	14	—89.4	+948.9	1	369		14	—71.2	+040.5	4
231		14	—110.0	+847.2	4	302		12	—88.7	+740.3	4	370	t	11	—71.2	+407.9	1
232		16	—109.4	+293.0	4	303		12	—88.6	+560.1	4	371		13	—70.8	+647.9	4
233	d	15	—109.4	+855.7	4	304		14	—88.1	—44.3	4	372		13	—70.7	+727.6	4
234		10	—109.1	+529.5	1	305		15	—88.0	+474.2	4	373	(a)	11	—70.6	+699.4	4
235	s	15	—108.8	+859.7	4	306		16	—87.9	+680.0	4	374		16	—70.4	+235.1	4
236		8	—108.7	+859	1	307		16	—87.6	+455.8	4	375		16	—70.2	—20.3	4
237	g	13	—108.5	+824.5	4	308		16	—86.5	+396.1	4	376		13	—70.2	—210.8	4
238		15	—108.4	+904	4	309	ζ	11	—86.1	+876.1	1	377		12	—70.0	—188.3	4
239		14	—108.1	+898.8	4	310		15	—85.9	+699.1	4	378		13	—69.9	+505.0	4
240	κ	15	—107.9	+877.6	4	311		13	—85.4	—155.3	4	379		13	—69.9	+529.7	4
241		15	—107.4	+895.3	4	312		13	—85.2	—285.4	4	380		16	—69.5	+586.1	4
242		13	—106.5	+800.0	4	313		13	—85.0	+605.8	4	381	t	12	—69.2	+406.7	4
243		16	—106.4	+848.4	4	314		16	—84.4	+928.5	4	382		11	—69.0	—201.3	4
244		16	—105.1	+544.1	4	315		15	—84.2	+1435.0	4	383		14	—69.0	—192.3	4
245		16	—104.9	—22.15	4	316		17	—83.5	+906	4	384		15	—68.7	+821.5	4
246		16	—104.5	+781.5	4	317		15	—83.2	—126.9	4	385		13	—68.5	—157.3	4
247		12	—104.4	+663.2	4	318		14	—82.6	+534.1	4	386		16	—68.5	+641.0	4
248		16	—104.4	+507.7	4	319		13	—82.3	+354.9	4	387		6	—67.9	+649.9	1
249		16	—104.3	—298.7	4	320		13	—81.0	—129.0	1	388	Z	13	—67.7	—206.3	4
250	T	10	—104.1	+545.8	1	321		13	—81.0	—129.0	1	389		14	—67.7	+511.4	4
251		16	—104.0	+597.8	4	322	(v)	13	—81.0	—129.0	1	390		14	—67.6	+748.4	4
252	ϕ	8	—103.5	+776.0	1	323		15	—80.9	+4610.0	4	391		16	—67.5	+591.2	4
253		16	—103.3	+124.1	4	324		15	—80.7	+606.5	4	392		13	—67.4	—460.7	4
254		16	—103.0	+128.9	4	325		17	—80.1	—67.0	4	393		16	—67.1	+216.9	4
255		15	—103.0	+194.5	4	326											
256		16	—102.4	—209.8	4												
257		14	—102.2	+654.7	4												
258		16	—101.9	+299	4												

No.	Letter.	Magn.	Δ RA from η Argus. x Sec. Dec.	Δ NP from η Argus. y Micro. Pts.	Class.	No.	Letter.	Magn.	Δ RA from η Argus. x Sec. Dec.	Δ NP from η Argus. y Micro. Pts.	Class.	No.	Letter.	Magn.	Δ RA from η Argus. x Sec. Dec.	Δ NP from η Argus. y Micro. Pts.	Class.
395		14	-66.5	-2049	4	459		11	-53.7	-1363	4	527		14	-37.3	-3013	4
396		14	-66.6	-1813	4			16	doubt-	ful	4	528		17	-36.8	+4187	4
397	[L]	14	-66.0	-445	2	460		16	-53.6	+3106	4	529		13	-36.1	-1755	4
398	b	8	-66.0	+9609	1	461		15	-53.4	+28	4	530		14	-35.9	+1230	4
399		14	-65.8	+6327	4	462		16	-53.4	+7459	4	531		11	-35.9	0	1
400		12	-65.8	+1679	4	463		13	-53.3	-2670	4	532		14	-35.6	-3140	4
401		16	-65.6	+7444	4	464		13	-53.3	+8689	4	533		12	-35.4	-4862	4
402		13	-65.6	-1813	4	465		15	-53.0	+7309	4	534		15	-35.1	-1124	4
403		11	-65.5	-2023	1	466		16	-52.7	+1855	4	535		10	-34.7	+7904	4
404		7	-65.5	ble	4	467		13	-52.4	+4900	4	536		15	-34.7	-137	2
405		15	-65.2	-2343	2	468		8	-51.6	+539	1	537		17	-34.4	+5695	4
406		11	-65.2	-3817	4	469		16	-51.4	+6560	4	538		15	-34.3	+1736	4
407		10	-64.2	+6130	4	470		15	-51.2	+1761	4	539		16	-34.3	+695	4
408		14	-64.1	-1973	4	471		16	-51.2	+4528	4	540		9	-34.2	+3003	4
409		14	-64.0	-1878	4	472		17	-51.0	-1860	4	541		16	-34.1	-1809	4
410		14	-63.9	-2098	4	473		17	-50.9	+2546	4	542		16	-33.9	+680	4
411		14	-63.8	+292	4	474		16	-50.7	+7598	4	543		14	-33.8	+358	4
412		14	-63.4	+7270	4	475		12	-50.5	+2906	4	544		13	-33.7	-2571	4
413		14	-63.4	+6414	4	476	(p)	10	-50.2	+3627	1	545		13	-33.6	+1042	4
414		12	-63.2	+7730	1	477		16	-50.0	-1770	4	546		15	-33.6	+1812	4
415		11	-63.1	-2148	4	478	(\pi)	9	-49.8	+5569	1	547	(\xi)	12	-33.5	-2155	1
416		14	-63.0	-1395	4	479		12	-49.8	+5476	4	548	(\eta)	13	-33.5	-577	2
417		15	-63.0	+2304	4	480		14	-49.7	+6894	4	549		17	-33.4	+5440	4
418		14	-62.6	-2285	4	481		14	-49.6	+539	4	550		15	-33.1	+6930	4
419		13	-62.6	-1905	4	482		15	-49.6	+509	4	551		16	-32.9	+3495	4
420		14	-62.5	-1990	4	483		16	-49.1	+8090	4	552		14	-32.8	+7303	4
421		15	-62.4	+6618	4	484		14	-49.0	+1705	4	553		11	-32.6	-884	1
422		13	-62.1	-1285	4	485		14	-48.9	+8352	4	554		15	-32.5	-1255	4
423		15	-62.1	+8091	4	486	(p')	17	-48.9	+3657	4	555		12	-32.3	+7318	4
424		15	-61.5	+6414	4	487		15	-48.9	+481	4	556		13	-32.2	-3706	4
425		15	-61.4	+6573	4	488		14	-48.6	+8207	4	557	(\eta)	15	-32.1	+1711	4
426	P	9	-61.2	+2854	1	489		12	-48.6	-1705	4	558		9	-31.8	+4058	1
427		15	-61.0	-150	4	490	C'	12	-48.4	+635	4	559		13	-31.6	+6172	4
428		14	-61.0	-2410	4	491		16	-48.0	+7987	4	560		13	-31.4	+160	4
429		11	-60.8	+6032	4	492		16	-47.4	+5090	4	561		15	-31.4	-4872	4
430	P	15	-60.6	+2898	4	493		13	-47.4	+5952	4	562		14	-31.3	+782	4
431	y	11	-60.6	-2834	1	494		16	-47.3	+5596	4	563		13	-31.2	+2785	4
432		13	-60.4	+5707	4	495		17	-46.9	+6528	4	564		16	-31.1	+1492	4
433	Z"	11	-60.3	+6260	4	496		16	-46.8	+6713	4	565		13	-30.9	-4545	4
434		9	-60.0	+6014	1	497	d	11	-46.2	+4743	1	566		16	-30.7	-147	2
435		9	-59.9	+6227	1	498		15	-45.7	+408	4	567		16	-30.7	+3459	4
436	Z'	16	-59.9	+2764	4	499		13	-45.7	-3914	4	568		14	-30.6	-1835	4
437		15	-59.8	+8668	4	500		13	-45.1	+5825	4	569		17	-29.9	+5674	4
438		15	-59.2	-1407	4	501	\psi	13	-45.0	+2718	4	570		17	-29.6	+4071	4
439		14	-58.5	+2334	4	502		11	-44.7	+6988	1	571	D'	8	-29.1	+860	2
440		13	-58.0	-1416	4	503		17	-44.6	+3725	4	572		16	-29.0	-4882	4
441	c	8	-57.8	+9528	1	504		16	-44.3	+3151	4	573		13	-29.0	+2964	4
442		14	-57.7	-1803	4	505		17	-43.8	+3815	4	574		16	-29.0	+6782	4
443		16	-57.5	+2844	4	506		15	-43.4	-3706	4	575	D	8	-28.8	+798	1
444		15	-57.2	-1156	4	507		16	-42.9	+6327	4	576		15	-28.5	ble	2
445		12	-57.1	+4796	4	508		15	-42.8	-2575	4	577	[s]	14	-28.5	+7177	4
446		16	-56.9	+1764	4	509		17	-42.6	+3735	4	578		16	-27.8	-3705	4
447		15	-56.9	+7439	4	510		16	-42.5	+3670	4	579		16	-27.5	-4272	4
448		14	-56.6	+8701	4	511	o	17	-42.4	+3367	3	580		16	-27.1	-4242	4
449		16	-56.5	+3170	4	512		11	-42.4	+2490	4	581		12	-27.0	+4118	4
450		15	-55.8	-865	4	513		16	-41.2	-1780	4	582		15	-26.5	+1749	4
451		15	-55.8	+7359	4	514		15	-41.0	-3049	4	583		12	-26.5	+4724	4
452	K'	8	-55.7	-1612	1	515	[o]	13	-40.3	-370	2	584	(\nu)	11	-26.4	-2001	1
453		15	-54.7	-565	4	516		13	-40.3	-3503	4	585		12	-26.2	+2198	4
454	(\eta)	10	-54.5	+4648	1	517		12	-40.1	-1920	4	586		14	-26.2	-209	4
455	K'	9	-54.3	-1591	2	518		16	-39.4	+802	4	587		16	-26.1	+7725	4
456		14	-54.1	+8211	4	519	u	11	-39.3	+3583	3	588		14	-26.1	+5911	4
457		16	-54.1	+1695	4	520		15	-38.9	+1331	4	589		15	-25.8	+415	4
458	K"	9	-54.0	-1600	1	521		16	-38.9	-1810	4	590		16	-25.8	+6811	4
						522	U	7	-38.5	+4627	1	591		17	-25.7	+5711	4
						523		14	-38.3	-1469	4	592		16	-25.5	-1810	4
						524	t	13	-38.3	-2585	3	593	\rho	8	-25.2	+6091	1
						525		16	-37.9	+806	4	594	(\tau)	13	-25.2	+1613	4
						526		13	-37.4	-3126	4	595		10	-25.0	+3331	1
												596		17	-24.3	+3634	4

No.	Letter.	Mag.	$\Delta R A$ from η Argus. x Sec. Dec.	$\Delta N P D$ from η Argus. y Micro. Pts.	Class.	No.	Letter.	Mag.	$\Delta R A$ from η Argus. x Sec. Dec.	$\Delta N P D$ from η Argus. y Micro. Pts.	Class.	No.	Letter.	Mag.	$\Delta R A$ from η Argus. x Sec. Dec.	$\Delta N P D$ from η Argus. y Micro. Pts.	Class.
597		11	-24.1 dou-	+5044 ble	4	661	(u)	11	-10.8	-1884	1	733		13	+1.9	+3372	4
598		15	-24.0	+675	4	664	[v]	12	-10.7	+106	2	734		12	+2.0	+2559	4
599		11	-24.0	+1835	4	665		12	-10.6	+8847	4	735		15	+2.2	+771	4
600		12	-23.5	+4548	4	666		17	-10.2	-555	4	736	(a)	9	+2.4	-233	1
601		11	-23.5 dou-	+4990 ble	4	667		14	-9.8	+1779	4	737		14	+2.6	+330	4
602		12	-23.5	+4832	4	668		12	-9.6	+2766	4	738		13	+2.7	+825	4
603		16	-23.3	+700	4	669		15	-9.4	-3886	4	739	E	11	+2.7	+1056	1
604		15	-23.1	-1920	4	670	[w]	13	-9.3	-830	2	740	[y]	13	+2.8	+207	2
605		15	-23.0	-1820	4	671		15	-9.3	-3040	4	741	(7)	11	+2.9	+507	1
606		14	-23.0	+6168	4	672		11	-9.2	+8548	4	742	(3)	13	+3.6	-3780	4
607	[x]	12	-22.6	+130	2	673		11	-9.2	+3741	4	743		11	+5.2	-57	1
608		13	-22.5	+3168	4	674		15	-8.7	-3706	4	744		12	+5.6	+1571	4
609		13	-22.4	-2015	4	675		15	-8.5	-4152	4	745		15	+5.7	+3980	4
610		12	-22.2	+7950	4	676		15	-8.3	-3185	3	746		15	+5.9	+3031	4
611		12	-22.1	-4542	4	677	κ	12	-8.2	-2510	4	747		14	+6.2	+4451	4
612		12	-21.9	-4730	4	678		12	-8.1	+1075	4	748		16	+6.2	-180	4
613	(r)	12	-21.9	+4617	1	679		16	-8.0	+8593	4	749		12	+6.3	-2852	4
614		16	-21.7	-4654	4	680		15	-7.9	+1313	4	750		15	+6.6	+963	4
615		11	-21.3	-4393	4	681		14	-7.9	+7343	4	751		15	+6.9	+3663	4
616		14	-21.3	-180	4	682		12	-7.5	-3531	4	752		15	+7.0	+300	4
617		17	-21.0	+2119	4	683	(\lambda)	12	-7.5	-1973	1	753		14	+7.4	+440	4
618	y	9	-20.9	-4910	2	684	\Gamma	12	-7.5	+9222	3	754		14	+7.7	+4802	4
619		8	-20.8	-4882	1	685		14	-7.2	+355	4	755		13	+8.1	+90	4
620		15	-20.8	-5067	4	686		14	-7.0	+2490	4	756		14	+8.8	-3819	4
621	(m)	10	-20.8	+5596	1	687		13	-6.9	+2803	4	757	(9)	10	+9.0	+985	1
622	I	9	-20.7	+1460	1	688		16	-6.8	+1060	4	758		12	+9.1	-2860	4
623		16	-20.2	+6670	4	689		13	-6.7	-1506	4	759		15	+9.5	-226	4
624		15	-20.1	+330	3	690		15	-6.4	-2242	4	760	(\eta)	10	+9.5	+907	1
625		13	-19.6	-4857	4	691		13	-5.6	+2952	4	761	(Z)	10	+9.7	+811	1
626		15	-19.5	-1922	4	692	R	9	-5.3	+3744	1	762		14	+9.8	+2050	4
627		14	-19.3	+660	3	693		16	-4.9	+2831	4	763		14	+10.1	+607	4
628		16	-19.3	+8869	4	694		13	-4.5	-1065	4	764		14	+10.1	+4433	4
629		11	-18.8	+5197	4	695	\phi	11	-4.5	+6682	4	765		16	+10.5	+1052	4
630	F	8	-18.7	-1776	1	696		14	-4.4	-4561	4	766		15	+10.5	-3699	4
631		15	-18.2	+6123	4	697		13	-4.2	+3321	4	767		14	+10.6	+3251	4
632		14	-18.1	+3237	4	698		14	-4.0	+2237	4	768	(W)	14	+10.6	+300	4
633		16	-17.9	-1337	4	699		14	-4.0	-1580	4	769		11	+10.8	+4224	1
634	[u]	15	-17.7	-85	2	700		15	-3.2	-4215	4	770		14	+11.0	+1238	4
635		15	-17.5	-2075	4	701		16	-3.0	-3144	4	771		14	+11.2	-4029	4
636		16	-17.5	+1302	4	702		15	-3.0	+9002	4	772		14	+11.2	+3246	4
637	a	8	-17.3	-4042	1	703		14	-2.8	+555	4	773		14	+11.9	+570	4
638		15	-16.8	+2808	4	704		15	-2.8	-3184	4	774		14	+11.9	+2913	4
639		16	-16.7	+2955	4	705		14	-2.6	+670	4	775		13	+12.1	+1798	4
640	(k)	10	-16.7	+2403	1	706		12	-2.3	+1996	4	776		15	+12.6	-290	4
641		14	-16.3	+8191	1	707		13	-2.2	+200	4	777	(t)	11	+12.7	+4948	4
642		14	-15.8	+6787	4	708		14	-2.1	+8748	4	778		10	+13.0	+623	1
643		13	-15.7	-4716	4	709		16	-1.9	-3104	4	779		15	+13.0	+3873	4
644	(2)	10	-15.5	+705	1	710		13	-1.9	+9154	4	780		15	+13.1	+3202	4
645		14	-15.3	+3329	4	711		15	-1.8	-4510	4	781	k	9	+13.4	-4277	3
646		14	-15.1	-1995	4	712		11	-1.6	+5005	4	782		14	+13.6	+1965	4
647		15	-15.0	-3035	4	713	[c]	14	-1.4	+4002	4	783	X	14	+14.0	+3404	1
648		16	-14.8	-4512	4	714		15	-1.2	+2122	4	784		14	+14.6	+290	4
649		15	-14.7	+8211	4	715		14	-1.1	-2943	4	785	r	10	+15.2	+7499	1
650		17	-14.6	-1043	4	716		14	-1.1	-2943	4	786		13	+15.3	+1867	4
651		12	-14.3	+3622	4	717	[x]	14	-0.6	-190	2	787		15	+15.4	+4353	4
652		10	-14.2	+4254	1	718		16	-0.4	-4550	4	788		14	+15.8	-2767	4
653	(s)	16	-14.1	-4607	4	719		13	-0.3	+8808	4	789		17	+16.5	+986	4
654		15	-13.7	+4442	4	720		16	-0.1	-2001	4	790		15	+16.6	+1855	4
655		16	-13.1	-1591	4	721	A	15	-0.1	-1839	4	791	r	14	+16.7	+838	2
656		15	-13.0	-3090	4	722		13	-0.1	+1852	4	792		17	+16.8	+892	4
657		11	-12.5	-3394	4	723		12	0	0	1	793	G	11	+16.9	+433	1
658		16	-12.5	+815	4	724		15	+0.1	-2380	4	794		15	+16.9	+3835	4
659		17	-12.5	+1470	4	725		15	+0.2	+7716	4	795	t	14	+17.5	-2100	2
660		14	-12.2	+425	4	726		15	+0.6	-1886	4	796		15	+17.5	-210	4
661		15	-12.2	-4558	4	727		17	+0.6	-601	4	797		14	+17.6	+5592	4
662		—	-11.8	+3354	4	728		13	+1.0	-49	2	798		15	+17.9	-3615	4
						729		15	+1.0	+2207	4	799		15	+18.0	-215	4
						730		12	+1.1	-34	2	800		17	+18.0	+1043	4
						731		14	+1.2	+8853	4	801		14	+18.4	-1814	4
						732		13	+1.3	+2971	4	802		11	+19.0	+2400	1
												803	o	11	+19.0	+2400	1

No.	Letter.	Mag.	$\Delta R A$ from η Argus. x Sec. Dec.	$\Delta N P D$ from η Argus. y Micro. Pts.	Class.	No.	Letter.	Mag.	$\Delta R A$ from η Argus. x Sec. Dec.	$\Delta N P D$ from η Argus. y Micro. Pts.	Class.	No.	Letter.	Mag.	$\Delta R A$ from η Argus. x Sec. Dec.	$\Delta N P D$ from η Argus. y Micro. Pts.	Class.
804		15	+19.2	+340	4	874		14	+50.1	-1355	4	940		13	+63.9	-3115	4
805		17	+19.2	+4366	4	875		14	+50.2	-1257	4	941		14	+63.9	+6094	4
806		17	+19.5	+946	4	876		14	+50.3	-1394	4	942		13	+64.1	-655	4
807		13	+21.4	+3065	4	877		12	+50.4	+6092	4	943		14	+64.1	+2838	4
808		14	+21.4	+5312	4	878		12	+50.5	+4778	4	944		16	+64.2	+3841	4
809		13	+21.7	-3140	4	879		11	+50.7	+5962	4	945		15	+64.5	-3630	4
810		17	+23.1	-718	4	880		15	+51.0	+4708	4	946		16	+64.9	-65	4
811		16	+23.8	+122	4	881		15	+51.5	-4622	4	947		15	+65.2	+1775	4
812		14	+23.8	-3681	4	882		16	+51.6	+1333	4	948		14	+65.2	+4888	4
813		13	+24.0	+2665	4	883		14	+52.0	+1901	4	949		15	+65.5	+3867	4
814		14	+24.3	+5379	4	884		15	+52.1	-4143	4	950		13	+65.7	+1418	4
815		13	+24.8	+5364	4	885		12	+52.6	+3982	4	951		11	+65.9	-4601	4
816		16	+25.5	+3951	4	886		15	+52.6	-1402	4	952		14	+66.3	-3130	4
817		16	+25.5	-55	4	887		15	+52.9	+1333	4	953		8	+66.7	-5486	4
818		15	+27.4	+1936	4	888		12	+53.1	-4153	4	954		15	+67.6	+4778	4
819		16	+27.6	+401	4	889		14	+53.6	-4153	4	955		12	+67.7	+1274	4
820		15	+27.8	+3701	4	890		14	+54.1	+5372	4	956		16	+67.9	-132	4
821		16	+28.8	-60	4	891		15	+54.6	-1162	4	957		13	+67.9	+4922	4
822		15	+29.5	+4584	4	892		12	+54.7	+6163	4	958		14	+68.0	+1470	4
823		13	+29.7	+1520	2	893		15	+54.8	-1530	4	959		11	+68.4	-4513	4
824		12	+29.9	+6119	4				doubt.	ful		960		12	+68.8	+5891	4
825		10	+30.7	+4077	1	894		13	+55.0	+3917	4	961		16	+69.2	-3370	4
826		15	+31.0	+687	4	895		14	+55.1	+5897	4	962		12	+69.8	-1229	4
827		14	+31.8	-1005	4	896		16	+55.2	-5534	4	963		15	+70.3	+4836	4
828		14	+32.0	-908	4	897		13	+55.2	+1239	4	964		10	+70.3	+4660	4
829		16	+32.6	-1851	4	898		13	+56.3	+4022	4	965		13	+71.1	+5991	4
830		14	+32.6	+350	4	899		15	+56.6	-3198	4	966		11	+71.5	-2175	4
831		14	+32.7	+1745	4	900		13	+56.6	+3372	4	967		12	+72.6	-487	4
832		13	+32.7	+4690	4	901		15	+56.7	+4075	4	968		15	+72.7	+1760	4
833		15	+32.8	+4187	4	902		12	+56.8	-4210	4	969		12	+73.0	+5298	4
834		13	+32.9	+5904	4	903		14	+56.9	+1326	4	970		11	+73.3	-1977	4
835		11	+33.3	+6249	4	904		16	+56.9	-1438	4	971		15	+73.3	-3674	4
836		15	+33.7	+4259	4				doubt.	ful		972		15	+73.8	-4465	4
837		9	+33.9	-4440	1	905		16	+56.9	-160	4	973		12	+74.6	-371	3
838		11	+33.9	+5909	4	906		14	+57.0	+5452	4	974		10	+75.9	+6053	1
839		15	+34.6	+949	4	907		15	+57.5	+4245	4	975		17	+76.0	-1869	4
840		14	+34.9	-6254	4	908		13	+57.8	-4830	4	976		14	+76.4	-3730	4
841		11	+37.0	-799	4	909		16	+57.8	-4930	4	977		16	+76.5	+6089	4
842		14	+37.2	+1305	4	910		12	+57.9	-3860	4	978		12	+76.9	+4155	4
843		15	+37.3	-294	4	911		16	+58.0	-3317	4	979		15	+77.3	+3380	4
844		7	+37.8	-4143	1	912	J	13	+58.0	+335	2	980		14	+77.7	+5173	4
845		16	+37.9	+2634	4	913		14	+58.7	+2270	4	981		14	+78.0	+2813	4
846		17	+38.6	-2055	4	914		14	+58.7	-2234	4	982		10	+78.3	+3041	1
847		16	+38.9	-1952	4	915		12	+58.8	+5244	4	983	v	9	+78.4	-3590	1
848		13	+39.1	+1605	4	916		13	+59.2	+1564	4	984		14	+78.7	+3113	4
849		14	+39.2	+2383	4	917		13	+59.3	+6174	4	985	e	9	+78.9	+5014	1
850		14	+39.6	-2645	4	918	m	12	+59.5	-1799	1	986		14	+79.1	+4238	4
851		15	+39.8	-3689	4				doubt.	ble		987		15	+79.9	+5500	4
852		12	+41.2	+3303	3	919		17	+59.9	-1408	4	988		13	+80.2	+79	4
853		12	+41.3	+5799	1				doubt.	ful		989		17	+80.8	-2134	4
854		12	+42.2	+2353	4	920		12	+59.9	+2008	4	990		15	+81.9	+4974	4
855		17	+42.2	-5794	4	921		14	+60.2	+3722	4	991		17	+82.7	-3545	4
856		14	+42.4	+5794	4	922		16	+60.3	-4880	4	992		15	+82.9	+5370	4
857		15	+42.6	+4382	4	923		16	+60.3	+36	4	993		14	+83.5	+726	4
858		11	+43.3	-6209	4	924		14	+60.4	+5994	4	994	e'	10	+83.8	+2020	4
859		13	+43.7	-3997	4	925		13	+60.5	-586	4	995		16	+83.9	-3068	4
860		14	+43.8	+3401	4	926	m'	12	+60.8	-1877	4	996		16	+84.1	+6024	4
861		13	+43.8	-2078	4				doubt.	ble		997		14	+84.6	+3331	4
862		8	+44.6	-2937	1	927		13	+60.8	+1229	4	998		13	+84.6	+833	4
			doubt.	ble		928		17	+61.0	+5996	4	999		15	+84.8	-3381	4
863		11	+44.7	+5909	4	929	h	10	+61.5	+2399	1	1000		16	+85.0	-1047	4
864		14	+45.1	+5889	4	930		14	+61.5	+4104	4	1001		13	+85.3	+6014	4
865		14	+45.5	-1114	4	931		13	+61.7	+4409	4	1002		15	+86.6	+3623	4
866		15	+45.6	+4512	4	932		15	+61.8	-4278	4	1003		13	+86.9	+412	1
867		12	+45.7	-3978	4	933	(z)	12	+62.0	+3870	1	1004		10	+88.0	+2156	1
868		14	+46.1	-1229	4	934	(t)	10	+62.1	+1494	1	1005	g	16	+88.4	+32	4
869		13	+46.8	+4672	4	935		11	+62.2	+5297	4	1006		15	+88.4	+3017	4
870		15	+47.2	+4551	4	936		16	+62.2	-4518	4	1007		14	+88.8	+4472	4
871		8	+47.7	+1921	4	937		16	+61.2	+3946	4	1008		10	+89.0	+5745	1
872	(x)	12	+49.4	+7585	1	938		15	+61.5	-2234	4	1009		12	+89.0	+686	3
873		14	+50.1	+1718	4	939		15	+61.9	-3930	4	1010		13	+89.9	+5514	4

No.	Letter.	Mag.	Δ RA from η Argus. x Sec. Dec.	Δ NPD from η Argus. y Micro. Pts.	Class.	No.	Letter.	Mag.	Δ RA from η Argus. x Sec. Dec.	Δ NPD from η Argus. y Micro. Pts.	Class.	No.	Letter.	Mag.	Δ RA from η Argus. x Sec. Dec.	Δ NPD from η Argus. y Micro. Pts.	Class.
1011	b	12	+90.0	-2509	4	1079	[e]	13	+117.4	+496	4	1148	(l)	15	+142.9	-1313	4
1012		9	+90.2	-1040	1	1080		16	+117.5	+5766	4	1149		15	+143.2	+5030	4
1013		9	+90.5	-190	1	1081		14	+118.3	+2644	4	1150		11	+143.4	+560	4
1014	a	14	+90.5	-599	4	1082	[g]	11	+118.4	+4353	3	1151	(y)	17	+143.5	+2788	4
1015		14	+90.6	+2614	4	1083		12	+118.4	-2665	4	1152		13	+143.5	+897	4
1016		14	+91.3	+4256	4	1084		15	+118.8	+4987	3	1153		16	+144.2	+5255	4
1017	a	14	+91.8	+445	4	1085	V	12	+119.1	-2190	4	1154	(v)	13	+144.4	+4897	4
1018		13	+91.8	-2250	4	1086		13	+120.5	-1830	4	1155		15	+144.7	+3789	4
1019		15	+91.9	+2664	4	1087		12	+121.5	-2114	4	1156		12	+145.2	+1596	1
1020	[d]	14	+92.1	-1560	4	1088	r	16	+122.4	+187	4	1157	(k)	11	+145.6	+1768	4
1021		15	+92.2	+3470	4	1089		14	+122.5	+3913	4	1158		12	+146.6	+2462	4
1022		16	+93.1	-908	4	1090		15	+122.5	-789	4	1159		13	+147.2	+2462	4
1023	[d]	16	+93.4	+1947	4	1091	t	9	+123.5	-1551	1	1160	(v)	16	+147.3	+2682	4
1024		15	+94.3	+2458	4	1092		15	+124.2	+5887	4	1161		15	+147.5	+2938	4
1025		16	+95.0	+1897	4	1093		16	+124.4	+232	4	1162		11	+148.3	+5848	3
1026	[d]	12	+95.3	+2496	4	1094	t	16	+125.3	-1346	4	1163	(k)	14	+148.3	-590	4
1027		15	+96.6	+2559	4	1095		14	+125.3	+1610	4	1164		14	+149.0	-627	4
1028		15	+96.7	+983	4	1096		13	+126.2	+1381	4	1165		16	+149.1	-3160	4
1029	[d]	13	+97.0	-287	3	1097	t	16	+126.3	-1086	4	1166	(k)	12	+150.0	-1731	4
1030		15	+97.2	+5683	4	1098		13	+126.5	-705	4	1167		13	+150.1	-445	4
1031		15	+97.2	-1754	4	1099		15	+126.6	+5998	4	1168	(k)	12	+150.3	+4619	4
1032	[d]	13	+97.7	+5983	4	1100	t	16	+127.2	+1343	4	1169		14	+151.2	+4780	4
1033		16	+98.0	-921	4	1101		15	+127.4	-3181	4	1170		13	+152.6	-2987	4
1034		11	+98.3	-2753	4	1102		9	+127.8	+6133	1	1171	(k)	11	+153.2	+4780	4
1035	[d]	12	+98.9	+5988	4	1103	t	15	+128.0	+3898	4	1172		16	+153.3	+5242	4
1036		15	+99.4	+2057	4	1104		16	+128.1	+809	4	1173		14	+153.3	-370	4
1037		13	+99.8	-857	4	1105	t	15	+128.5	+5787	4	1174	(k)	15	+153.6	+1970	4
1038	[d]	16	+99.9	-418	4	1106		14	+128.5	+2989	4	1175		15	+154.3	-238	4
1039		15	+100.2	+5626	4	1107		11	+129.0	+517	4	1176	(k)	8	+155.9	-1726	1
1040	[d]	15	+100.3	-1000	4	1108	t	15	+129.0	-3421	4	1177		13	+157.4	-4628	4
1041		11	+102.1	-3256	4	1109		14	+129.4	-3038	4	1178		16	+157.5	-1132	4
1042		14	+102.1	+2866	4	1110	t	16	+129.8	-2570	4	1179	(k)	11	+157.8	-1733	4
1043	[d]	15	+102.5	+999	4	1111		11	+130.0	+6173	4	1180		11	+158.1	-1788	4
1044		10	+102.7	-1123	4	1112		16	+130.4	+1708	4	1181	(k)	11	+158.3	+92	4
1045	[d]	13	+102.8	+5593	4	1113	t	15	+131.1	+5797	4	1182		6	+158.8	+2782	1
1046		14	+102.9	-3171	4	1114		14	+131.2	+5366	4	1183	(k)	16	+158.8	-1260	4
1047	[d]	11	+103.2	+2172	4	1115		12	+131.5	+6088	4	1184		12	+160.3	+32	4
1048		15	+103.3	+2414	4	1116	t	15	+132.2	+3823	4	1185	(k)	13	+161.1	-814	4
1049		15	+103.3	+2564	4	1117		12	+132.2	+2935	4	1186		13	+162.6	+4493	4
1050	[d]	15	+103.4	+3682	4	1118		15	+132.4	+1151	4	1187	(k)	12	+162.6	-2558	4
1051		15	+103.5	+5593	4	1119	t	12	+132.4	+1151	4	1188		11	+163.0	+4002	3
1052		13	+103.6	-1658	4	1120		16	+132.9	+6098	4	1189	(k)	16	+163.2	-1136	4
1053	[d]	16	+103.8	+957	4	1121	t	16	+133.3	-3268	4	1190		15	+164.0	+3118	4
1054		15	+104.6	+3958	1	1122		14	+133.4	+768	4	1191		12	+170.2	+4032	4
1055	[d]	15	+104.7	+2460	4	1123	t	15	+133.9	+1099	4	1192	(k)	13	+170.2	+4142	4
1056		11	+105.5	+2776	1	1124		11	+134.4	+4918	3	1193		12	+171.4	+5677	4
1057		13	+105.7	-2762	4	1125	[h]	11	+134.5	+5396	3	1194	(k)	14	+171.5	-1893	4
1058	[d]	14	+105.8	-465	4	1126		16	+135.3	+1573	4	1195		15	+171.4	-526	4
1059		11	+106.4	+1616	3	1127		11	+136.1	-3018	4	1196	(k)	8	+172.1	-566	1
1060	[d]	14	+107.7	+2519	4	1128	t	16	+136.2	+1603	4	1197		11	+174.6	+4663	3
1061		13	+108.1	+5531	4	1129		11	+137.7	-822	3	1198	(k)	12	+177.4	+4072	4
1062		15	+108.6	+3494	4	1130	t	12	+137.8	-327	4	1199		12	+178.1	-2430	4
1063	[d]	11	+108.9	-1130	3	1131		15	+137.8	+3017	4	1200		14	+178.7	+986	1
1064		9	+109.3	+5866	1	1132	t	14	+138.2	-2000	4	1201	(k)	7	+178.9	+3441	1
1065		13	+110.5	+2669	4	1133		11	+138.3	-547	4	1202		12	+180.6	-2539	4
1066	[d]	13	+110.9	+6045	4	1134		13	+138.7	-367	4	1203	(k)	11	+181.9	-2112	4
1067		14	+110.9	+5634	4	1135	t	15	+139.8	-3535	1	1204		8	+194.0	-2192	1
1068		11	+111.0	-1402	1	1136		10	+140.5	+5937	4	1205	(k)	11	+194.8	-2134	1
1069	[d]	12	+113.0	+753	1	1137	t	15	+140.6	+4833	4	1206		12	+197.5	-2997	4
1070		12	+113.7	-623	4	1138		14	+140.7	+3849	4	1207		12	+198.2	-2816	4
1071		13	+114.1	-818	4	1139	t	17	+141.6	+2485	5	1208	(k)	12	+199.8	-2187	4
1072	[d]	13	+114.3	+2395	4	1140		15	+142.1	-1041	4	1209		13	+201.1	+846	1
1073		15	+115.1	+5786	4	1141		15	+142.2	+2960	4	1210	(k)	9	+202.2	-1910	1
1074		13	+115.3	+566	4	1142	t	14	+142.5	+2786	4	1211		5	+211.9	-5145	4
1075	[d]	14	+115.3	+4028	4	1143		14	+142.9	-967	4	1212		7	+224.2	-3611	1
1076		14	+115.8	+2264	4	1144	t	15	+142.9	+3158	4	1213	(k)	12	+225.3	-3615	2
1077		12	+116.9	+2526	4	1145		15	+142.9	+3158	4	1214		12	+225.3	-3615	2
1078	[d]	13	+117.3	-1756	4	1146		15	+142.9	+3158	4	1215	(k)	12	+225.3	-3615	2
						1147						1216					

REDUCED OBSERVATIONS
OF
NEBULÆ AND CLUSTERS OF STARS,
MADE WITH THE TWENTY FEET REFLECTOR,
IN THE
YEARS 1834, 1835, 1836, 1837, AND 1838,
AT FELDHAUSEN,
ARRANGED AS A CATALOGUE, IN ORDER OF RIGHT ASCENSION,
FOR
THE EPOCH 1830.

REDUCED OBSERVATIONS of NEBULAE and CLUSTERS of STARS made with the 20 feet Reflector,
in the years 1834, 1835, 1836, 1837, and 1838, at Feldhausen.

No.	Synon.	R. A. 1830.0. h. m. s.d.	N. P. D. 1830.0. ° ' "	Description, Remarks, &c.	Sweep.
2308	III. 461	0 1 15.4	115 55 0	F; v L; v m E; v g b M; 4' l; 1' br.	733
2309	.....	0 1 25.3	147 58 11	F; R; 30".	733
		25.3	58 21	c F; S; R.	504
2310	.....	0 1 54.2	147 56 26	c F; preceding of 2. Requires attention, but no doubt remains.	504
2311	.....	0 2 7.2	147 56 56	c c F; the following of 2. Requires attention, but leaves no doubt	504
		9.5	55 51	c c F; S; R.	735
2312	.....	0 2 51.3	147 53 47	c F; S; R.	735
2313	.....	0 5 16.2	114 7 16	c F; L; R (by diagram); v g v l b M; attached to and nearly involving a L star; the following of 2. A very F object of singular appearance, 3 or 4' diam.; forms a kind of cometic appendage to the star, which, however, is quite at the edge.	641
2314	.....	0 6 23.8	151 16 15	c F; R; v l b M; 30".	734
2315	Δ. 507	0 6 26.4	130 9 58	B; v L; v m E in a long irregular train, the preceding end being much the brightest. Whole length = 1½ diam. of field, or 22'. The nucleus is either a double star or a much more sharply terminated nebulous mass, elongated in a different position (146°.5) from that of the nebula (109°.8).	488
		28.3	9 41	v B; v L; v m E; at least 25' l and 3' br. The following part is faint, the preceding and shorter triangular the 2d. nucleus taken. A strange object.	638
		34.2	9 5	v B; v L; a very long irregular crooked ray with 3 nuclei, the second of which appears to consist of stars. See Plate IV. fig. 8.	737
2316	.....	0 12 49.4	139 34 35	c F; S; R. The first of a group of 4 nebulae	497
		49.6	34 50	c F; v S; R; g b M. 1st of 4.	496
2317	.....	0 12 59.2	139 35 8	c F; v S; R. The 2nd of a group of 4; in centre of gravity of the triangle formed by the other three.	497
		59.2	35 20	c F; v S; R; 2nd of 4, in centre of gravity of the others.	496
2318	.....	0 13 0.4	139 36 35	v F; S; R. The 3rd of a group of 4	497
		1.6	36 40	v F; S; R; g b M. The 3rd of 4	496
2319	.....	0 13 7.9	139 34 15	F; S; R. The last of a group of 4	497
		8.1	34 30	F; R; g b M; 20". The last of 4	496
2320	.....	0 14 26.6	136 13 13	v F; R; b M; 40". r.	490
2321	.....	0 15 25.1	123 28 44	v F; R or v l E; g b M; 15".	635
		26.7	30 0	p B; p L; l E; 45"; precedes a star 14 m.	493
2322	Δ. 18 B. 38	0 16 24.4	163 1 58	⊙ 47 Toucani. A most magnificent globular cluster. It fills the field with its outskirts, but within its more compressed part, I can insulate a tolerably defined circular space of 90' diameter wherein the compression is much more decided and the stars seem to run together; and this part I think has a pale pinkish or rose-colour.	745
		25.9	1 51	The great cluster preceding the Nubecula Minor. Estimated diameter of the denser portion 5'; of the whole (not, however, including loose stragglers) 8'. Stars 14...16 m and one = 12 m, n p the centre. Excessively compressed. (N. B. In a sweep below the pole, when of course owing to the low altitude much of the light was lost.)	441
		26.5	1 15	47 Toucani. A most glorious globular cluster. The stars are =, 14 m, immensely numerous and compressed. Its last outliers extend to a distance of 2" = 16' in R. A. from the centre. It is compressed to a blaze of light at the centre, the diameter of the more compressed part being 30" in R. A. It is at first v g, then p v m b M. It is completely insulated. After it has passed, the ground of the sky is perfectly black throughout the whole breadth of the sweep. There is a double * 11 m preceding the centre (Pos. 226°.5—Δ R. A. = 6.5 from centre of neb).	482
		26.5	1 10	Fills the field with its stragglers, condensation in three distinct stages, first v g, next p s, and finally v s v m b M up to a central blaze whose diameter in R. A. is 13'.5 and whose colour is ruddy or orange-yellow, which contrasts evidently with the white light of the rest. The stars all nearly equal (12...14 m). A stupendous object. See Plate III. fig. 1.	625

REDUCED OBSERVATIONS OF

No.	Synon.	R. A. 1890.0. h. m. s. d.	N. P. D. 1890.0. ° ' "	Description, Remarks, &c.	Sweep.
2323	.....	0 18 19.7 23.5	124 37 43 37 0	e F; S; has a small faint double * n p, 2' dist. F; L; v l E; 60"; has a double * 2 1/2' dist. n p.	635 493
2324	.....	0 18 50.5 52.1	147 55 26 55 18	p B; R; p s b M; 25" p B; v S; R; g m b M; 15"	504 735
2325	.....	0 19 4.5	162 28 23	p B; l E; v g b M; 40"	625
2326	.....	0 21 12.8 13.5	124 11 52 12 11	v F; the preceding of two. The other v L and B. p B; p L; p m E; v g b M.	635 493
2327	Δ 590?	0 21 57.8 58.9	124 11 42 11 47	B; L; v m E; p s l b M; 4' 1; 1' br; pos = 227°; the f of 2 v B; v L; v m E; p s m b M; 8' 1; 1' br; pos = 47° 9; dies away gradually at both extremities; has a star 10 m, dist 45', pos = 327° 9. See Plate VI. fig. 19.	635 493
2328	h. 27	0 23 6.7	96 5 19	v F; v l E; g l b M; 60" l.	739
2329	.....	0 24 52.2	122 43 13	v B; S; l E in parallel; s m b M to a * 11 m [Obs. makes R. A. 25 m but as this and the neb. of 620, are certainly identical, the earlier minute is preferred.]	494
2330	II. 478 h. 30	53.2 0 25 26.7	43 55 100 38 24	p B; S; E in parallel; v s b M almost to a star p F; R; g b M; 60"	620 740
2331	.....	0 23 48.3	164 3 8	v F; L; R; v g l b M; 2'	625
2332	.....	0 26 37.2 39.6	146 43 46 42 53	v F; S; R; 15"; precedes 3 stars v F; R; g l b M; 20"	504 735
2333	.....	0 28 30.0 34.9	120 24 31 24 53	v F; R; 25"; near one or two stars v F; S; R.	620 495
2334	III. 223?	55.2 0 28 50.5	23 58 110 52 6	F; S; l E among several B. stars p B; p L; E; g b M; r; 80" l. 50' br. If this nebula be really III. 223, the P. D. assigned to that nebula by my Father's Observations must be 1° in error. The error cannot lie in this observation, the 10th degree of Polar distance being beyond the possible reach of the instrument in sweep 641	494 641
2335	.....	0 29 7.3 8.9	164 6 28 6 23	e F; R; near a * 3 m. (At the beginning of the Nubecula Minor) e F; S; l E; r.	482 625
.....	.....	0 30 ..	164 27 ..	Here comes on the preceding edge of the Nubecula Minor, seen as a mere nebula—the sweep being below the pole and vision imperfect	441
2336	.....	0 32 23.8 30.3	147 6 6 6 13	v F; S; R; 15" the preceding of two e F; S. (Owing to some unknown cause of unsteadiness the Right Ascensions of this sweep are liable to an error which may amount to several seconds of time).	504 735
2337	.....	0 33 0.8 5.3	147 8 26 8 18	p F; S; R; 20"; the following of two F; R; v g b M; among stars. (See the above remark respecting R. A.) ..	504 735
2338	.....	0 33 51.1 51.2 53.1	164 18 50 20 54 19 58	F; v g b M; irreg figure F; R; the field is full of the nebulous light of the Nubecula Minor The first of an irregular string of nebulae and stars which descends at an angle of about 45° from the centre to the edge of the field (i. e. in a n f direction).	482 745 625
2339	.....	0 33 55.3	164 23 56	v F; R; outlying	441
2340	Δ. 2	0 34 40.7	164 17 10	An irregular train of stars and nebosity in the Nubecula Minor. (Evidently that referred to in f 625.	482
2341	.....	0 35 29.2	141 6 36	e F; p L; R; g v l b M; 50"	497
2342	.....	0 37 5.1	164 31 32	a v F, R nebula or group. (We are now fairly in the Nubecula Minor, and the field begins to be full of a faint perfectly irresolvable nebulous light).	482
2343	.....	0 37 7.2 9.9 13.7	164 22 22 22 18 21 50	A binuclear nebula, or two, v S, R, running together A small irresolvable knot in the bright part of Nubec. Min. p L; v F; R; v g b M; (in a sweep below the pole and ill seen) the R. A. is probably also in error.	625 738 441
2344	.....	0 39 3.7 8.7	164 18 9 18 47	v F. (Below the pole, and the sweep otherwise irregular. R. A's not good) F; E or binuclear; S; v g l b M	441 625

No.	Synon.	R. A. 1830.0. h. m. s. d.	N. P. D. 1830.0. ° ' "	Description, Remarks, &c.	Sweep.
2345	V. 1 h. 61	0 39 3.9	116 13 57	v v B; v v L; v m E; 30' l, 3' or 4' br; has several stars in it; g m b M to a centre elongated like the nebula itself. The neb. is somewhat streaky and knotty in its constitution and may perhaps be resolvable.	646
		11.6	13 45	v v B; v v L; a superb object; $\frac{1}{2}$ radii of field in length (24'); breadth about 3'; posn = 143° 8' very exact. Its light is somewhat streaky, but I see no stars in it but 4 large and 1 very small one, and these seem not to belong to it, there being many near.—The difference of R Ascensions of this and the former obs. arises in great part from the undefined nature of the object. I prefer this however.	733
2346	Δ 19? or Δ 21?	0 39 9.5 10.0 11.1	164 1 8 0 38 0 52	p B; p L; oval; r; 2' diameter F; R 30" F; L; R; v g b M; 2'. Here begins a starry region of the Nubecula Minor	738 745 625
2347	.....	0 39 11.1 13.9 14.2	122 21 17 21 31 21 13	v B; S; p m E; s m b M; has a * 9 m 5' dist n f B; p S; l E; v s v m b M; has a * 7' m 5' dist n f v B; R; g m b M; 40". has a * 8 m dist 5'	495 620 494
2348	.....	0 39 33.5 34.6 39.5 42.7	164 26 33 25 45 26 18 26 43	F; S; R; g b M; 40" South of a * 8 m. (In Nubec. Minor) Not v F; S; R; has a star 9 m n f. F; l E; 30"; precedes a star 9 m F; S; R; 18"; a star 9 m n f.	482 441 738 745
2349	Δ 3? or Δ 21?	0 40 13.0 13.4 23.6	164 2 8 1 48 1 57	p B; R; 60" has a star 13 m in centre. Occurs in a field illuminated by the Nubecula Minor and many stars. p F; R; 90" v F; R; g b M; 2'; r. There has probably been an error of 10' committed in reading the chronometer. Reduction re-examined and found correct.	738 745 625
2350	.....	0 40 15.4	129 10 12	F; S; R; v s v m b M to a * 13 m. A trapezium of L. st. follows	488
2351	.....	0 40 53.6 56.7 59.2 62.0	164 24 7 25 53 24 28 25 13	v F; situated on the edge of the Nubecula Minor F v F; R; 30" F; S; R; 40"	441 482 738 745
2352	.....	0 41 43.9	164 12 28	A F, p L, cluster of v S stars. It is the preceding knot (or centre of condensation) of the resolvable portion of the Nubecula Minor which fills the subsequent field and consists of irregularly clustered stars 12....20 m.	738
2353	.....	0 42 15.7	164 27 52	v F; S; R; 30"	745
2354	VI. 20 h. 74	0 44 22.5	117 30 33	G; B; L; R; g b M; all resolved into stars 12....16 m; 5' diam. N.B. This observation decides the doubt raised in the obs. of sweep 292 (see Catal. of Nebulae, &c. h. No. 74) respecting the Right Ascension of this object in favour of the latter of the two results there set down, which is consequently to be adopted as the correct result of that observation.	643
2355	.....	0 44 29.4 29.9 32.3	122 8 4 7 34 7 28	v B; L; m E; s h M; has a * 11 m n p B; L; R; g l b M; 90" v B; L; p m E, oval; has a * 11 m n p	495 620 494
2356	.....	0 44 55.3 46 3.7	164 13 22 19 23	Hereabouts seems to be placed the main body of the Nubecula Minor which is a Faint, Rich, Large Cluster of very small stars (12....18) filling many fields, and broken up into many knots, groups, and straggling branches. But the whole is clearly resolved into stars. I should consider this to be about the main body of the Nubecula Minor, which is here fairly resolved into excessively minute stars, which are however certainly seen with the left eye.	625 482
2357	.....	0 45 12.8	164 4 37	e F	441
2358	Δ . 5	0 46 11.7 11.8	164 18 17 18 46	p F; p L; R; v g l b M; r e F. [This obs. gives 47 for the minute of R. A. The earlier minute preferred.] In a sweep below the Pole.	625 441
2359	Δ . 530?	0 46 51.9 53.5 72.1 ..	128 37 20 36 13 36 14 37 56.1	B; v L; v g p m b M; v m E; irreg fig; 8' to 10' l; 3' or 4' br; has subordinate nuclei. See Pl. V. fig. 10. F; v L; v g b M; 4' l, 2' br; has another neb attached A very faint nebula attached to the large one of f 488 No. 36, or a subordinate nucleus. A large oval nebula containing 3 stars. [N.B. Mr. Dunlop's neb 530 is described by him as easily resolvable into very minute stars. Its identity with this is therefore very doubtful.]	486 488 488 803
	..	..	..	v L; p B; between 3 st 8 m; seen in twilight	802

No.	Synon.	R. A. 1830.0. h. m. s. d.	N. P. D. 1830.0. ° ' "	Description, Remarks, &c.	Sweep.
2360	.....	0 47 17.0 17.6 18.3 20.8	163 6 52 7 4 7 23 7 16	p B; v S; R; v l b M; 15"; r..... F; v S; R; g l b M; r; 15"..... An extremely small <i>bright</i> knot of the Nubec. Min. 15" diam..... p B; v S; R; 12"; r. Situate at the upper limit of the nubecula which here is starry. At the other it is nebulous.	625 482 738 745
2361	.....	0 48 11.8	163 9 48	An extremely small <i>faint</i> knot of the Nubec. Min. 15" diam.....	738
2362	.....	0 48 44.0 44.5	122 52 23 53 36	F; e S; R; s b M to a stellar nucleus..... e e F; v S; almost doubtful whether really the object looked for. Has a p B * following 2' dist. (N.B. The coincidence of the places destroys this doubt.)	494 620
2363	.....	0 48 42.0 44.4	143 41 52 41 55	F, S, R, 15' follows a star 12 m on same parallel..... v F; S; R.....	730 498
2364	.....	0 49 16.1	131 22 23	F; S; Stellar; the bad definition of a south-easter prevents certainty, but I think it is not a star.	638
2365	.....	0 49 16.1	143 53 45	v F; S; R. The R A may err several seconds. The P D also is not very good. Viewed; found exactly in place of No. 29 f 498. p B. S. R. b M. 15". there is also another, pos = 36°.3 Δ P D = 4'.	498 730
2366	.....	0 49 31.5	143 49 45	v F, l E, v g b M. Place from No. 29 f 298 pos 36°.3 Δ N P D = 4'....	730
2367	Δ 23	0 50 23.3 24.0 25.1 25.9 26.4	163 23 18 23 20 22 49 23 12 24 10	⊙. A small v B, highly comp. oval cluster 2' l; 1' br; v g b M stars = 13 m. A resolved, v comp. somewhat oval cluster of close-wedged stars 13...15 m ⊙; S; B; little Elliptic; g b M; 2'. Fairly resolved into rather large and not very crowded stars. ⊙; v B; S; l E; r or resolved; 50' l, 60' br; a close compressed knot of stars with outliers.	738 745 482 625
2368	.....	0 50 44.9 45.1	126 3 9 3 6	p B; S; oval; resolved; 60"..... F; S; R; g l b M; makes a triangle with 2 st. s. of neb..... e F; S; R; at the northern angle of an equilateral triangle formed with two stars 11 m.	441 493 635
.....	.....	0 51 ..	162 55 ..	The upper edge of the Nubecula Minor.—Resolvable.....	745
2369	.....	0 52 16.2	165 22 12	v F; L; R; v g b M; 3' or 3 1/2' diam.....	622
2370	Δ 25	0 53 17.0 17.5 19.5 19.6 19.6	163 5 21 5 54 5 58 5 37 6 42	Cluster; imperfectly resolved; rather irregular figure; 5' diam. Not equally condensed about centre; fades imperceptibly; has a double star (12 = 12 m) in centre. B; L; irreg fig. with a * 13 m in most comp. part..... B, L neb with r centre; irregularly E into a kind of broad train as in figure (Pl. IV. fig. 6) gently graduating away to the borders. 6' diameter. B; L; irreg R; g m b M; 3' or 4' in extent; fades away insensibly..... B; L; p m E; p g m b M; 5'; r (ill seen, below the pole).....	482 745 738 625 441
2371	.....	0 53 25.0 27.8	144 9 24 9 42	e F; S; R. (N.B. The R As in this sweep open to error of some seconds) e e F seems to have a v F star involved.....	498 730
2372	.....	0 56 17.6	156 31 12	e F; v m E; v l b M; a Ray nebula, pos = 145° 4	508
2373	.....	0 56 19.2 19.9	126 3 15 3 41	F; R; l b M..... F; S; R; g b M; 20".....	635 493
2374	Δ 55?	0 56 24.4 31.6	162 35 42 31 48	v F; L; oval; v g v m b M..... e F; p L; R; v g b M.....	441 738
2375	Δ 62	0 57 21.5 25.3 26.1 28.8	161 45 42 45 22 45 52 45 48	⊙. v B; v L; p g v m b M. Diam. of more condensed part = 60" ± in R A; but there are loose stars to a considerably greater distance, st. 13 or 14 m all nearly equal and distinct, but run into a blaze in centre. ⊙; v B; v comp; p s v m b M; 4'; all resolved into stars 13...15 m.... v B; v L; p s v m b M; R; 5 or 6' diam. All resolved..... A fine, highly condensed ⊙. p s b M; diam 4'.....	510 625 509 482

No.	Synon.	R. A. 1830.0, h. m. s. d.	N. P. D. 1830.0, o. r. s.	Description, Remarks, &c.	Sweep.
2376	Δ 31?	0 57 50.7 : 57.1 57.5 60.0	162 57 43 57 57 57 32 58 58	Cluster, 6th class; F; R; 10' diam. Stars 15....18 m (below pole) v F, L, p. rich cluster; 6th class. Stars 14....15 m..... F, L, p. comp. cl of 6th class. 10' diam. g b M; stars 12....16 m;— in some parts almost nebulous. Cluster 6th class; stars 12....15 m, a few = 10 m and one of 9 m; in comp. M; fills field and has loose straggling lines and crooks branching out.	441 482 625 738
2377	61.3 0 58 5.8	58 33 121 5 34	F, L, cl; 1. comp; g b M; 7' diam; resolved into st 14....16 m..... v F; S; R; g l b M; 15"	745 495
2378	0 58 30.0 30.4	163 44 3 44 6	p F; S; R; r; pretty compact	482 625
2379	0 59 47.6	162 54 18	@; a v S, v B knot of visible stars 15 or 20' diam. almost like a solid mass v F; p L; R; g l b M; 2'	745
2380	1 0 45.1 :	137 35 13	A star 7 m? After a long and obstinate examination with all powers and apertures I cannot bring it to a sharp disc and leave it, in doubt whether it be a star or not. The star B 137 immediately preceding offered no such difficulty, giving a good disc with 320. [No doubt a "Stellar Nebula".]	490
2381	1 1 38.4	160 47 7	F; R; v L; v g l b M; 3'	509
2382	1 1 45.2	126 41 4	e F; R; S near a v S star	802
2383	1 2 11.7 14.7	126 23 45 24 41	v F; R; g b M; 20"	486 803
2384	1 2 29.1 31.6	162 40 11 40 32	v F; p L; R; v l b M; 2'	625 745
2385	1 2 30.6 31.6 33.8	121 7 36 7 45 6 58	e F; p L; R; g l b M; 2'	745 495 645
2386	1 2 42.3 42.9 43.9 44.6	163 15 56 16 23 16 7 15 39	p F; R; g b M; 40' in a field rich with stars 11....15 m..... p B; R; g b M; 60"	494 625 738 745
2387	Δ 36?	1 3 7.1 9.1 10.1 13.0	163 47 47 47 44 47 48 47 8	F; R; 40"	745
2388	1 3 14.1 17.7	8 39 8 6	p B; L; R; v g l b M; r; 3'	441 745
2389	1 3 34.6	128 59 16	B; R; g b M; 2'. Has two stars near	738
2390	1 4 17.2 20.3	120 8 39 59 13	p F; S; R; g b M; 15" has a * 12 m following. Place liable to some error owing to some temporary unsteadiness in the apparatus. F. S. R. Observed when past meridian so that no R. A. and only a very rude P. D. could be obtained. p B; S; R; b M; 30" (R. A. uncertain)	441 745 735 504
2391	27 ±	B; R; p s b M; 40"	504
2392	1 5 23.2 23.3 23.4	149 9 25 9 31	v F; S; R; g l b M. 18"	803
2393	1 5 43.2 45.2	128 48 51 48 20	p B; R; p g b M; 20"	486
2394	1 5 46.4 48.9	122 38 49 39 13	p B; S; R; g b M	645
2395	1 5 51.4	122 44 ±	p B; R; b M; 20"	494
2396	5 52.4 5 59.9 60.9	41 3 149 11 20 11 21	v F; S; R; g b M. (P. D. a rough estimate from that of the nebula imme- diately preceding). p B; R; b M; 20"	645 494 735 504

REDUCED OBSERVATIONS OF

No.	Synon.	R. A. 1830.0. h. m. s. d.	N. P. D. 1830.0. o. i. e.	Description, Remarks, &c.	Sweep.
2397	.....	1 7 20.7	146 18 12	v F; S; R; b M; 15". R A may err several seconds being only roughly determined by an auxiliary star, having passed beyond the field.	500
2398	.....	1 8 8.0	164 12 11	Chief centre of condensation at southern edge of an irreg. figured nebulous mass 2' diameter.	745
2399	Δ. 7	1 8 52.7 62.7	164 11 51 11 38	F; p L; irreg fig; r; 2'. Nebula and stars the first of an irregular line .. p B; p L; irregular nebula with many stars. [The first of an irregular line of 3 nebulae and many stars].	625 738
2400	.....	66.5: 1 9 30.6	11 30 124 15 44	A resolved nebula or cluster of irregular figure p B; R; g l b M; 20". [This nebula was looked for in the place here set down in sweep 635, but was not seen. The observation, however, in sweep 493 is distinct and regular, so that there is no doubt of the existence of such a nebula, at this R. A., within the zone swept (123° ... 126°). In all probability, therefore, the degree was wrong read off, and instead of 124 should be 123 or 125. The minute can hardly be wrong.]	441 493
2401	Δ. 60	1 9 43.4 50.2	162 26 46 26 46	p B; p L; R; g b M F; L; R; v g b M; 4' diam	625 482
2402	Δ. 8	1 9 56.9 57.8 59.2 62.5	164 12 45 12 18 11 42 12 11	irreg R; r; 60". The second of a train of F. nebulous clustering patches which run across the field. p B; p L; irreg; the 2nd of an irreg. line of mixed neb and st S; R; a resolved nebula or cluster	745 738 441 625
2403	.....	1 10 32.3	149 48 18	F; R; g b M; r; 60"	736
2404	Δ. 9	1 10 53.4	164 14 8	The third mass in an irregular line of loose stars and nebula. p B; p L; irreg fig.	738
2405	.....	1 12 42.8	131 52 22	e F; l E; 20". A difficult object but certain after long attention with the left eye.	638
2406	.....	1 12 55.2 58.3	149 25 20 24 46	v B; S; l E; p s b M v B; S; l E; p s m b M	735 504
2407	.....	1 13 29.3 31.4	124 57 31 58 0	p B; S; R; l b M B; v l E; p g m b M; near a v S star	635 493
2408	.....	1 16 9.0 12.7 16.2	125 57 10 58 46 56 49	p B; S; rather a doubtful object. The preceding of two F; S; l E v F; S; l E; this is the "doubtful" neb of a former sweep	486 803 802
2409	.....	1 16 12.5 14.2 18.7	126 0 20 0 46 0 14	p B; S; E; b M; 20". The following of two F; S; R or l E p F; S; l E	486 803 802
2410	.....	1 17 0.3 3.1	129 0 56 2 21	e e F; S; R; v g b M e e F; S; b M	803 638
2411	.....	1 17 29.6 30.4	128 58 26 58 21	e e F; S; R; v g b M e e F; the s p of two which form an equilateral triangle with a star 13 m ..	803 638
2412	.....	1 17 30.6 31.9	128 57 6 56 21	e e F; S; R; v g b M e e F. The n f of two	803 638
2413	.....	1 17 45.6	128 54 6	e e F; S; R; v g b M. The 4th of a group of 4	803
2414	.....	1 20 15.6	126 36 24	v F; S; R	802
2415	.....	1 21 0.2	130 11 46	e F; S; attached to a minute star, and very near a bright one	488
2416	.....	1 21 21.8	126 28 40	A Double Star. The left eye leaves no doubt of its being involved in v F. neb. diffused over 15". An extremely delicate and difficult object. Pos. of the double * 225°; dist 4'; 15 and 16 magnitudes.	486
		35±	28 58	v F; S; R; R A only rough being already beyond the field	802
		.....	30 ±	There is a nebula but I perceive no D * in it. Obs. past merid and R A not taken.	803
2417	.....	1 22 1.6	142 28 14	F; S; R; b M among 5 or 6 stars 11 m	498
2418	.....	1 22 18.0	113 33 5	B; L; p m E; g p m b M; 3' l, 2' br.	641
2419	.....	1 24 31.3 31.4	124 23 13 22 29	v F; R; 25" F; S; R; b M; 15'	493 635
2420	.....	1 24 55.6	129 34 14	v F; p L; R; v l b M; 2'; has a double * 5' or 6' n f	638

No.	Synon.	R A. 1830.0. h. m. s.d.	N P D. 1330.0. o. s. e.	Description, Remarks, &c.	Sweep.
2421	Δ. 17	1 25 42.8	164 26 25	B; R or l E; p s b M to a *; has also a * involved which looks like a second nucleus and several small st about it.	745
		46.9	25 27	p B; S; irreg R; p s b but not to M, but rather to a point near the southern edge. Is decidedly resolved, and has scattered st. (This is an outlier of the Nubecula Minor.)	441
2422	I. 281 h. 139	1 26 22.4	120 16 27	p B; v m E; p s l b M; 2 1/2'. No other near it within 3 fields in R A and 1 field's breadth in declination.	644
		23.9	17 5	v B; L; v m E; p s p m b M; has a * 10 m; n f	645
		25.8	17 13	v B; v L; v m E pos 118.3; 1st g then s m b M to nucl 4' l 1 1/2' br has a * 9 m n f.—(N.B. The place assigned to I. 281 in my former Catalogue is R A 1° 27' 22.9" N P D 120° 22' in which it is now evident that the minute in R A is there mistaken, and the N P D materially in error, since by the remark in sw 644 it appears that there are not two distinct nebulae in this place. The difference of the descriptions is explained by the low situation of the object in the latitude of Slough.)	494
2423	.....	1 26 23.8	127 22 44	F; R; 12" follows a * 12 m. This is possibly identical with the next but one, with a mistaken minute.	822
2424	.....	1 27 17.3	127 21 36	e e F; v S; R; the preceding of two in field together	803
2425	.....	1 27 29.8	127 21 56	F; S; R; the following of two. Possibly identical with the last but one. (Both rightly reduced.)	803
2426	Δ. 479	1 27 38.8	132 18 19	B; p L; m E, nearly in the parallel; p m b M	489
		41.2	18 3	B; L; m E; g b M; 1 1/2' long	753
		....	19 ..	B; m E; g b M; 80° P D rough being taken 2 fields past the meridian ..	752
2427	.....	1 27 43.2	130 1 6	p F; S; R; b M; 15"	488
2428	.....	1 28 8.5	130 12 58	p F; S; R; b M; 15". Precedes 2 st 11 m	638
2429	.....	1 28 49.1	128 11 20	p B; S; R; g b M; 15". Follows a pretty bright D star	486
		50.6	11 35	Not v F; R; 30". Has a double star n p	802
2430	.....	1 31 7.4	120 47 17	v F; (sky cloudy). The preceding of two	644
		8.5	48 10	e e F	645
		11.6	46 43	v F; v S. The preceding of two	494
2431	.....	1 31 15.5	120 46 30	v F; p L	645
		15.9	46 12	v F; (sky cloudy). The following of two	644
		18.1	46 38	F; S; R; g b M; 15". Has a star near it, following	494
2432	.....	1 31 21.1	133 23 19	p B; S; R; g p m b M. The preceding of two	489
		21.8	23 33	F; S; R; 20"	753
		....	24 ±	F; S; R; P D rough, being taken when considerably past merid.	752
2433	.....	1 31 32±	133 27 ±	e F; R. Place roughly obtained from that of the foregoing neb from which its position is 144° (= 54° s f).	753
		35.5	26 8	F; S; l E; g l b M. The following of two	489
2434	.....	1 31 57.9	155 45 49	v F; irreg. R; v g l b M	508
2435	.....	1 32 12.7	166 24 47	e F; R; v g l b M; 40"	622
		12.9	25 45	v F; R; v g b M; 40". Reduced on the supposition of a mistaken wire (1st for 2nd). And there can be no doubt that this supposition is correct; as (independent of the coincidence of results) were it otherwise this nebula must have been in the field of view at the moment of observation in sweep 622, and, being at least equal in brightness to that actually observed, could not fail to have been noticed.	746
2436	II. 481 ?	1 40 48.2	101 16 4	F; R; g l b M; 35"	650
2437	III. 459 h. 155	1 40 57.1	114 38 33	v F; v S. Requires attention to distinguish it from a star	646
2438	.....	1 41 12.0	143 38 5	F; v L; R; v g v l b M; 3'	498
2439	.....	1 41 45.8	139 28 30	v F; R; g b M; 20"	744
		54.9	29 30	B; R; g b M; 30".—(N.B. Both observations are correctly reduced, but there is an obvious error of 10' in one or other, arising from mis-reading or mis-registering of the chronometer; and I consider the obs. in sweep 744 to be more open to that mistake than that of sweep 497.)	497
2440	.....	1 42 13.1	125 47 53	F; S; R; 15"	802
2441	.....	1 42 22.4	125 43 5	v v F; S	802

REDUCED OBSERVATIONS OF

No.	Synos.	R. A. 1830.0. h. m. s.d.	N P D. 1830.0. o. p. s.	Description, Remarks, &c.	Sweep.
2442	I. 62 h. 165	1 42 39.1	100 32 34	e F; p L; certainly not entitled to a place in the 1st class.—(N.B. The Right Ascension here set down is of course to be preferred to the rough R A (1.42.54±) of my former Catalogue.)	650
2443	I. 105 h. 165	1 44 45.2	104 34 46	p B; l E; p s m b M; 40°	649
2444	III. 460 h. 166	1 45 50.3	114 35 52	p F; R; g b M; 25°. No other neb within 15' all round.—(N.B. This remark shows that the nebula No. 167 of my former Catalogue is really identical (as there suspected) with III. 460.)	646
2445	.....	1 46 24.5	126 43 20	F; S; R; b M; 15°. [It is barely possible that this and the next nebula may be identical with Nos. 2446 and 2447 by a mistaken degree in P.D.]	486
2446	.....	1 46 31.5	126 40 56	e e F S R. R A only rudely taken by a star, being out of the field.	803
2447	III. 266	1 46 48.0	99 53 24	e e F; 40°	650
2448	.....	1 47 58.7	120 45 12	p B; l E; p s b M; 35°	644
		60.2	45 6	p B; p m E; p g p m b M; 30°	645
		61.9	45 33	B; S; E; p s b M	494
2449	.....	1 48 9.0	147 31 53	p B; R; g b M; 30°	503
2450	.....	1 48 24.5	147 35 43	v F; S; R; b M	503
2451	III. 464 h. 178	1 48 28.7	96 14 13	v F; E; v l b M; 30°	739
2452	III. 468	1 50 32.7	102 19 41	F; R; g l b M; 20°	649
2453	.....	1 50 36.5	117 7 18	p B; S; R; g b M; 18°	643
		46.0	7 18	F; S; R; g l b M; the reductions having been examined and found correct, a mistake of 10° must have been committed in reading or registering the chronometer in one or other of these observations. There is no apparent reason for preferring either.	646
2454	.....	1 51 56.1	123 36 58	p B; p L; l E; attached to a star 12 m	503
2455	.....	1 53 52.4	146 39 13	p F; S; R; makes an obtuse angled triangle with 2 st 11 m	503
2456	.....	1 54 37.4	165 3 9	Somewhat doubtful, but I believe it is a v F neb involving a v F *	745
		40.5	3 5	F; v S; R; has a * 12 m 25° dist. 45° n p.	622
		43.1	3 0	e F; S; R; 10° close to a v S star.	746
2457	.....	1 55 3.3	158 41 26	e e F; v S; R; has a * 13 m preceding, dist 100°	508
2458	h. 192	1 56 6.5	114 7 20	v F; l E; g b M; 25°	646
2459	.....	1 57 46.1	159 16 1	p F; R; g b M; 30°	513
2460	h. 196	1 59 34.9	116 16 17	A v F double * involved in a v F nebula	646
2461	.....	1 59 38.1	131 53 33	F; R; s b M; r; 15° a difficult object	489
		44.8	57 13	v F; v S; R; 12°	752
2462	.....	1 59 40.0	128 16 46	F; R; 30°; v s v m b M to a * 13 m	803
		42.3	18 55	F; R; 40°; v s v m b M to a * 12 m	802
2463	II. 482 h. 199	2 1 2.2	100 56 14	e F; S; R; 1st of a group of 4	650
2464	II. 483 h. 200	2 1 3.7	100 56 24	v F; S; R. The 2nd of a group of 4	650
2465	II. 484 h. 201	2 1 17.4	100 57 14	v F; S; R. The 3rd of a group of 4	650
2466	II. 485 h. 202	2 1 22.9	100 59 24	v F; S; R. The last of a group of 4	650
2467	.....	2 3 16.0	147 32 8	p F; R; g l b M; 40°; r	503
2468	.....	2 4 17.4	126 39 30	p B; l E in merid; 40° l; g b M	486
		17.7	37 40	v F; S; l E; 15° l 12° br	801
		24.8	40 16	p F; l E; g b M (R A correctly reduced)	802
		.....	39 ±	v F; R; place roughly taken being past the meridian	803
2469	.....	2 5 11.5	122 45 3	p B; S; p s m b M	645
		12.7	44 22	B; S; E; p s m b M; 18°	644
2470	.....	2 6 9.8	132 50 2	p F; v S; s v m b M, like a blurred star	489
		13.1	49 23	F; R; g b M; 30°	752

No.	Symbo.	R. A. 1850.0. h. m. s. d.	N P D. 1850.0. o. s. m.	Description, Remarks, &c.	Swcep.
2471	II. 474 h. 209	2 8 15.3 15.3 16.9	102 8 40 8 24 8 1	F; R; b M; 60"; ill observed in a south-east cloud F; R; g l b M; 40"..... Not v F; p L; R; v g b M; 50".....	648 650 649
2472	.....	2 12 16.2 21.4	132 31 35 31 10	e F; v S; R; p s b M; has a * 7 m s f and 6 other S at intermediate .. F; R; g b M; 20".....	499 752
2473	.....	2 12 26.9	150 38 30	e F; S; R; has two small stars very near it.....	501
2474	.....	2 13 8.3 10.2	132 11 15 11 22	p F; R; p s l b M; 40" has a * 8 m following in parallel Not v F; R; p g b M; 35" has a * 9 m foll 4' dist	743 638
2475	.....	2 13 52.5	124 29 49	p B; S; R; p s b M. Has a * 10 m exactly foll in the parallel just at the edge or 35' dist from centre.....	635
2476	.....	2 14 3.0	111 35 30	p B; l E; g b M; r; 30". Has a coarse double * prec.	642
2477	III. 224	2 15 10.7	111 28 50	F; E in parallel; g l b M; 20" l	642
2478	III. 239	2 17 23.4	115 34 27	p B; R; g p m b M; 60".....	646
2479	.....	2 19 50.0 52.1	135 12 8 12 45	v F; S; R; g l b M; 15"..... e F; S; v l b M; 20".....	805 634
2480	II. 487 h. 225	2 20 22.7	101 18 14	e F; L; R; g l b M; 2'.....	650
2481	.....	2 20 37.6	109 48 12	p B; E; g b M; 50" l, 35" br	640
2482	.....	2 22 6.1 6.6 10.7 14.0	132 10 15 9 43 9 15 9 17	v F; l E; g b M; 25"..... F; p L; l E; has a * 8 m 3' dist, s f e e F; p L; R; 40" n p a * 11 m.—(N.B. The night appears to have been hazy and was interrupted by cloud.)..... v F; R; 20".—(N.B. An extraordinary discordance in the observed Right Ascensions of this object, for which I can assign no reason.—The reductions are correct.).....	743 489 639 752
2483	.....	2 24 3.2 10.7	126 47 35 48 30	B; p m E; p s b M; 30" l; position 215° 7'..... p B; m E; g b M; 80" l, 15" br	486 802
2484	.....	.....	47 30	p B; S; l E. Transit lost owing to a passing cloud	636
2485	.....	.....	45 47	No description—observation evidently hurried	801
2486	.....	2 24 13.1 14.1	107 57 42 57 37	p F; S; R; p g m b M; 25"..... e F; irreg R; l b M.....	640 741
2487	III. 472	2 24 49.4	101 30 39	e e F; S; R	650
2488	.....	2 25 15.3 22.4	135 16 25 16 21	Not v F; S; R; almost stellar; between 2 st nearly in the parallel F; S; R; g b M. 15". [Both R A's correctly reduced]	634 805
2489	Δ. 519?	2 26 47.4	129 47 13	p B; L; p s b M. 3' l, 2' br; either Binuclear or more E on the n f side than on the opposite. No other neb near it..... B; L; p m E; v s m b M; 100" l, 60" br. Unequally bright, and ex- hibiting an approach to the Binuclear form (See Plate VI. fig. 14). e F; S; R. 15" the preceding of two	638 743 732
2490	.....	2 30 47.1	145 36 39	F; p m E; has a v F star at the s f extremity	650
2491	II. 284 h. 249	2 31 8.8	98 52 14	F; S; R; g b M; 20"; the following of two	732
2492	.....	2 31 12.1	145 36 9	p B; R; b M; 35". Observed in a south-east cloud-drift.....	648
2493	.....	2 32 17.4	102 1 15	p B; S; R; like a star 12 m a very little rubbed at the edges, a curious little object and easily mistaken for a star, which, however, it certainly is not.....	635
2494	.....	2 32 43.2	125 0 10	p B; R; g p m b M; 30".....	650
2495	I. 63 h. 254	2 32 45.3	98 59 9	B; p m E; s b M; 90" l, 40" br	643
2496	.....	2 36 26.0	119 43 33	B; L; v m E; p s p m b M; 3' long; pos = 151° 1'	644
2497	V. 48	2 39 4.1	120 59 12	B; L; v m E; p s v m b M to a p L, R nucleus; 4' l, 40" br	645
2498	.....	5.5	59 6	F; R; g l b M; 30".....	736
2499	.....	2 39 34.2	150 37 53	p B; L; p m E; v g l b M; 2' l, 40" br	652
2500	III. 449 h. 269	2 41 10.7	107 42 40	F; R; g b M; taken for No. 3 sw 520, but proves, on reduction, to be a different nebula.....	732

REDUCED OBSERVATIONS OF

No.	Synon.	R. A. 1830.0. h. m. s. d.	N P. D. 1830.0. o. p. n.	Description, Remarks, &c.	Sweep.
2499	.....	2 45 51.3	145 45 59	F; R; g b M; — c	520
2500	II. 470 h. 275	2 46 18.2	100 43 44	F; v S; R; p s b M; stellar	650
2501	.....	2 46 44.9	109 20 32	F; v m E; 90° l, 10° br; has 2 st 10 mag, f	652
2502	III. 469	2 50 50.7	103 4 51	p F; R; g l b M; 25°	649
2503	.....	2 51 40.8	122 47 13	v F; l E. 18°	645
		43.6	46 5	v F; p m E; v l b M; 60° l, 30° br	635
2504	III. 245	2 55 4.9	113 32 15	B; v L; p m E; v g b M; 31° l, 21° br. Has in or near the middle a star 16 m.	642
2505	.....	2 55 29.2	102 44 56	v F	649
		46 ±	46 ±	The sp of two	648
2506	II. 475	2 55 48.1	102 40 50	p B; L; R; 80°. The n f of 2, dist about 7½', pos. 45°	643
		48.2	39 41	p F; R; b M	649
2507	II. 285 h. 285	2 57 58.5	100 12 19	F; R; g b M; 25 to 30°	650
2508	.....	2 59 39.4	129 40 53	Not v F; R; p s l b M; 20°. Has a * 11 m 2' n.	638
		42 ±	42 ±	Viewed past merid. Seen in place but v F, as it began to cloud	743
2509	II. 258	3 2 5.6	111 14 42	p B; L; R; v g m b M 2' diam	741
		7.3	14 0	p B; v L; R; g m b M; 4' diam	641
		7.6	13 10	B; v L; R; r; 3' first v g then p s b M. With the left eye I see it mottled. (N.B. This is no doubt a distant ⊕).	642
2510	II. 286 h. 289	3 2 59.4	99 33 59	F; p m E; 50° the preceding of two	650
2511	III. 591 h. 291	3 3 8.9	99 35 20	e F; R; the following of two; pos from the other = 120°	650
2512	Δ. 205??	3 4 16.8	157 25 16	p F; l E; g b M; 25°	508
		20.8	26 9	F; S; p m E; g b M (growing cloudy)	512
		.....	.....	Seen found in sweeping for Δ 205 below the sweep. It has about the same R A but farther south. Only this neb found.	631
2513	.....	3 4 52.1	157 35 36	p F; R; g l b M; 15°	508
		59.6	36 38	Not v F; S; R; b M. (R A roughly taken by the intervention of an auxiliary star, being past meridian when observed).	512
2514	.....	3 5 4.4	143 59 8	B; L; v m E in pos 80°; v g b M to an axis; 2½' l, 1' br	520
		.....	.....	Found in place and viewed p M, but very faintly seen	732
2515	.....	3 6 23.3	148 27 9	Star 8 m the chief of a cluster of 18 or 20 stars	519
2516	.....	3 6 26.9	112 37 35	F; S; almost stellar; but E; has a * 8 m prec 7½', 2' n	642
2517	Δ. 337	3 7 35.4	145 51 44	p B; R; v g b M; 5'; resolved into st 15 m. A very faint nebula (?) precedes.	732
		37.8	51 33	⊕; B; L; irreg R; 2½' diam; all resolved into equal stars 14 m.—Has a * 9 m 45° n f 5' dist.	520
2518	.....	3 8 35.6	131 43 11	v B; R; g m b M (hazy)	743
2519	III. 956	3 9 35.5	100 55 24	e e F; barely perceptible	650
2520	.....	3 10 21.4	123 12 25	v F; L; R; v g l b M; 2½' diam	645
2521	Δ. 487	3 11 4.3	131 43 11	v B; R; g m b M; 90° (hazy)	743
		14.4	43 43	⊕; v B; R; 1st g, then s v m b M; r, mottled, but not resolved. (N.B. There must have been a mistake of 10' in reading or registering the chronometer in one or other of these observations. The reductions of both are correctly performed).	754
2522	.....	3 12 0.3	110 1 35	p F; v L; 1st g then p s b M to a F nucleus; m E 3 or 10' l, 2' br	741
		2.0	1 59	B; v L; 1st v g then p s v m b M; 3½', 2' br. m E. (N.B. These dimensions can only refer to the brighter portion).	652
2523	I. 106	3 14 12.6	106 0 25	p F; R; g l b M; pos from a * 7 m = 31°. Δ R A = 7°. 5; * 4' s ..	651
2524	.....	3 14 32.2	127 48 40	v F; R; p L; v l b M; 90°. (P D evidently 5' too large)	636
		32.6	43 45	⊕; v F; R; p L; v g v l b M; r; 90°	801
		33.1	43 12	F; L; R; g l b M; 2'	802
2525	.....	3 15 7.8	142 47 33	F; m E in position 37°. 3; g b M; 2' l, 15" br	807
2526	.....	3 15 34.7	111 53 50	p B; R; g b M; 25°	642

No.	Synon.	R. A. 1830.0. h. m. s. d.	N P D. 1830.0. o s s h.	Description, Remarks, &c.	Sweep.
2527	Δ. 548	3 16 11.3 12.4	127 50 49 49 30	v B; v L; 4' diam, 1st g, then v s, v m b M to a stellar nucleus v B; p L; 1 E; v s v m b M, to a nucleus 2" diameter	801 636
2528	Δ. 206	3 16 13.2	157 6 9	p B; irreg R or 1 E; v L; v g b M; r; 3'	508
2529	Δ. 547	3 16 13.8 14.9	187 42 49 43 0	p B; p L; 2' diam; a miniature of the last neb of this sweep p B; S; R; p s b M	801 636
2530	III. 197 h. 298	3 16 18.0	93 38 4	F; R; b M; 20". The first of 3	739
2531	III. 196 h. 297	3 16 18.5	93 37 4	Not v F; v S; E; 6 or 8"; and of 3. Query if not a nebulous double star.	739
2532	.....	3 16 20.5	93 32 24	F; R; b M 15". The 3rd of 3	739
2533	.....	3 16 25.7	112 7 30	F; S; R; b M; 15"; precedes IV. 77	642
2534	IV. 77	3 16 58.2	112 8 10	F. Attached cometically to a * 9 m which forms its head. It is an exact resemblance of Halley's comet as seen in the night glass. Pos. of tail = 239°.1.	642
		58.2	8 25	A complete telescopic comet; a perfect miniature of Halley's, only the tail is rather broader in proportion; m E; 90" l; the star at the head = 10 m. See fig. 17, Pl. VI.	641
2535	.....	3 17 28.4	127 4 50	60" diam; v s v m b M to nucleus; ? a disc	802
2536	.....	3 18 17.3	108 11 25	F; R; g l b M; 30"	652
2537	.....	3 19 57.6 58.0	126 17 38 19 30	F; S; R; g p m b M; 15" v F; R. (Clouding over rapidly)	801 636
2538	.....	3 21 16.3 18.9	122 52 28 52 42	v F; 1 E; 40" B; R; p s m b M. A double star precedes	802 645
2539	.....	3 21 25.3	121 29 32	p B; R; p s l b M; 40"	644
2540	.....	3 21 31.3	127 44 31	v B; 1 E; p s b M; 45"	645
2541	.....	3 21 48.3	108 22 29	F; S; R; has a * 12 m s f	802
2542	I. 257	3 21 49.4	121 41 ..	v F; R; p s l b M; 20" R A by working list; P D roughly taken; Transit missed-while observing another nebula.	652 644
2543	.....	3 23 55.9	109 51 52	e F; S; p s l b M; has a * 8 m s f. Very difficult and probably not to be seen without a recently polished mirror, such as was used in this observation.	652
2544	.....	3 23 58.3	125 26 24	p B; R; p s b M; 30"	635
2545	Δ. 591	3 23 ±	124 19 ±	B; L; m E, but with a R nucleus much brighter than the enviroing F atmosphere. P D roughly taken. Transit missed, the observation having been lost by relying on the R A given in Mr. Dunlop's Catalogue (3' 25") which is too great. That here set down is assumed at random as probably nearer the truth.	635
2546	III. 246	3 24 31.7 32.5	111 23 50 24 8	B; L; p m E; p s m b M; 2' l B; m E; g m b M; 90" l, 40" br	642 641
2547	III. 487	3 24 38.7	105 47 45	v F; S; 1 E; g l b M; 25"	651
2548	II. 290	3 25 19.4 20.3	104 15 11 16 2	p F; p L; R; 40" near 3 st, 2 of which are 10 m p B; R; first v g then more s, b M; 70"	649 757
2549	.....	3 25 35.6 38.5	140 52 33 51 43	v F; R; g b M; 40" v F; p L; irreg; near stars	806 807
2550	.....	3 26 7.9	110 4 48	F; L; R; v g l b M; 2'	741
2551	III. 559	3 26 18.0 18.7	110 52 51 51 55	v F; S; R v F; S; R	652 642
2552	.....	3 27 8.4	126 42 37	A very remarkable neb. A decided link between the nebulae M 51 and M 27. Centre v B; somewhat extended; g v m b M; a * 13 m near the edge of the halo involved. The area of the halo v F; general position of the longer axis 20°.3 whole breadth = 5'. See Pl. IV. fig. 1.	801
		10.2	42 43	v B, E, resolvable nucleus; or has 2 or 3 st involved; the preceding Arc is the brighter. I think the oval is in some degree filled up to the south.	802
2553	III. 857	3 27	121 47 ..	Place from working list. Seen sweep 644, but under circumstances not admitting an observation of its exact place.	644

REDUCED OBSERVATIONS OF

No.	Synon.	R. A. 1830.0. h. m. s.d.	N P D. 1830.0. o. s. d.	Description, Remarks, &c.	Sweep.
2554	III. 960	3 27 38.4 41.0 41.9	110 57 2 56 50 56 45	e F; S; R; between 2 very faint stars v F; R; situated exactly between 2 stars 14 m (about one semi-diameter from either edge by diagram). e F; S; R; v l b M. Situate between 2 v S stars	741 652 642
2555	II. 262	3 27 44.5	115 30 28	B; L; R; p s b M; 2'. (The P D differs 4' from the working list, but it is expressly stated in the obs. that the index was correctly read, the difference having doubtless been noticed at the time.) v B; v S; the preceding of 3	646 802
2556	.....	3 28 41.3	125 48 29	v B; p L; l E; g m b M; the 2d of 3	802
2557	.....	3 28 51.3	125 47 9	B; S; l E; p m b M; the 3d of 3 of the same R A as the second	802
2558	.....	3 28 51.3	125 49 49	v B; L; R; p s b M. A fine nebula. The obs. of the place like that of Δ 591 above was lost by setting the instrument on the place given in Mr. Dunlop's Catalogue, and relying on his R A ($3^h 31^m$) which is too great, instead of sweeping over them, when they could not have escaped being regularly taken.	802
2559	A. 574	3 29 11	125 35 11	v B; L; R; p s b M. A fine nebula. The obs. of the place like that of Δ 591 above was lost by setting the instrument on the place given in Mr. Dunlop's Catalogue, and relying on his R A ($3^h 31^m$) which is too great, instead of sweeping over them, when they could not have escaped being regularly taken.	655
2560	III. 961	3 29 8.3 9.7	111 27 15 28 21	F; S; R; g b M; 15"	642
2561	.....	3 29 33.5	126 1 5	F; S; R; b M; 15"	641
2562	.....	3 29 58.5	108 54 20	\oplus ; p B; R; g p m b M; 70"	660
2563	II. 263	3 30 9.6	115 4 6	v B. Seen but no place or description further	801
2564	.....	3 30 25.8	126 4 35	p F; v S; R; p s m b M	652
2565	III. 451	3 30 58.6	108 59 34	B; R; g p m b M; 40"	646
2566	I. 58	3 31 5.9	113 34 15	\oplus ; v B; R; g m b M; 90". A globular cluster in all probability identical with this, was also seen in sweep 656, while searching beyond the meridian for Δ 562.	660
2567	II. 593	3 31 50.0	109 15 27	v B; the 1st of 3, seen but no place or further description	801
2568	III. 247	3 31 55.7	113 16 45	p F; R; g l b M; 30"	652
2569	.....	3 31 57.2 68.5	126 1 45 125 59 58	v B; p m E; p s m b M; 60" l. B; R; p s m b M; 50"	642 641
2570	I. 107	3 32 34.3	109 8 18	B; R; p s m b M; 30"	741
2571	.....	3 32 34.4	126 8 45	v F; S; R.	642
2572	.....	3 32 37.6	121 52 22	\oplus ; v B; p L; p s b M; r or resolved; 2'	656
2573	.....	3 33 4.7	134 39 39	v B	802
2574	.....	3 33 20.6	116 46 3	v B; the 2d of 3, seen but no place or further description	801
2575	II. 267	3 33 30.5	113 6 30	v B; L; R; first v g, then v s, v m b M; 5'	652
2576	.....	3 34 22.6	128 3 55	v B; R; p s m b M; 40"	659
2577	II. 291	3 34 32.0	104 2 36	B; R; p s m b M; 40"	752
2578	III. 248	3 35 22.0	112 38 50	F; S; E; g p m b M; 15"; has a * s f dist 2'	646
2579	.....	3 35 51.4	125 56 40	p B; l E; p g m b M; 55"	647
2580	A. 426	3 36 40.1	137 45 51	p B; p m E; g b M; 25"	642
		42.7	46 53	p F; E; p s l b M; 40" l	641
				F; S; R; 15"	660
				p B; v S; p s b M; 15" (clouded)	656
				F; v m E; v l b M; 3' l, 20" br; pos = 184°.2	649
				F; L; m E; v g v l b M; 90" l	757
				F; S; l E; g b M; 20"	647
				B; l E; p s b M	641
				p F; S; R; p s m b M; 20"	801
				B; L; p m E; s m b M; 100" l, 60" br	654
				v B; L; m E; v s v m b M to nucleus = * 10 m	805

No.	Synon.	R. A. 1830.0. h. m. s. d.	N. P. D. 1830.0. o. i. s.	Description, Remarks, &c.	Sweep.
2581	Δ. 562	3 37 ?	126 45 ?	B; p m E; p g b M. The place is taken from Mr. Dunlop's Catalogue, but I have reason to believe this R A too great and the N P D also materially in error—perhaps 126 35 would be preferable. It was found by sweeping past the meridian.	663
	.....	.....	.....	⊕; v B, and evidently a globular cluster. Observed past meridian, clouds having prevented its place being secured at the time of transit.	636
2582	.....	3 37 11.8	126 23 49	F; v L; g l b M; R; 4"	801
2583	II. 458	3 37 22.5	108 48 21	p B; R; g m b M; 40"	741
		24.2	48 16	p B; R; v s m b M to a nucleus = * 13 m; 60". (N.B. Both observations agree in making the degree of P D 108—whereas it appears in the reduction of my Father's observations as 109.)	652
2584	III. 249	3 37 22.7	112 26 34	F; S; R; g b M; 15"	647
		25.6	27 48	p F; S; R; b M; 20"	641
		25.9	27 55	p B; R; g p m b M; 40"	642
2585	.....	3 38 5.6	135 11 6	p B; v L; v m E; 3' 1, 20" br; pos = 221° 6.	654
2586	.....	3 38 54.5	135 10 31	F; v m E in pos = 39° 5; 3' long	805
		58.4	10 55	A ray nebula (v m E) v g p m b M; 2' 1; pos. 42° 3; 38° is no measure.	752
		59.4	11 53	p B; v m E; g l b M; a ray nebula, 4' 1, 20" br; pos = 38° 0	639
2587	.....	3 39 52.7	127 13 33	F; S; R; 15'; attached to a star 14 m	801
2588	II. 460	3 41 2.6	106 55 0	p B; v l E; p m b M; 25"	651
2589	.....	3 42 55.3	150 19 58	v F; R; g l b M; 15". In a constellation of B st forming almost a cluster.	756
		61.4	20 10	F; S; R; b M; 15"; one of a constellation with 7 B stars	501
2590	.....	3 45 25.9	162 12 10	F; irreg R; g l b M; 30"; has a * 7 m f, and others near	514
		.....	.....	Viewed past merid; found in place; p B; R; g b M; 30"	745
2591	.....	3 46 34.2	135 2 13	v F; l E; g b M; 25"	805
		37.5	2 16	F; S; p m E in the parallel; g b M; 15' 1	654
2592	.....	3 46 40.8	158 44 20	p F; L; R; v l b M; 50"	512
		42.8	43 31	p F; R; g l b M; 25"	508
2593	.....	3 46 59.5	110 57 55	e F; S; R; precedes 2 B st and the nebula III. 962	642
2594	III. 962	3 47 6.8	110 59 22	e F; S; makes an obtuse angled nearly isosceles triangle with two st 10 m n of it.	647
		8.8	60 56	p B; l E; g b M (newly polished mirror); makes an obtuse angled triangle with 2 st 10 m to its north	652
		10.5	60 30	F; S; R; makes an obtuse angled triangle with 2 B st, the one preceding, the other following it.	642
2595	Δ. 427??	3 47 35.4	137 59 4	p F; R; v l b M; 20". (Newly polished mirror, but the sky dull and haze forming; so that this may very possibly be Δ 428.)	654
		36.9	59 37	v F; p L; R; v g l b M; 80". I feel convinced this nebula is too faint to have been seen by Mr. Dunlop. Put on the 9-inch aperture, could not discern the least trace of it. Mirror polished yesterday, and in high beauty. Sky superb.	805
2596	.....	3 48 2.7	127 29 42	v F; L; E; v g v l b M; 23'	801
2597	Δ. 480	3 50 2.6	132 51 37	p B; R; g b M; 2' has 2 st 12 m near it	752
		3.0	51 22	p B; p L; R; 90'; makes a triangle with 2 stars 13 m about 1 radius of nebula (by diagram) from its edge.	639
		4.2	53 11	p B; R; 2' near a star.	804
2598	.....	3 51 52.2	125 57 1	v F; v S; R; 10'	801
2599	.....	3 52 7.2	156 30 1	p B; S; l E; p m b M; 18"	508
		10.1	31 58	p B; S; R; b M; 15"	512
2600	Δ. 438	3 52 7.3	156 42 5	F; L; R; v g l b M; 23'. With 9 inches aperture, and a mirror newly polished yesterday, and in high beauty, it is barely possible to discern with the utmost attention that this nebula exists; but to have discovered it with that aperture and power 180 would have been quite out of the question; possibly, however, 90 might show it better.	805
		12.2	42 11	F; v L; R; v g l b M; 3'. Sky dull, a haze forming	654
2601	.....	3 52 42.1	139 23 50	F; L; R; v g l b M; 23'; has north of it a triangle of st 12 m	744
		45.8	24 5	F; L; R; v g v l b M; 70"	516

REDUCED OBSERVATIONS OF

No.	Synon.	R. A. 1890.0. h. m. s. d.	N. P. D. 1890.0. o. f. s.	Description, Remarks, &c.	Sweep.
2601	.....	3 52 53.7	134 58 37	F; E in the parallel; v g v l b M; 60" l, 40" br.....	639
		54.3	57 37	e F; l E; S	752
		58.7	58 18	F; p m E; precedes 2 bright stars.....	804
2603	Δ . 569??	3 53 46.4	142 48 47	F; v S; R; p m b M; 12"; has * 3 m 15.5' prec in R. A., to northward	807
2604	.....	3 55 11.6	156 30 55	e F; S; R; (a doubtful object.) Has a * n p, 10 m, 3' dist.....	508
2605	.....	3 55 58.3	143 2 44	e e e F; S; R; between 2 st 12 and 13 m	807
		....	3 41	e e e F; S; R; R. A. not taken on the wires; requires a negative swing correction, being past meridian.	806
2606	.....	3 57 59.1	133 52 37	F; R; v g p m b M; 80". Not resolved. A companion to Δ 466	752
		63.3	52 38	F; R; g p m b M	804
2607	Δ . 466	3 58 20.0	133 48 57	Θ . B; p L; R; 3' diam. Resolved into stars barely perceptible	752
		21.2	49 37	B; L; l E; p s b M; 3'. It is just north of a great group of large stars 6, 7, and 8 m, scattered over two or three fields.	639
		22.8	49 38	B; R; g p m b M	804
2608	.....	3 58 55.2	158 6 5	p B; m E; v g b M; 90" l; pos 125.5	508
		56.1	6 25	B; m E; p g b M; 90" l, 15" br; pos 117.6	653
		58.4	6 47	B; p m E; S; g l b M; 25 or 30". (Cloudy.)	512
2609	Δ . 343	3 59 56.0	144 33 48	B; L; v m E; g b M; 3' l, 40" br	520
		....	35 1	B; L; v m E; s b M (by diagram); pos = 102.0 \pm ; P D rough. Transit missed.	521
2610	III. 499	3 59 57.0	99 17 15	v F; first v g, then p s, v m b M; 20".....	758
		58.1	17 19	e e F. So very faint that I almost doubt the observation	650
2611	.....	4 0 25.6	111 37 55	B; L; p m E; g b M; has a * 3 m s p 3' or 4' dist	642
2612	.....	4 0 51.8	111 30 30	p B; R; b M; barely in time, and too late for a good observation	647
2613	.....	4 1 43.6	143 7 39	e e F; v S; R; 12". In a very dark field; no * 13 m within 5'	525
		50.3	7 30	v F; v S; R; v l b M; 12"	655
2614	.....	4 2 4.9	144 33 29	v F; R	521
2615	.....	4 3 8.9	167 17 58	A poor cluster of about a dozen stars 9 ... 12 m within a space of about 5', the largest taken.	746
2616	Δ . 409??	4 3 23.8	158 21 11	B; E; s p m b M, growing more R internally; 60" l, 30" br; pos 77.0 ..	526
		26.0	20 13	p B; E; v s b M to a roundish nucleus.....	744
		....	....	p B; p m E; v s v m b M; seen in sweeping in vain for Δ 409	805
2617	.....	4 3 54.0	156 17 0	F; R; g l b M; among B st; one = 9 m, 3' n	508
		58.1	17 56	e F; v S; R; g l b M; 12"	512
2618	IV. 26	4 4 49.0	103 10 13	B; S; R; first p s, then v g b M; 20". A mottled disc, but so hazy at the borders that I have no doubt of its being a very distant and highly compressed \oplus . It is not a planetary nebula, though a near approach to one: does not bear magnifying. A power of 320 is of no use. A very remarkable and interesting object. (N. B. The minute of R. A. certainly correct.)	757
2619	.....	4 5 11.0	153 20 51	v F; S; R; g b M; 15"	756
2620	.....	4 5 23.7	123 17 1	B; R; p s b M; 60". The n p of two. (Pl. V. fig. 11.)	662
		24.9	17 6	p B; R; p s l b M; pos from the following neb = 517.9	663
		27.9	17 55	F; R; b M; 60". The preceding of two	635
2621	Δ . 600	4 5 29.2	123 19 14	a B ray; p s m b M; 4' l; the s f of two. See fig. 11, Plate V.	662
		30.4	18 11	p s b M; full 7' long; position 32.2	663
		32.4	19 10	B; v L; v m E; 5' long. A fine and curious object. The following and brighter of 2. In the ray is either a v F * or a knot in the nebula.	635
2622	.....	4 6 11.4	146 34 5	v B; R; has 2 st n f	521
		12.8	33 55	v B; p L; R; s m b M to a stellar nucleus. Has 2 st 10 m n f.	520
2623	.....	4 6 37.1	153 13 11	F; S; R. Has a v S star foll. Dist 13' rad of neb (by diagram)	524
		37.6	15 1	F; S; R. Has a v S star 1 diam s f.	756
2624	.....	4 7 7.8	121 59 22	v B; l E; p s v m b M; 50" l; 40" br	644
2625	.....	4 7 26.3	146 55 6	v F; R; p L; v l b M; 60"	519

No.	Synon.	R. A. 1830.0. h. m. s. d.	N. P. D. 1830.0. ° ' "	Description, Remarks, &c.	Swep.
2626	4 8 19.5 20.7	118 54 31 55 16	v F; E; r. Rather a doubtful object The suspected nebula of f_{511} . Certainly verified; v F; g v l b M; 15"	511 643
2627	4 9 23.5	148 10 10	B; p L; p m E; s m b M to a round nucleus = * 11 m.	519
2628	4 10 57.8 60.1	146 29 20 29 42	p B; R or l E; b M to an elongated nucleus B; l E; g b M to an extended nucleus. A D * precedes.	521 520
2629	4 11 30±	146 0 18	B; R; 40"	521
2630	4 12 32.2	146 12 1	v B; R; g m b M; 60" between 3 stars B; R; in a triangle formed by 3 stars v F; S; R; v g l b M; 20"	520 521 526
2631	4 13 7.6 8.0	140 34 40 34 35	F; R; 25"	744
2632	4 14 0.5 0.8	155 26 23 26 16	p F; l E; g l b M; 25" long. p F; p m E; g p m b M; 25" l, 15" br. [Min of R A by obs 15].....	805 654
2633	4 14 11.3	160 50 55	A star 7 m chief of a cluster 8th class—about 20 in number, loose and straggling.	513
2634	4 15 34.6 35.8	153 12 30 11 52	v B; L; m E; g m b M; r; 2' l, 1' br B; L; m E; v g p m b M; 90" l, 40" br; has a * 14 m at the southern edge.	808 756
2635	Δ. 338??	4 16 11.1	145 20 39	B; v L; first v g then s, m b M to a stellar nucleus. Diameter in R A = 15". A star 11 m involved, n p, gives it a distorted appearance. A curious object.	520
2636	12.8 4 16 17.9	21 2 138 39 43	p B; L; R; v g, then p s, b M. v F; S; R; g l b M; 20" (hazy)	521 526
2637	4 16 44.8	133 51 49	Found in place and viewed past meridian; not v F; S; R.	744
2638	4 16 48.2	134 1 19	F; S; R; g b M; 20"	752
2639	4 16 58.8	130 59 22	v F; S; R; 15" g b M; has a double star n f.	804
2640	4 18 37.7	147 22 7	p F; S; R; 15"; has a * 13 m, 1' n f. p B; S; R; p g b M. Has a * 10 m 60" dist and one 14 m dist one radius of neb from its edge, both s f.	658 519
2641	4 19 25.7 27.0 27.1	141 59 22 59 4 59 39	nor v F; R; g p m b M; 20"	807
2642	4 20 57.2 58.1	145 19 47 20 8	v F; S; R; p s l b M. v F; S; R; p g b M, dilute at the borders F; S; E; g b M F; S; l E; g l b M.	655 525 520 521
2643	4 21 59.4	132 31 47	p F; S; R; g b M a * 12 m prec 20.0; pos from centre of neb = 28° 8	804
2644	4 22 26.8	117 5 2	not v F; p L; R; g b M. (N.B. Time of transit somewhat confusedly stated in MS., which renders a mistake of 10' not improbable.) See the next observations.	643
2645	35.3 35.1	4 58 4 36	v v F; R; g b M; 15"	646
2646	4 23 39.4	117 20 ±	p F; S; R; g l b M 15"	511
2647	4 23 33.5	138 11 9	v F; v S. v F; R; b M; 15"	643 805
2648	4 23 45.0 55.6	138 9 24 145 24 16	F; R; b M; 20"	805
2649	4 24 8.3 9.6	145 26 25 25 42	B; m E; p L; p s m b M; 60" l. The preceding of 2 B; m E; s m b M; 60"; pos = 15° 0 e F; L; roundish undefined. The following of 2 e F; p L; l E; the following of 2	520 521 520 521
2650	4 27 21.8 23.9 25.4	134 4 54 4 44 3 37	p F; S; p s b M F; S; v l E; v l b M; 20"	639 752 804
2651	Δ. 339??	4 27 53.7 54.3	144 57 42 58 33	F; p m E; v g l b M; 20"	521
2652	4 31 2.1	110 59 17	p B; L; m E; s b M; 3' l, 2' br; pos 105° 8 B; L; m E; first v g then v s, m b M to a nucleus 5" in diameter; 3' l, 1' br.	520
2653	4 31 36.7	162 11 55	A nebula. No description v F; R; g l b M; 60"	652 523

No.	Synon.	R.A. 1830.0. h. m. s.d.	N.P.D. 1830.0. ° ' "	Description, Remarks, &c.	Sweep.
2654	II. 522 h. 526	4 32 30.4	98 56 6	F; R; g b M; 40"; near some small stars	758
2655	.....	4 33 16.3	107 19 40	e F; v S; R; between 2 stars	651
2656	.....	4 35 22.1	156 8 23	p L; p rich; irreg R cluster; p m comp M; 5'; stars 11..... 16 m....	517
2657	.....	4 36 58.0	156 31 50	F; R; g b M; 30"	658
		60.9	31 27	p B; S; R; g b M; 15"	508
		64.0	30 56	v F; R; g b M; 30"	761
2658	.....	4 38 30.2	131 48 31	F; p m E; g l b M; 40"	804
2659	.....	4 38 39.1	131 50 20	v F; l E; g l b M; 20"	804
2660	.....	4 38 43.3	159 8 37	F; R; g b M; 30"	523
2661	.....	4 38 47.9	158 59 54	v F; S; R.....	653
		49.9	59 32	v F; S; R; g b M; 12"	508
		49.9	60 21	F; R; g b M; 35"	759
2662	.....	4 38 58.0	160 55 1	p F; L; R; g v l b M; 2' diam	523
		58.2	54 53	v F; L; R; v g l b M; 2 1/2' diam	509
		58.3	55 12	p F; L; l E; g b M	751
2663	.....	4 41 5.4	135 5 26	e F; R; attached to a star 14 m.....	804
2664	.....	4 42 13.3	156 7 25	e F; S; R.....	658
2665	Δ. 296??	4 43 2.3	149 33 33	B; L; p m E; s v m b M to a nucl; 2 1/2' l; 1 1/2' br; a * 12 m involved..	519
		5.5	33 8	B; L; m E; first g, then p s m b M; 4' l; 1 1/2' br.	665
2666	.....	4 43 29.2	122 15 14	p B; L; irreg R; surrounds a * 12 m, touches two 21 m and has a fainter just at the edge.	645
		32.4	16 42	p B; L; irreg R; involves 4 stars, and is v g b about the chief of them ..	644
2667	.....	4 43 46.3	160 7 20	v F; S; attached to a star 10 m. A doubtful object	523
2668	.....	4 43 49.9	138 6 43	e e F; R; r, or else stars seen on it. Well defined (hazy).....	526
		52.2	6 19	v F; S; R; very near a star 15 m.....	805
		52.4	7 5	F; R; r, or has some v F stars involved	744
—	Nubecula Major	4 44	160°45'..161°	Lower part of zone begins to be filled with the faint light of the Nubecula Major. At 4° 47' this light increases, and we are evidently on the skirts of the Nubecula. At 4° 50'; N.P.D. = 160° 2' stars from 12 to 15 m are now very numerous.	751
2669	.....	4 44 26.0	159 7 48	v F; irreg R; 90"; r.....	653
2670	.....	4 45 0.9	124 13 21	v F; R; g b M; 20"	662
		4.6	13 47	e F; R; v l b M.....	663
2671	.....	4 45 48.7	150 5 11	B; R; first g, then p s l b M; 60"	756
		52.8	5 22	v F; p L; R; g b M; 50"	519
		55.4	5 16	p B; irreg R; p g m b M; 60"	524
2672	.....	4 48 31.5	159 37 57	F; S; R.....	523
		35.3	38 44	F; S; R. (Sky hazy.)	509
2673	.....	4 48 40.0	159 40 7	F; S; R.....	523
		41.3	40 13	F; S; R. (Sky hazy.)	509
2674	.....	4 48 51.4	158 30 31	v F; E; v l b M.....	508
2675	.....	4 49 5.9	158 50 41	p B; R; v g l b M; 40"	508
		7.6	50 42	⊕ p B; R; g l b M; 90". Resolved. With the left eye I see the stars. (N. B. The degree is 159 in the original, but this is a manifest error, the zone swept not extending so far as 159.50.)	653
		8.0	51 4	p B; p L; R; g b M; 50"	759
		8.3	49 51	p B; R; g l b M; 70". Has a * 10 m s f	522
		9.7	50 39	p B; L; R; g l b M; 80"	512
2676	.....	4 49 14.1	120 9 23	F; S; R; g l b M; 20". Has a * 9' m s f, 90" dist	645
		14.8	8 42	p F; l E. Has a * 10' m s f dist 60"	644
		17.0	9 21	F; S; R; 20". A star 10 m s f and a small D * s p. (N. B. The R.A. is 4.50 17.0 by the original obs.; but this must be presumed erroneous, as the three observations manifestly refer to the same nebula.)	511
2677	.....	4 49 51.1	159 23 46	p B; R; g l b M; 60"; r.....	523

No.	Synon.	R. A. 1830.0. h. m. s. d.	N. P. D. 1830.0. ° ' "	Description, Remarks, &c.	Source.
2678	.....	4 50 21.5	150 1 6	F; L; R; v l b M; 90"; very dilute at borders. A star g' m s f almost involved.	519
		24.0	0 51	F; p L; R; v g l b M; 50". Has a very delicate and beautiful 1st class double star attached.	524
2679	.....	4 50 25.9	143 38 10	B; S; R; p m b M; 20"	520
		28.7	38 10	p B; S; R; g p m b M; 15"	807
		30.1	38 14	v F; S; R; p s b M; 20"; very dilute at borders	525
2680	Δ. 73?	4 50 40.3	160 8 32	A v F, S, cluster	751
2681	.....	4 50 58.6	110 37 36	p F; p L; R; g l b M; 50"	652
2682	.....	4 50 59.0	153 16 25	F; R; v g l b M; 40"	808
2683	.....	4 51 5.4	160 2 2	e F; S; E; 40" l; r	751
		7.6	2 26	B; R; b M; 90"	523
2684	Δ. 76?	4 51 56.0	160 15 43	⊕; B; S; R; r	748
		61.4	16 12	⊕; B; irreg R; g b M. Resolved into st 14 m, with outliers as far as 4' diam.	751
2685	.....	4 51 57.2	159 42 46	A p B, S, cluster	523
2686	.....	4 51 58.5	157 12 0	v B; S; l E; p s b M. Double or extended wedge-shaped	653
		58.9	11 11	v B; E or binuclear; m b M; 40" l. The s p of two	522
		59.0	12 45	v B; S; p m E	652
		59.1	11 12	v B; S; E; b M; 15"	508
		60.2	12 7	v B; R with an appendage; g m b M; 30"	760
2687	.....	4 51 59.1	157 10 ±	v F; the n f of two	508
		62.0	11 40	e F; R; p L; the 2nd of 2, making a lozenge with the other, and two stars.	658
		62.4	10 31	v F; S; R; s b M; the n f of two	522
2688	.....	4 52 18.8	157 19 46	F; R; b M; 20"	653
		19.7	19 31	F; R; b M	508
		20.6	19 36	p F; R; v g l b M; 60"	760
2689	.....	4 52 51.4	159 40 55	p B; S. A knot of clustering stars	523
		51.6	39 47	F; S; R. (Sky hazy.)	509
		55.2	39 36	The second of a series of clustering patches	748
2690	.....	4 53 8.8	159 37 26	The third of a series of clustering patches. Oval	748
		12.6	36 43	A rather poor irreg R cluster. (Sky hazy.)	509
		13.5	36 55	A cluster, p B; p m E; 3' l, 90" br; stars 12 m	523
2691	.....	4 53 21.4	157 11 1	A double star, the chief of a p Rich, p L, cluster of loosely scattered st; 1 comp M; 8'; stars 11.... 15 m.	522
		21.5	11 45	A poor loose cluster 8' diam; stars 10.... 15 m; chief D * taken	653
		21.7	11 40	A double star, the chief of a poor loose cl 3 or 4' diam	658
2692	.....	4 53 37.9	116 17 25	v F; v L; v m E; v g v l b M; 4' l, 2½' br	646
2693	.....	4 53 47.0	156 56 36	e F; R; g b M; 40". A very starry field follows this, and hereabouts may be said to commence the denser part of the Nebula Major.	761
2694	.....	4 53 50.3	158 55 9	A S double * 1st class in centre of a S. R. neb	512
		50.3	55 20	v S; R; 12"	759
2695	.....	4 54 16.2	159 2 8	p B; L; R; g m b M	512
2696	.....	4 54 18.2	157 21 31	F; v S; R; has two or three stars appended	508
		....	22 4	p B; S; R; has two stars appended forming an arc with the nebula. (N.B. This obs makes the R A h. 54.2.1, but having been made in a hurried and somewhat irregular manner when the nebula was leaving the field, it is most likely that the sliding eyepiece was not brought fully up to its bearing; a source of error which has on more than one occasion produced embarrassment. The R A adopted is liable to no objection.)	760
2697	.....	4 54 23.3	158 20 11	B; R; r	759
2698	.....	4 54 42±	159 27 ..	v F; S; the first of a trapezium of 4 neb. Place estimated from those of the 2nd and 4th.	748

No.	Sym.	R. A. 1830.0. h. m. s. d.	N. P. D. 1830.0. ° ' "	Description, Remarks, &c.	Sweep.
2699	Δ 114	4 54 58.8 60.5	159 28 0 28 14	R; g b M; 2' (thick haze) B; R; resolvable; No. 2 in a group of four forming a sort of lozenge	509 748
2700	.....	4 55 4.4	128 57 46	v F; p L; v g l b M; 90"	801
2701	.....	4 55 11.3 14.0	157 26 29 26 10	A star 9 m in a faint cluster of 6th class A * 9 m in the centre of a poor cluster of v S stars 4' diam	760 508
2702	.....	4 55 18.1	159 26 ..	F; S; No. 3 in a group of 4. Place estimated from No. 2	748
2703	.....	4 55 21.5	158 27 14	v F; R; the preceding of two in the field	759
2704	.....	4 55 24.0	159 27 54	p B; v S; R; No. 4 in a group of 4	748
2705	.....	4 55 33.1	160 4 47	c F; irreg R; 2'	751
2706	Δ 167	4 55 41.5	158 28 29	v B; R; g b M; 60". The following of two in the field	759
2707	.....	4 55 48.3	159 30 9	v F; S; R	748
2708	.....	4 55 54.3	160 42 37	F; S; R; 20". Has a * 13 m close to edge (about 45° sf by diag.)	751
2709	.....	4 56 13.0	156 46 38	A very faint small nebula with 3 v S st involved; place deduced not from a sweep but from a drawing carefully made of its configuration with the neighbouring nebula, especially of the cluster /653, 14. See fig. 3. Pl. III.	
2710	.....	4 56 14.6 15.0 19.1	156 43 49 43 56 43 43	Chief * 9' m in a L loose cluster Place of a very close double star in a cluster class 6 A cluster, 6th class. (Plate III. fig. 3)	653 761 658
2711	.....	4 56 22.1	156 40 19	A v B, v L neb with stars (the chief of which in the anterior part of the neb taken) of a crooked rounded oblong shape. A fine object. See fig. 3. Pl. III.	653
		23.6 28.3 30.5 39.4	40 5 39 31 39 46 40 10	B; 4' 1; 2 1/2' br v B; v L; m E; stars seen v B; v L; irreg oval figure with stars in it v B; v L; irregularly extended, irresolvable but thickly dotted with many distinct stars. (N.B. The discordance in R. A. arises in part from the great magnitude and irregular shape of the object, and the want of a natural centre of reference: partly, however, to the state of the reductions in this sweep which are not very satisfactory.)	658 522 761 508
2712	.....	4 56 32.0 33.6	152 17 4 16 46	F; S; R; b M; 15"	756
2713	.....	4 56 44.8	157 57 23	v F; S; R; g l b M; 15"	524
2714	III. 500 h. 345	4 57 10.1	99 23 10	v F; S; R; 15". The zone here is full of grouping and clustering stars ..	760
2715	Δ 169	4 57 14.1 51.2	158 40 17 40 31	p B; R; g b M; It is visible in strong > and is much brighter than II. 522 or III. 399. Cluster of 6th class; p Rich; L; irreg fig; b M; st 11 18; fine object.	758 512
				A star 9 m the chief of a cluster of 6th class 4' in diam; nebulous. The most condensed part is v' south of the stars. (N.B. In the former obs it does not appear that this particular star was taken, nor what centre of reference was fixed upon.)	759
2716	.....	4 57 24.5 26.2 27.1 27.5	156 42 46 42 10 43 3 42 11	p B; p L; with one conspicuous star. See fig. 3. Pl. III. A star 10 m involved in F neb 2' diameter A star in the centre of a B, L, R nebula	761 658 653
				v B; v s m b M to a * 10 m which is double or triple. Other clusters and nebulae in field.	522
		29.2	43 0	B; irreg R; 2'; has a * 10 m in centre	508
2717	.....	4 57 27.7 35.2	160 28 43 29 17	F; S; R; g b M; 25"	523
				v F; R; 30". Taken at leaving the field, which, in so faint an object, is a source of uncertainty in R. A.	751
2718	.....	4 57 27.8	158 30 47	F; R; g b M; 20"	759
2719	.....	4 57 32.7	102 6 40	p B; p L; irreg R; or v l E; v g b M; 80" among p B st	757
2720	.....	4 57 32.7	153 33 25	v F; m E; g l b M; 25" 1; in field with many B and 1 v B * 7' m n p the neb.	808
2721	.....	4 57 47.1	156 36 41	p F; p L; irreg R with 2 or 3 B st	761
2722	.....	4 58 0.5 1.5 2.3	159 48 19 48 57 48 57	An irreg R, comp cluster, b M; 40" diam. p B; S; R; 40"; r; preceded by a hook of stars 12 m p F; R; r; among numberless stars	656 523 748

No.	Synon.	R. A. 1880.0. h. m. s.d.	N P D. 1880.0. o. r. s.	Description, Remarks, &c.	Swcep.
2723	.....	4 58 11.4 11.7 12.2	157 29 55 29 51 29 36	p F; R; p g b M..... v b; S; R; s m b M; 20" (evidently better seen) B; R or oblong; pretty evidently a double star with a nebula about it ...	658 760 512
2724	.....	4 58 20.4	156 40 41	v F; S; R; g b M.....	761
2725	.....	4 58 36.3	160 41 7	v v F; irreg R; a'	751
2726	.....	4 58 38.1	156 14 18 14 15	p B; L; R; g b M; a'	653
		40.7	14 15	B; L; R; v g p m b M; r; 3'.....	808
2727	.....	4 58 54.9	159 38 40 55.6	B; R; p m b M; 35'; r	657
			39 12	⊕; B; S; R; r	748
2728	.....	4 59 15.1	164 32 25	⊕; E; attached to and following a D * (9 = 9 m).....	514
2729	.....	4 59 20.6	157 59 14 25.1	v B; R; v s m b M; 30'	759
			25.1	v B; E; S. Stellar, like a * 9 m blurred	658
		26.5	60 6	v B; S; R; s v m b M; 15'.....	760
2730	Δ. 531?	4 59 20.7	128 13 41	B; v L; m E; regular elliptic; res. I see several small st in it	801
		23.8	14 36	v B; v L; m E; g l b M; 5' l, a' br; pos 314° stars seen in it. Visible with C and lamp illumination.	661
		....	14 ±	v B; v L; v m E; g b M; 4' l. Taken as Δ 531 but too late for transit, the observation having been missed by relying on Mr. Dunlop's place.	659
2731	.....	4 59 47.0	156 5 15	p Rich cl of S stars which fills field. In northern edge of the Nubecula Major.	808
2732	.....	5 0 3.1	122 11 11	p B; p m E; g p m b M; has a * 13 m following.....	645
2733	.....	5 0 25.3	162 8 14	v F; R; v g l b M; 40'.....	656
2734	.....	5 0 36.5	160 24 25	e F; R; 25'	657
2735	.....	5 0 37.3	151 21 58 42.1	p B; p m E; v g l b M; 40" l	756
			22 11	F; p m E; g b M; 70" l 25" br.....	524
2736	.....	5 0 46.2	159 48 11 52.2	v F; S; R; g l b M; 30' insulated	523
			47 43	p B; R; b M; 60"	513
2737	.....	5 1 5.2	159 48 18	F; S; R; v g l b M; query whether a * 11.12 m near it's f be not also nebulous.	526
2738	Δ. 81	5 1 12.9	160 2 12	F; p L; l E; a'	751
2739	.....	5 1 45.3	159 50 40 51 14	F; R; g b M; 40"	657
		45.8	51 14	F; R; g b M; 90"	656
		48.1	51 11	F; S; R; g l b M; 45". The preceding of two in the field	523
		50.1	50 53	B; L; R; v g b M; 21'.....	513
2740	Δ. 549	5 1 48.0	127 44 14	B; E; 3' l, 90" br; in a field strongly illuminated by the ☾ in her first quarter.	661
		....	46 ±	B; L; l E; first g, then p s m b M. Transit missed, P D very rough....	659
2741	Δ. 233?	5 1 56.2	156 20 56	v B; S; R; p s b M	512
		57.0	20 46	v B; v S; v s v m b M; a condensed knot of stars, two of which (one on either side) are exterior.	761
		58.3	20 11	B; S; R; s b M; 25"; has a 2 st very near, one n p, one s f	522
		59.2	20 15	A v S compact cl of st 11 m with (?) nebulosity; 20"	508
		59.7	20 48	B; S; R; has * 12 m n p	653
2742	.....	5 2 1.0	159 19 14 19 40	F (?); R; b M. (Thick haze in sky).....	509
		3.4	19 40	F; S; R; 30"	748
2743	.....	5 2 6.3	119 29 44 31 ±	p F; S; l E the preceding of 2	643
		7 ±	31 ±	v F; E; place roughly deduced from that of its companion.....	511
2744	.....	5 2 17.0	119 28 51 17.3	F; S; R; g l b M; 15" the following of 2	511
			28 14	F; S; R; the following of 2	643
2745	.....	5 2 36.3	158 13 47	p B; L; g b M; 3'	759
2746	Δ. 235	5 3 5.1	156 37 1	Nebula; no description but that it has a ⊕ following it	761
		5.4	36 30	p F; R; l b M; 25".....	658
		6.5	36 55	e F; S; R; 15" precedes a globular cluster	512
		7.5	36 31	v F; R; l b M; 40".....	522
		7.9	36 38	F; S; R.....	653

REDUCED OBSERVATIONS OF

No.	Synon.	R. A. 1890.0. h. m. s.d.	N P D, 1890.0. o. s.	Description, Remarks, &c.	Sweep.
2747	.....	5 3 18.1	159 51 40	p F; S; R; g b M; 40" the second of two in field	523
2748	.....	5 3 55.2	157 32 15	v F; R; a nebulous knot in the s p part of a cluster	760
		58.9	31 59	The southern of two nebulae in the same cluster of stars	508
2749	Δ. 256	5 3 58.5	156 39 35	⊕; B; Rich, compact; v m compressed	512
		59.5	39 15	v B; S; R cluster of distinct stars; m b M; 2' diam	508
		59.6	39 27	v B; R; g m b M; 50"; has several small st near it	653
		59.6	39 40	⊕; v B; L; R; g p m b M; 100"; resolved. I see the stars	658
		60.3	39 51	v B; R; p s m b M; 2' diam; resolved. The stars well seen	522
		60.5	39 26	⊕; v B; S; R; v m b M; resolved; has several outliers	761
2750	.....	5 4 0.1	157 29 28	v F; R; another nebulous knot in the cluster	760
2751	.....	5 4 10.2	127 11 38	v F; v m E; a long ray through a star 11 m.	801
2752	.....	5 4 12.4	160 33 10	v F; S; R; r	657
2753	.....	5 4 15.3	160 50 57	F; R; b M	751
		15.5	51 2	p F; v S; R; v l b M among many stars	513
2754	.....	5 4 23.6	157 29 13	A p L, Rich, 6th class cluster; irreg fig; in radiating streaks. Place that of a * 10 m (one of 3 such). It is within this cluster that the two nebulae No. 2748 and No. 2750 occur.	760
2755	.....	5 4 24.3	149 56 55	v F; v m E; g v l b M; 90" 1	756
		32.3	56 16	v F; v m E; 2' l, 20" br; pos = 162.0. I prefer the former R A as the zeros in / 756 are more numerous than in / 524, and the extrameridian correction evanescent in the former sweep, whereas in the latter it amounts to several seconds.	524
2756	.....	5 4 44.8	156 26 10	v F; 20"; the preceding of 2	658
2757	.....	5 5 7.7	156 27 20	v F; 20"; the following of 2	658
2758	.....	5 5 9.7	160 34 17	The most compressed part of a p F; L; branching cl of stars 12 ... 15 m	751
2759	Δ. 246	5 5 26.2	155 8 18	B; L; R; g l b M; 90"	513
		28.3	9 45	B; R; r with left eye; 2 1/2' diam.	803
2760	.....	5 5 28.0	158 16 37	F; R; 60"; r	655
2761	.....	5 5 28.0	159 36 54	v F; S; R; g b M; 20"	748
		28.4	36 44	F; S; R; 20"; the first of 3	523
		28.5	37 19	F; the preceding of 3	656
		31.9	36 45	F; S; R; 15"; the preceding of 3	657
2762	.....	5 5 43.5	159 34 8	F; p L; R; g l b M; 80"	748
		44.5	34 9	F; S; R; 25"; the second of 3	523
		47.5	36 50	The second of 3. Place roughly estimated from a diagram made at the time from those of the others.	656
		48.5	34 5	F; S; R; 20"; the second of 2	657
2763	.....	5 6 14.2	159 37 44	v B; S; R; p m b M; 40"; the last of 3	523
		16.0	37 28	B; R; g b M; 60"	748
		16.0	37 34	v B; R; p g v m b M; 60"; the following of 3	656
		18.5	37 35	B; R; g m b M; 30"; the following of 3	657
2764	.....	5 6 14.7	159 26 17	B; v S; l E; uniform in light; 10"	748
2765	.....	5 6 16.6	160 57 27	v F; p L; runs into and forms the first mass of a series of clustering groups	751
2766	.....	5 6 20.8	158 51 1	The first nucleus of a clustering group of mixed stars and neb.	759
		.....	.....	Seen. No place or description	512
2767	B. 895	5 6 40.2	158 39 48	A star 7' m, the chief of a large very loose clustering mass	759
2768	Δ. 170?	5 6 45.7	158 50 54	p B; irreg fig; the following of 2 in field together	512
		47.8	51 1	The second nucleus of a binuclear clustering group of mixed nebula and stars	759
2769	.....	5 6 47.7	160 56 11	The last of three clustering groups (bazy)	509
		49.0	56 22	The most condensed part of a large rich cluster of scattered stars which more than fills field.	513
2770	.....	5 7 47.5	160 45 1	The general middle of the same cluster	513
		68.1	48 55	A star 9 m the second in magnitude and near the centre of clustering groups which run together and form a cluster which fills the whole field. v l comp M; St 11 ... 16 m	751

No.	Synon.	R. A. 1880.0. h. m. s. d.	N. P. D. 1880.0. ° ' "	Description, Remarks, &c.	Secep.
2771	.....	5 7 13.5	161 58 26	F; R; b M; r. Hardly visible through a thick haze. The observation makes the R A 6" 13.5, but this is impossible from the context. It may be 8".	509
2772	.....	5 7 20.2 25.1	157 29 20 29 46	e f; the preceding of 2..... v F; R; the preceding of 2.....	658 760
2773	.....	5 7 32.9	157 32 31	F; R. [There has been most probably a mistake of 10' in reading or registering the chronometer committed here.]	653
		39.6	31 36	p F; R; g b M; 25"; has 2 s t 12 m to the north.....	522
		39.6	32 11	p B; R; g b M; 40"; the following of 2.....	760
		42.3	32 9	p B; R; g b M; 60".....	508
		....	32 40	F; R; b M; the following of 2. [The seconds of R A come out on reduction 48.3, but the nebula was taken on leaving the field, and the observation is noted as unsatisfactory in the MS.]	658
2774	.....	5 7 47.6 47.9 47.9	157 39 31 40 9 40 21 40 55	p F; v L; R; v g b M; r; 3'..... B; L; R; g b M; 3'..... p B; L; R; g l b M; 2'..... p F; v L; R; v g b M; 3'; a fine nebula. [The R A comes out 7" 27.5, but this cannot be admitted. The nebula was taken at leaving the field, and no doubt the slider of the eye-piece could not have been brought up to its contact. The P D, however, is good.]	522 508 653 760
2775	.....	5 8 5.8 7.6	159 10 59 11 21	B; E; 30"; has a double star in the centre (Pl. VI., fig. 11)..... B; S; R; g b M; 15'.....	656 748
2776	.....	5 8 29.4	161 24 8	The first and brightest star, 9 m, of a cluster of loosely scattered stars.....	514
2777	Δ. 508	5 8 29.7	150 14 47	Superb ⊕; v B; R; first v g, then s v m b M; 4'; resolved, the stars barely visible in strong twilight.	772
		31.7	14 12	Superb ⊕; all resolved into stars 14"; v s m b M to a blaze or nucleus of light; diam in R A = 15 seconds of time. Difference of left and right eyes in resolving this cluster very remarkable. Returning from the left to the right eye, the object (in comparison) appears as if glazed over with a kind of dull film.	638
		....	15 ±	v B; R; v s v m b M; 3'; all clearly resolved into stars from 14 to 16 m except at the centre, where they are massed together into a blaze of light.	754
2778	.....	5 9 18.5	156 30 56	v F; l E; g l b M; 25".....	761
2779	.....	5 9 19.5	147 35 49	F; m E; v g v l b M.....	665
		20.3	35 50	F; E; towards a star 11 m; g l b M 30"; has another * 9 m, n.....	664
		23.2	35 50	F; S; m E; pos 45° n f to s p. Has a * 11 m n f.....	519
2780	Δ. 170 or 172	5 9 30.6	158 57 48	⊕; a fine large cluster of st = 13 m; m b M. [The preceding of 3 objects, all of which were taken, and the R A therefore probably hurried and somewhat anticipated.]	523
		33.2	57 49	⊕; B; R; g b M; 3' diam; resolved into stars.....	656
		34.6	58 2	v B; L; l E; v m comp M; 3'; r.....	759
		35.4	58 20	v B; L; oval; resolved.....	748
		36.7	58 9	p B; S; R; a cluster of s t 12 m; diam 1'.....	508
		36.7	57 48	⊕; v B; v m comp 3' diam.....	512
2781	.....	5 9 44.4	157 59 30	p F; R; g l b M; 30".....	658
		44.8	58 58	F; R; v g l b M; 90".....	759
		46.0	58 51	F; R; g b M; 2'.....	522
		48.5	59 23	p F; p L; R; v g b M; 90".....	760
2782	.....	5 10 7.5	159 3 21	B; S; R; 35".....	653
		11.5	3 0	B; E; g b M; 2'; r. The second of 3 objects.....	657
		11.6	3 28	⊕; B; S; R; 25'; r.....	523
		12.4	3 22	A cluster nebula; S; R; p B; 40".....	512
		17.7	3 45	F; R; g b M; 40".....	748
2783	.....	5 10 17.9	159 2 49	A v B; L; Round cluster of stars 12 m, 5' diameter. (N. B. This obs. must refer to the general cluster in which the former is situated as a nebulous-looking knot—a combination of the most ordinary occurrence in the Nubecula Major, though very rare in other parts of the heavens.)	508

No.	Synon.	R. A. 1830.0. h. m. s. d.	N. P. D. 1830.0. ° ' " "	Description, Remarks, &c.	Sweep.
2784	.....	5 10 31.5	159 19 40	v B; R; g m b M; 50"	657
		31.5	20 41	B; R; g b M; 12 seconds diam in RA in time. Has a bright star to s ..	509
		32.1	20 6	B; p L; R; g b M; 90"	513
2785	.....	5 10 41.7	159 6 31	Centre of a L; oval; r; neb 3' or 4' l, 2 1/2' br	653
		43.0	6 10	A L, irregularly E cluster and neb. Has 2 bright neb n p	509
		44.8	4 57	The preceding part of a nebulous cl of irreg fig	523
		46.5	6 1	B; L; irreg fig; Binuclear; 3' l, 2' br. The s f of 3	513
		49.5	5 19	A bright cl of irregular figure	508
		51.9	6 24	Two oval nebulae joining	748
		53.6	5 50	An irregular cluster with a nebulous knot.—[N.B. This object, by diagrams, made in several of the observations, appears to consist of a resolvable and irresolvable portion, the general form being that of a somewhat crooked oblong extended from n p to s f at an angle of 60 or 70° with the parallel, the northern end being nebulous, the southern starry. This anomalous form and constitution will serve to explain the apparent disagreement of these descriptions and places.]	657
2786	.....	5 10 52.8	155 26 54	F; S; R; v g b M; 20"; has a * 7 m n f, dist 6'	518
2787	Δ. 172?	5 11 31.1	158 57 45	F; R; v g b M; 60"	759
2788	.....	5 11 52.1	174 15 5	p F; L; irreg R; v g b M; r; 3' diam. (R A open to much error for want of zero stars to be depended on.)	668
2789	.....	5 12 3.3	156 20 50	v F; R; 30"	518
2790	.....	5 12 23.5	160 59 2	e F; R; g v l b M; 90"	751
2791	Δ. 172 or 173?	5 12 27.0	158 55 35	v B; v S; stellar; has a * n p	653
		28.0	55 26	B; v S; R; r; 15"; has a small star very near the edge	523
		28.4	55 35	a v B; v S; knot of stars	657
		29.5	55 3	v B; S; R; 20"	509
		29.8	55 36	B; S; R	759
2792	.....	5 12 59.5	157 49 11	F; R; b M; 60"	522
		60.8	49 25	F; irreg R; r; query, if not a knot of v S stars	658
2793	Δ. 247 or 248	5 13 5.7	155 39 37	v B; L; R; v g m b M; 2'; r	512
2794	Δ. 175??	5 13 14.8	158 57 31	v F; p L; R; v g l b M; 45"	523
		15.1	58 4	v F; R; 40"	759
		16.9	57 25	v F; R; 20"	657
—	.....	5 13	159	The southern part of the field is here illuminated by the faint light of the Nubecula Major.	
2795	.....	5 13 25.0	156 29 6	e F; p L; R; 2'. (Sky dull)	761
2796	.....	5 13 28.9	154 8 48	p F; p L; R; v g l b M; 80"	515
		31.5	8 27	p B; R; g b M; 30"	518
2797	.....	5 13 29.9	122 19 42	v F; L; R; v g v l b M; 2'; has a * 12' prec and 3' n	644
—	.....	5 13 55.2	157 22 33	The star (L C 409, B 922 θ Doradus of the Brisbane Catalogue) marks the northern limit, and the commencement in R A or nearly so of a great irregular series of clusters, more or less connected by scattered stars.	760
2798	Δ. 210	5 13 58.4	157 34 10	Cluster of 7th class; a fine L cluster of sc st which fills the field. The point taken is in the middle of 3 groups in the most condensed part.	658
		63.9	34 3	The first of the series of clusters which extends northwards as far as B 922.	760
2799	.....	5 14 56.1	159 16 38	B; S; R; l b M; in the general irresolvable illumination of the Nubecula Major. Beyond the limit of the sweep, and the right ascension in consequence liable to error; [besides which, the reductions of this sweep run badly.]	513
		15.7	18 21	B; S; R; g l b M; 25"	513
2800	.....	5 14 7.9	157 39 23	The second of a series of clusters which extend northwards as far as B 922	760
		9.4	38 9	A poor cluster; the southern of three or four	508
2801	.....	5 14 11.4	157 31 23	The third of a series of clusters extending to B 922	760

No.	Synon.	R. A. 1850.0. h. m. s.d.	N P D. 1850.0. o. f. n.	Description, Remarks, &c.	Sweep.
2802	.....	5 14 19.9	159 30 25	p B; S; R; insulated in the recess of an arc-formed nebulous cluster. (See plate III, fig. 6, for this and several following objects.)	523
		20.1	30 13	B; R; g b M; the preceding nebula	509
		20.9	30 22	p B; R; g b M; 2'. An arc of faint stars connects it with another	748
		21.1	29 50	p F; R; g b M; insulated within an arc	657
2803	.....	5 14 22.6	159 33 55	The south preceding of two, forming a binuclear nebula at the southern extremity of an arc-formed cluster of stars.	657
2804	.....	5 14 27.1	159 32 45	The north following of two, forming a binuclear nebula at the southern extremity of an arc-formed cluster.	657
		27.9	32 55	p B; r; the most compressed part of an irregularly figured cluster, whose outliers form an arc.	523
		30.7	33 2	The second, or northern nucleus of an irregular binuclear nebula which terminates, to the south, an arc-formed cluster.	748
		31.1	33 22	B; irreg R; (the following of two very close) connected by an arc-formed cluster with another (No. 28 of same sweep).	509
2805	.....	5 14 32.0	159 33 50	A 3rd and v F nucleus of the nebular group at the southern extremity of the arc-formed cluster. From figure of Jan. 17, 1838.	....
2806	II. 289 h. 352	5 14 39.0	101 40 13	p B; R; g b M. Very visible in strong ϵ light	758
2807	.....	5 14 45.7	160 39 52	v F; l E; g v l b M; r. (N. B. The Nubecula Major is here very poor, and hardly anything of it seen.)	751
2808	.....	5 14 51.0	159 33 46	A fourth nucleus at the southern end of the arc-formed nebula and cluster, as laid down in the figure of Jan. 17, 1838. Pl. III. fig. 6.	....
2809	.....	5 15 13.0	156 18 31	p F; R; v g v l b M; 3' diam mottled (resolvable)	761
2810	.....	5 15 15.7	159 29 0	v F; follows a double star. An outlier of the arc-formed nebula and cluster. Laid down in drawing Jan. 17, 1838, whence also its place. See Plate III. fig. 6.	....
2811	.....	5 15 17.1	125 53 26	A large scattered cluster, which more than fills the field. Stars 10...12 m. Place that of a double star, the chief star.	661
2812	.....	5 15 42.5	156 20 41	e F; 2' diam	761
2813	.....	5 15 51.9	156 30 11	v F; v S; R; has a * p 25' dist	512
2814	.....	5 15 58.3	159 9 21	p B; R; b M; 15'	538
2815	.....	5 16 24.4	155 8 55	v F; p L; l E in parallel; v g l b M; 2' l; 90° br.	515
		24.5	8 20	p F; p L; E in parallel; 90°, 50°; has a * or two in it	518
2816	.....	5 16 36.3	162 15 51	v F; S; R; g l b M	514
2817	.....	5 17 2.5	157 30 25	p B; R; g l b M; 40°	514
		4.9	30 8	p F; p L; R; g l b M; 40°	538
		6.7	30 35	F; p L; R; g l b M; 70°	508
		9.1	30 49	p F; R; v g b M; 80°	658
2818	.....	5 17 10.4	159 38 35	F; R; g b M; 80°; r. On a ground of small stars	760
2819	.....	5 17 46.2	153 11 41	p B; irreg R; g b M; 25°. Among many st, one = 7' m, n p	513
		47.6	12 28	e F; p L; l E; v g v l b M	524
2820	.....	5 17 47.4	157 37 11	e F; S; R	515
2821	.....	5 18 3.8	158 2 57	F; R; v g b M; 40°; 3 stars 10' m precede	538
2822	Δ. 124?	5 18 6.0	159 49 35	F; R; 40°	759
2823	.....	5 18 11.8	156 47 55	p B; R; b M; 60°	513
		13.1	48 16	p B; S; R; b M; 15°	658
		13.3	47 44	L; R; b M	512
		15.0	47 46	⊕; p B; R; p s m b M; 2' diam. Resolved.	653
		15.3	47 31	p B; S; R; g p m b M; 40°	761
2824	.....	5 18 16.9	158 45 56	A star 7 m. The most southern and largest of a L, brilliant but poor cluster which fills the field. Stars 8, 9...12 m.	522
2825	.....	5 18 33.3	159 30 19	v B; R; g m b M; 25°	759
		34.0	30 24	B; R; g b M; 40°	656
		35.4	30 10	B; R; g m b M; 25°	523
		36.5	30 55	v B; R; g b M; 40°; r	657
		37.0	30 37	v B; S; R; g b M; 30°	748
4016	.....	5 18 38.9	157 27 13	F; S; R; r.	509
					760

REDUCED OBSERVATIONS OF

No.	Synon.	R.A. 1890.0. h. m. s. d.	N.P.D. 1890.0. ° ' "	Description, Remarks, &c.	Sweep.
—	—	5 18 19	160...161	Sky black in all the southern part of the degree swept, but the 5' at the upper end ($160^{\circ} 2'$... $160^{\circ} 7'$) marks the edge of the nebulous light of the Nubecula Major.	751
2826	—	5 19 13.5	156 55 51	F; R; g b M; 30". Among many stars	522
2827	Δ. 129	5 19 18.0	159 23 2	Fine cluster. Irreg fig. The chief nucleus (which seems to be a close double star, 9 m) taken.	523
		19.6	23 29	The most condensed knot (= 12") in a pretty rich L, s c, cl	656
		20.3	22 58	The brightest v S knot in a L irreg cl of st 11 m 16 n	748
		33.9	23 45	p rich L cluster 10' diam. It has in it a close triple star, easily taken for a nebulous knot. (N.B. This is doubtless the knot taken in the three foregoing observations, but it does not appear what point in the cluster was taken in this obs; probably the general middle.)	657
2828	—	5 19 37.2	156 58 8	e F; p L. (Possibly the same with No. 2826, but the nebulae are so crowded that they may with equal probability be different ones.)	760
2829	—	5 19 51.1	159 34 47	B; S; R; g b M; 25"; r	748
		53.6	34 15	B; S; R; v g v m b M; 15"	657
		53.8	34 37	v B; v S; R; g b M; 20"	509
2830	—	5 20 0.7	161 25 57	v F; L; irreg R; 3'	509
		0.8	25 0	F; p L; irreg fig; r; a' l, 90" br	513
2831	—	5 20 4.7	159 10 0	v F; L; R; g v l b M; 60"	657
2832	—	5 20 16.0	157 2 41	Cluster, 6th class; e F; L; irreg R; 4' diam. Resolved into S st with nebulous light.	761
2833	—	5 20 32.0	156 56 5	p B; R; g l b M; 40"	538
		32.2	56 38	p L; b M. Seen through cloud.	653
		32.5	56 41	p F; R; g l b M; 2'	761
		33.8	55 58	p B; S; R; v g b M; 20"	503
		34.3	56 47	p F; R; g b M; 60"	760
		34.5	56 35	p B; R; b M; 45"	658
		34.7	56 34	p B; R; p m b M. (In the body of the Nubecula Major.)	512
2834	—	5 20 49.7	159 56 52	v F; oval; r; 40"	751
2835	—	5 21 1.5	155 38 40	v F; R; 30". A faint and poor cluster precedes	515
2836	—	5 21 12.5	156 52 52	v F; S; R; g l b M; 15"; has 4 B st prec	527
		13.4	52 37	B; R; first g, then s b M; a group of B st prec	805
2837	—	5 21 18.8	156 1 58	Cluster 8th class; poor; sc st; a * 10 m the chief, in southern part taken	515
2838	—	5 21 36.7	159 42 0	p F; irreg R; g b M. (See remark on the next neb.)	748
		52.1	41 35	p B; R; 60". Situated in the main body of the Nubecula Major	509
		56.5	41 0	p B; p L; irreg R; r. Field full of light, consisting partly of stars, and partly of resolvable nebula.	513
2839	Δ. 131	5 21 57.1	159 38 50	v F; R; g b M. Field full of the nebulous light of the greater Nubecula. [NOTE.—As it is hardly possible, without some perceptible slip of the apparatus, to make so great an error in P.D. in an object of this nature, as this observation would imply, I cannot help supposing that an error of 20" ± has been committed in R.A., and that the places of the nebula 748, Nos. 25 and 26, should stand as follows:—748, 25—R.A. 5 21 56.7, P.D. 159 42.0; and 748, 26—R.A. 5 22 17.1, N.P.D. 159 38.50. This would reconcile everything. Now both these nebulae were observed in quick succession in this f at leaving the field, where there is always a liability to an anticipation of the R.A. from the sliding eye-piece not being urged up to full contact; and the quantity in question (at this P.D.) does not exceed what might very well arise from that cause.]	748
		74.4	38 21	p B; R; 60". Situate in the main body of the Nubecula Major	509
2840	—	5 22 7.8	158 5 13	F. The preceding nucleus of the compound nebula figured in fig. 2, Pl. III. Place by Δ R.A. and P.D. from the chief nucleus measured on diagram.	—
2841	—	5 22 10.8	156 17 38	A double neb; pos. 260°; dist 80". The first p B; S; R; 30". The second e F; R; almost stellar. See 30. note, p. 19.	538
		10.8	18 25	p F; irreg R; b M; 25"	658
		12.0	18 41	p B; R; p s b M	761
		14.7	17 48	B; e S; b M; 10"	508
		15.1	18 1	p B; S; R; v m b M, to a * 1 30"	522

No.	Synon.	R. A. 1850.0. h. m. s. d.	N. P. D. 1850.0. ° ' "	Description, Remarks, &c.	Sweep.
2842	.....	5 22 27.2	158 4 31	The 2nd nucleus of the composite nebula of fig. 2, Pl. III., from diagram ..	....
2843	.....	5 22 28.6	158 6 47	P; S; R. The third of a group of 4 nebulae connected by stars	538
		29.8	6 49	The first bright nebulous head of a large beautiful irregular cluster of resolved stars.	759
		32.0	7 2	The second nebula of a group of three	653
		33.5	7 13	B; S; R. One of the chief nuclei or knots of a large irregular cluster nebula. (See remarks on this nebula further on, and refer to figure 2, Pl. III.)	512
—	.....	5 22 35.8	158 4 3	Hereabouts may be placed the general middle of the group of 3 nebulae referred to in No. 31, f 653.	653
2844	Δ. 175	5 22 45.8	158 7 52	The second of the two nebulous heads of the cluster referred to in No. 36 of this f.	759
		46.6	7 39	The last of 3 nebulae in a zig-zag formed cluster	656
		46.9	8 7	p B; S; R. The 4th of a group of 4 connected by stars, &c.	538
		48.0	7 52	The third nebula in a group of 3	653
		49.5	8 8	p B; S; R. Another chief nucleus or knot of the cluster neb	512
		50.0	8 20	The southern and brightest nebular nucleus of a great branching cluster. [Note.—A reference to fig. 2, Pl. III. which is a very careful and exact representation of this highly characteristic object, will explain all the apparent discordances of these descriptions. It is proper here to observe, that each observation has been referred to its proper point by sketches made at the moment of observation in the sweeping book. In fact the places of the two principal nebulous masses only in the southern part of the object have been taken, none of the others being sufficiently prominent or definite. The diagram, however, from which the figure is taken, affords data for measurement equal to direct observation in a sweep.]	760
2845	.....	5 22 49.5	158 3 27	An outlier of the group figured in III. 2. Place from diagram. v F; p L	....
2846	.....	5 22 54.7	156 32 10	A nebulous group or knot	658
2847	.....	5 22 56.4	157 20 11	p B; S; R; b M. Has 2 st 9 and 10 m following	522
		57.6	20 37	p B; v S; R; 10"	760
2848	Δ. 89	5 22 59.8	160 5 52	p B; S; R; g l b M; a double neb. It has a v F neb attached n p	523
		62.2	5 54	B; R; a double nebula. (Clouding over.)	513
		63.5	6 25	A double neb. Pos. 339.1; 50' dist; each F; R; g l b M; 35" and 30" ..	657
		64.6	6 57	p B; binuclear (by diagram, double); g b M; 30"	751
2849	.....	5 23 39.7	154 7 16	A star 14 m, with an e F nebula about it	515
		41.7	4 26	v F. (Cloudy.) (N. B. The P D has been probably spoiled by the cloud.)	518
2850	Δ. 90	5 24 10.4	160 18 10	p B; R; g l b M; 50"	523
		11.3	18 5	v F; 40"; has a * 15 m at 60" dist pos = 19°.6	657
		13.2	18 57	p B; irreg R; v g b M	751
2851	.....	5 24 47.5	156 36 16	e e F; v v L. Great blotches of diffused nebulosity	761
2852	.....	5 25 0.7	162 37 50	p B; R; b M; 90"	672
2853	III. 590	5 25 2.4	104 11 24	v F; R; 25"	757
2854	Δ. 237	5 25 7.5	156 32 1	p F; R; g b M; r	761
—	.....	5 25 ..	160 23 ..	The southern edge of Nebecula Major. All the zone south of this is dark and starless.	751
2855	.....	5 25 29.8	154 54 9	p B; L; R; g l b M; 24' diam; a star 9 m n p	515
2856	.....	5 25 38.8	156 24 36	A rich, discrete cluster, class VII. Not much comp M; 10' diam stars 13 m.	761
2857	.....	5 25 56.3	158 37 2	p B; S; R; p s b M; 20"	759
2858	.....	5 26 2.5	156 44 10	A close first class D star, 10 and 11 m, with a thick nebulous mist like dust about it.	658
		5 4	43 51	B; R; or l E; binuclear or s b M to a double star 10 and 11 m. [Note.—The obs gives 22° for the R. A, but this is impossible. From the context it is presumed to be 26, being evidently the same object with No. 28, f 658.]	522

REDUCED OBSERVATIONS OF

No.	Synon.	R. A. 1830.0. h. m. s.d.	N. P. D. 1830.0. o. f. s.	Description, Remarks, &c.	Sweep.
2859	.....	5 26 7.3	160 3 7	A large ill-defined patch at the lower edge of the Nubecula Major, which is pretty definite here, and very bright.	751
		7.3	2 40	The first of several nebulae running together and forming a very remarkable group, which fills the field with a faint diffused nebulosity. See fig. 7, Pl. IV.	523
2860	IV. 21	5 26 9.9	112 4 3	F; irreg R; v s b M; to a st 12 m; 2 or 3 st involved, and several bright ones near.	647
2861	.....	5 26 14.4	126 30 12	The cusp of a cluster of stars, 3....11 m; arranged pretty exactly in a figure of 3 with appendages. * 8 m in cusp taken.	659
2862	.....	5 26 26.3	158 58 43	p B; S; R; insulated, but has a group of 4 nebulae following in the parallel.	538
		29.0	58 19	p F; S; R; g l b M; 40"	513
2863	Δ. 211	5 26 35.1	157 58 50	The second of a great line of rich clusters which are connected by abundant scattered stars. (The first not taken.)	760
2864	.....	5 27 2.0	159 59 0	The second of the group, fig. 7, Pl. IV. L; F; v g b M	523
		2.0	58 34	F; R; g b M; 40"	748
		6.0	58 57	p F; p L; irreg R	751
2865	.....	5 27 7.3	160 4 19	F; v L; v g b M; the third of several whose borders join, forming the group in fig. 7, Pl. IV.	523
2866	Δ. 136	5 27 10.0	158 58 34	v F; p L; R; the first of a group of 4 neb with stars. (N.B. The mirror newly polished. See fig. 20, Pl. VI.)	538
2867	Δ. 136	5 27 25.1	158 57 ±	F; S; the second of a group of 4 nebulae with stars. The place interpolated from those of the 1st and 3rd by the aid of a diagram made at the time. Pl. VI., fig. 20.	538
		29.3	56 45	The first nebulous knot of a large fine nebulous cluster 3' in extent. (N.B. This is doubtless identical with what is called the second in f 538, as it does not appear that in this obs the separate nebulae of which the group is composed were so well distinguished as in that f where a freshly polished mirror was used. The diagram of sweep 535 represents the (really) first as much fainter and more diffused than the others.)	759
2868	Δ. 77??	5 27 35.7	158 57 3	The third of a group of 4 nebulae with stars; p B; R; p l b M. Pl. VI., fig. 20.	538
	Δ. 136	5 27 45.0	158 57 37	A star 9 m, the chief of a curious cluster of mixed stars and nebulae 5' in diameter.	513
		47.8	57 28	The brightest star in a p L irreg cluster with nebulae mixed	509
		48.8	57 37	The chief star, 9 m of a large irregular cluster. (Note. The cluster referred to is obviously the "group of 4 nebulae with stars" of f 538.) Pl. VI. fig. 20.	508
2869	Δ. 136	5 27 45.1	158 58 ±	The last nebula in the group of 4 with stars. Place concluded (with no precision) from the 1st and 3rd by the aid of a diagram. [N.B. I suspect all the nebulae of this group to be placed several seconds too early by f 538 in R. A. The reductions in that f are not good, and the group lies at the southern limit of the zone beyond the fair grasp of the reductions.]	538
2870	.....	5 27 48.2	157 35 34	The third of a great line of rich clusters all connected by abundance of irregularly scattered stars.	760
2871	.....	5 27 56.0	120 55 2	e e F; S; R; south of several bright stars	535
		57.3	54 40	F; R; l b M; 30"; at the apex of a sort of cusp of stars	645
		58.0	56 12	v F; S; R; at the apex of a converging parcel of distant st	644
2872	.....	5 28 3.2	159 59 4	The 4th of several running together (fig. 7, Pl. IV.). F; S; attached to a larger (the 5th).	523
2873	.....	5 28 5.6	121 0 50	e e F; v S; certainly not to be seen except in a superbly clear night, as this is.	645
2874	.....	5 28 10.5	167 52 45	e F; l E; 40"; has a coarse double star n f, 6' distant	746
		14.5	53 23	e F; S; R; g b M; 15"	670
2875	.....	5 28 17.7	159 59 49	The 5th of several running together (fig. 7, Pl. IV.); attached to a smaller, No. 4.	523
2876	.....	5 28 18.7	159 58 59	The 6th of several running together (fig. 7, Pl. IV.). This also is a double nebula, having a very small one attached n p (No. 7.).	523
2877	Δ. 213	5 28 20.3	157 33 57	The following part of a large irregular cluster which extends obliquely across the field. (Note. This is one member of the collection of clusters whose details are noted in f 760.)	512

No.	Synon.	R.A. 1850.0. h. m. s.d.	N.P.D. 1850.0. ° ' "	Description, Remarks, &c.	Sweep.
2878	.....	5 28 30.9	156 22 16	v B; v L; oral; v g p m b M; a beautiful nebula; it has very much resemblance to the Nebula Major itself as seen with the naked eye, but is far brighter and more impressive in its general aspect as if the nebula were at least doubled in intensity. (Note.—July 29, 1837. I well remember this observation, it was the result of repeated comparisons between the object seen in the telescope and the actual nebula as seen high in the sky on the meridian, and no vague estimate carelessly set down. And who can say whether in this object, magnified and analysed by telescopes infinitely superior to what we now possess, there may not exist all the complexity of detail that the nebula itself presents to our examination!)	761
		32.8	21 12	v B; v L; E; g b M; 3'	508
		34.3	21 36	p B; v L; l E; g b M; 3'	522
2879	.....	5 28 37.6	158 48 15	e e F; R; b M; exceedingly difficult and delicate. (Sky perfectly clear.) The preceding of two.	526
2880	.....	5 28 49.3	158 48 20	F; g b M; north of a v B group of 2 st g m, 1 = 9', 3 or 4 = 11 ..	762
		51.4	49 18	e e F; R; b M; the following of two; in field to s is a brilliant group of stars.	526
2881	.....	5 28 51.3	159 7 12	A pretty rich irregular cluster which fills the field; a knot in it taken	748
2882	.....	5 28 52.4	159 15 35	A cluster; a double star in it taken	657
2883	.....	5 29 12.9	160 6 28	p B; R; g b M	523
		14.5	6 7	B; p L; R; g b M; 2'	748
		15.6	5 53	p F; p L; R; g l b M; 2'	513
		17.1	6 47	v B; L; l E; g m b M; 3'	751
2884	.....	5 29 16.8	157 33 42	The 4th of a great line of rich clusters connected by abundant irregularly scattered stars.	760
2885	.....	5 29 20.4	160 52 28	v F; L; irreg R; 3 B st precede	509
		22.7	52 3	p B; R; g b M; 2'; 3 st precede	513
2886	.....	5 29 22.2	155 20 0	e F; R; 30"	515
2887	.....	5 29 32.9	159 16 40	The second knot in a rich cluster of irregular figure of stars 11 16 m. The knot seems to be a close double or triple star.	748
		34.9	16 5	A little knot, a triple, perhaps a quadruple star, forming a point of reference in a cluster of the 7th class. The knot looks like a nebula till analysed.	657
2888	Δ. 178??	5 30 ..	158 52 ..	Here commences a very starry or resolved region of the greater Nebula ..	759
		30 3.2	52 29	The middle of the most condensed part of a cluster of stars 13 m which runs off to the s p and joins No. 39 of this sweep.	759
2889	.....	5 30 14.9	161 59 55	F; R; v l b M; 60"	672
2890	Δ. 214	5 30 25.6	157 0 50	Place of a double star class I, (h 3779), the chief of a great cluster of S at loose and filling the field. It is the forerunner of the great cluster-region of the nebula.	658
		27.6	0 12	v B; S; R. Here comes on the richest and brightest part of the starry and clustering portion of the nebula. (Note.—From this object being described at one time as a double star, and at another as a nebula, it is probable that it is in one of those singular close-knotted groups which especially characterize the nebulae.)	760
2891	.....	5 30 49.3	156 35 25	A B S stellar neb, or very close cluster 15"	512
2892	.....	5 30 51.8	141 2 25	e e F; p L; R; 40"	525
2893	Δ. 215	5 30 55.3	157 24 35	A very condensed pellet of stars 2' diam with stragglers. The nucleus is 10 or 12".	653
		56.1	24 28	B; S; irreg R; s m b M. A close compressed cluster, stars 12 ... 14 m	538
		57.9	24 21	⊕; B; S; R; comp M to a blaze of stars. Many stragglers	522
		58.3	25 1	⊕; v B; R; p s v m b M; resolved. (Note.—This obs makes the minute of R.A. 51, but the united testimony of all the rest shows this to be a mistake; and it appears by this very f that there are not two. The zone swept being only 1° in breadth; and 2, or, according to the MS., 3 minutes having elapsed without an object before this came to be taken.)	760
		59.5	24 35	⊕; B; irreg R; 2'. The stars easily distinguishable	512
		60.0	24 32	B; pretty rich, compressed cluster of stars 12 m	508
2894	.....	5 31 1.9	141 4 5	e F; p L; R; v l b M; 30"	525

REDUCED OBSERVATIONS OF

No.	Synon.	R.A. 1830.0. h. m. s.d.	N.P.D. 1830.0. ° ' "	Description, Remarks, &c.	Sweep.
2895	.....	5 31 28.1	157 6 16	A small highly condensed knot in an immensely large and very rich cluster, which fills much more than the field, and is like the Milky Way.	761
		28.6	4 31	A very small nuclear knot in an extremely rich assemblage of stars and clustering groups which fill the field.	522
2896	.....	5 31 38.4	107 56 54	A fine clustering group of large stars	652
2897	.....	5 32 11.1	159 17 49	p F; R; b M; 20"; in a field full of stars	748
		11.9	18 10	p B; R; b M; 40"; in a field rich with clustering stars	509
		12.3	18 3	p B; R; g l b M; 80" in the n p part of a cluster	513
		12.7	18 25	F; R; 30"; r	657
2898	.....	5 32 38.8	160 57 12	F; R; v g l b M; 3'	751
2899	.....	5 32 45.4	157 38 13	v B; S; R; p s m b M; 25"	538
2900	.....	5 32 46.8	157 48 10	A pretty L, irreg cluster 7th class; chief * 9 m taken (at leaving the field); the rest are 10....15 m.	759
		56.1	48 50	Chief * 9 m of a v irreg cluster, 4' long, 3' br	512
		57.1	48 49	A cluster, 6th class	760
2901	.....	5 33 5.4	159 22 28	The general middle of a cluster of loose stars 11....16 m. It is rich, and fills the whole field.	513
2902	.....	5 33 15.0	160 4 17	F; v L and diffused; irreg R; g b M	523
2903	Δ. 218	5 33 36.3	157 49 11	p B; v L; v g l b M; 1 E; 4'. A fine cluster precedes it.	759
		37.1	49 41	v F; v L; R; v g l b M; 4' diam.	760
2904	.....	5 33 41.4	161 11 30	p B; R; p g l b M; 2'; a star 10 m involved, p	509
2905	Δ. 98	5 33 46.7	160 16 3	B; R; g b M; 60". [NOTE.—The obs makes the degree 159, but although the zone swept in this f was intended to be only of 1° in extent (159....to 160), yet as the star B 1065 (P D 160.15) was taken shortly after, in it, it appears to have overlapped considerably into the next degree, on which account I am induced to regard this neb as identical with No. 35, f 751, in which no mistake of the degree was possible.]	748
		49.4	16 23	B; R; g b M; 60". See note on the last obs.	751
2906	.....	5 33 51.1	157 54 7	v S; F; R; 12". In the northern part of a cluster of stars 14 m, 8' long, 3' br.	538
2907	.....	5 34 54.1	169 58 40	v F; S; 1 E; b M; 2 at 9 m follow toward the north.	670
2908	Δ. 241	5 34 59.4	157 3 17	A very L, v rich cluster of separate stars 9....11 m, which fills the whole field.	508
		64.6	0 10	Cluster 7th class. The 2nd of two stars 9 m, which may be considered the leading stars of the very large and fine cluster of the Nebula Major, which fills many fields, is of all degrees of condensation, and much broken up into groups and patches.	658
		73.9	1 19	An ill defined nebuloid group of stars 15 m. (N. B.—Clouds very troublesome.) The field full of grouping stars.	653
2909	.....	5 35 16.7	161 48 30	v B; S; 1 E; g m b M; r. Almost a ⊕	672
2910	.....	5 35 23.8	157 40 11	B; L; g b M. The first of 3 neb which run together.	522
		26.1	39 25	v F; p L; irreg R. The first of 3, which run together. See Plate III. fig. 5.	538
2911	Δ. 240	5 35 23.8	156 8 10	p B; R; g b M; 60"; resolved into stars 13....15 m	539
		25.0	7 41	A rich, R, p L cluster of stars 12 m; 1 comp; 5' l; one * 11 m	515
2912	Δ. 100?	5 35 28.8	160 3 32	v F	751
2913	Δ. 219?	5 35 35.2	157 40 51	B; L; g b M. The second of 3 which run together	522
		45.3	40 30	B; L; E. The middle of 3 which run together	538
		46.6	40 57	v B; v L; g b M. The second of a train of 3. The first is a large irregular nebula.	760
		47.5	40 56	v B; v L. A singular figure like 3 nebula lumped together	508
		50.1	41 3	p B; irreg fig; g l b M. (By a diagram made at the time, it consists of 3 pretty distinct masses which extend over a considerable space in R.A. Plate III. fig. 5.)	512
2914	.....	5 35 53.5	156 59 46	A more condensed part of the great cluster (761, 59), of a crescent-like form, occupying one field. Rich and fine.	761
2915	.....	5 35 56.3	161 5 54	⊕; B; R; g b M; 2'. Resolved into stars.	656
		59.6	7 0	F (?); R; g b M; 3'. (Hazy sky.)	509

No.	Synon.	R A. 1890.0. h. m. s.d.	N P D. 1890.0. o. 1 2 3	Description, Remarks, &c.	Sweep.
2916	Δ. 220	5 35 57.1	157 41 11	B; L; b M. The 3d of 3 which run together. (Plate III. fig. 5.)	522
		57.1	41 47	v B; L; g b M. The third of a triplet.	760
		59.0	41 15	p B; L; R. The third of 3 which run together	538
2917	.....	5 36 10.5	159 9 42	v F; R; g b M; 90". [There is strong ground to suspect an error of a degree in the P D. It should most likely be 160.]	748
2918	.....	5 36 30.3	157 40 4	p F; L; R; follows a group of 3 running together	538
		31.0	40 16	F; irreg R; g l b M; r; 2'. (Pl. III, fig. 5.)	508
		31.6	40 7	Irreg R; r; 2' diam	760
		31.9	39 48	F; irreg R; g l b M.	512
		38.3	40 11	v F; R; follows 3 v B L nebulae which run together	522
2919	.....	5 36 36.7	157 5 23	B; R; v g l b M; 20"; a rich clustering part precedes	653
		37.1	5 56	v B; R; v g v l b M; 20"	761
		37.7	4 46	B; S; v g b M; 20"	508
		40.7	5 55	B; R; g b M; 40"	658
2920	.....	5 36 43.8	160 39 26	p B; S; R; g b M; insulated	523
		44.3	38 57	B; R; g l b M; 25"; has a * 9 m, 5', n p.	513
		46.2	39 52	p B; S; R; g b M; 20"	751
2921	.....	5 36 43.8	120 9 33	v F; S; R; g p m b M; 20"; in a rich field	645
		44.7	9 43	v F; S; R; p s l b M; 25"	535
2922	.....	5 37 13.3	159 1 18	The chief * (9 m) of a L, irreg figured, looped or hooked cluster of stars 12... 15 m; rich and various, and filling the field	759
2923	.....	5 37 30.4	160 20 0	v F; R; g b M; the first of a group of six nebulae. See Pl. IV, fig. 9.—(N.B.—In the original obs all the nebulae of this group in the 748th sweep have the P D 159°, but this having been satisfactorily proved to be a mistaken reading for 160; it is corrected accordingly here and subsequently.)	748
2924	.....	5 37 44.4	124 1 59	Cluster, 8th class; coarse, loose, and filling the field; stars 10... 13 m. Place, that of a double star in a vacant part.	663
2925	.....	5 37 46.1	160 17 15	The second of a group. Pl. IV, fig. 9.	748
2926	.....	5 37 51.5	159 42 40	A very faint large oval ill-defined nebula; not taken in sweeping, but laid down from a careful drawing. See Notes on the Catalogue of Nebula Major.	
2927	.....	5 38 8.1	157 31 6	F; l E; g b M; 2'	760
2928	.....	5 38 9.0	159 29 10	Cl VI; v F at and nebulosity of irregular branching figure, or rather 3 clusters connected. See Notes on Catal of Nebula Major.	
2929	.....	5 38 20—	159 53 10	v v F; v v L; v g l b M. See do. do.	
2930	.....	5 38 27.1	161 6 20	p B; S; R; g b M; 30"; insulated	523
2931	.....	5 38 29.3	159 30 57	A v L v rich cluster of sc at 10... 15 m which more than fills the field..	513
2932	.....	5 38 40.6	160 46 13	p B; R; b M; the preceding of 2 on the same parallel; a star 9 m between	523
2933	Δ. 102	5 38 43.2	160 15 10	B; R; g b M; 90"; the 3rd of a group of 6.	748
		43.9	15 52	v B; R; the 3rd of a group of 7. Pl. IV, fig. 9.	751
2934	III. 241	5 38 43.5	112 4 50	e F; R; g b M; 20"	647
2935	.....	5 38 43.9	160 21 24	p F; the 4th of a group of 7. Pl. IV, fig. 9.	751
		49±	21 54	p F; S; R; g b M; the 5th (4th properly) of a group of 6, R A only estimated from a rough diagram incorrect (as it would seem) in the order of the objects.	748
2936	.....	5 38 46±	160 13 24	v F; the 5th (4th in MS) of a group of 6. Pl. IV, fig. 9.	748
2937	.....	5 38 59.0	156 57 46	v F; E; g l b M; 40"; north of 2 stars 10 m	761
2938	Δ. 103??	5 39 29.0	160 18 54	p B; R; last of a group of 6. Pl. IV, fig. 9.	748
		31.6	19 50	B; the 6th of a group of 7	751
2939	.....	5 39 40±	160 16 ±	v F and S; the last of a group of 7; this nebula escaped notice in 748. Pl. IV, fig. 9.	751
2940	Δ. 143	5 39 50.1	159 5 37	The middle of a large extended faint nebulous mass which forms the northern branch of the great looped nebula, and is almost, or entirely, detached from it. See the next object.	513

No.	Synon.	R. A. 1830.0. h. m. s.d.	N. P. D. 1830.0. ° ' "	Description, Remarks, &c.	Sweep.
2941	Δ. 142	5 39 51.3 52.8 53.4 53.7 53.9 54.0 54.0	159 11 17 11 21 11 22 11 14 11 6 11 9 11 2 11 5	The nucleus of the great looped nebula about 30 Doradus..... The chief star of the great nebula..... Do..... Do..... Do; the great nebula; an assemblage of loops..... Do..... Do..... See Pl. II. fig. 4, and the explanation.....	757 523 653 656 508 509 513 657
2942	5 40 16	159 34 28	p L, p B, m E, of irreg rounded and somewhat serpentine figure, much brighter in its foll part; E generally in parallel. Involves 5 stars, 2 of which are 10 m. See Catal of Nubecula Major.	
2943	5 40 31.2	160 46 13	B; R; b M; resolved; the following of two on the same parallel, a star 9 m intervening.	523
2944	Δ. 594	5 40 48.6 55.2	124 18 47 19 28	⊕; B; R; with an appendage to northward; 2½ diam. (N.B.—I have no confidence in this R. A. The reductions of this / run badly, and the object was taken at leaving the field.) B; irreg R; g b M; 3' 1; 2' br with stars appended. This R. A. to be preferred.	662 663
2945	5 40 58.4 62.7 66.1	154 22 18 22 35 22 29	B; L; R; g l b M; 90'; has a * 10 m 2' dist 25° s f..... p F; L; R; v l b M; 2'..... F; R; g l b M; 40'.....	518 515 539
2946	5 41 5.1	145 36 20	e F; R; v l b M; 40'.....	521
2947	5 41 5.6	159 44 39	The preceding of two forming a double nebula. The place deduced from that of the following and brighter, by Δ R A = 7'.1, Δ N P D = 20'', as they result from the drawing of Dec. 4, 1837. Pl. III. fig. 4.	523
2948	5 41 9.8	159 49 43	The north preceding of the four principal nuclei of the nebula of Pl. III. fig. 4.	
2949	Δ. 152??	5 41 10.9	159 51 33	The most southern of a group of 4 or 5 nebulae, 5' diam mixed with stars. This is the south preceding of the four chief nuclei of the complex group of Pl. III. fig. 4.	523
2950	Δ. 145?	5 41 12.7	159 44 13	B; R; double; the other sp is F; R; followed by clustering stars.	523
2951	5 41 15.0	159 29 10	Cluster VI of v F st and nebula. See Catal of Nubecula Major.	
2952	5 41 28.3	159 49 14	The north following nucleus of the complex group of Pl. III. fig. 4, from drawing.	
2953	5 41 32.2	159 50 41	The south following nucleus of the complex group of Pl. III. fig. 4, from drawing.	
2954	5 41 34.9	159 45 47	A very faint nearly round nebula close to a star 10 m, not observed in sweeping, but laid down, Dec 4, 1837, in the drawing fig. 4, Pl. III. whence its place is derived.	
2955	5 41 48.2 49.3	158 32 42 32 21	p F; S; R..... e F; S; R; insulated.....	673 538
2956	5 41 49.7	159 45 19	B; p S; R; l b M; follows a star 10 m with other S st about it. Not observed in sweeping, but laid down in the drawing of Dec 4, 1837, whence its place is derived, III, 4.	
2957	5 42 20.0	159 31 55	v F; S; m E; g l b M; r' 1; perhaps a v F double neb. See Catalogue of Nubecula Major.	
2958	5 42 29.1 30.3	142 9 0 158 26 25	e F; R; 40'; a line of 3 st, 10 m to s, points nearly to it..... v F; S; R; 12'.....	765 538
2959	5 42 32.4	152 51 26	F; irreg R; p s b M; s f a small group.....	524
2960	52.1 52.6	51 24 51 3	e F; S; R; has a star 16 m in centre..... p F; R; p s l b M; 50'.....	539 756
2961	5 42 51.0 52.4	157 24 20 24 4	A star 9 m, chief of a F irreg oblong cluster 3' in extent..... Cluster, irregularly elongated; not very rich.....	658 760
2962	5 42 54.5	158 26 25	F; S; R.....	759
2963	5 42 52.0	159 17 20	Cl VI. v F, R, 60'', partially resolved. See Catal of the Nubecula Major	.....
2964	Δ. 184??	5 42 54.9	159 0 4	v F; S; R. This nebula forms an appendage to the skirts of the great looped nebula 30 Doradus, which hang down in visible fringes from the upper (southern) part of the field.	759
2965	5 43 8.2	141 36 58	p B; R; v l b M; 30'.....	525

No.	Synon.	R. A. 1830.0. h. m. s. d.	N. P. D. 1830.0. ° ' "	Description, Remarks, &c.	# sweep.
2965	Δ. 185??	5 43 15.8	158 20 55	A small close knot or cluster, 40"	759
		—	20 25	B; S clustering group or ⊕; 30" stars visible. [N. B.—This obs makes R A 5 42 48.1, but this must have been observed by mistake on the moveable wire. See Catal of Nubec Major.]	538
2966	Δ. 147??	5 43 20.6	159 17 21	The cluster s f the great looped nebula	522
	Δ. 151?	22.0	17 23	A bright S cluster of distinct stars. (Thick haze.)	509
	or	24.9	17 12	⊕; B; R; 3'; all resolved into stars 13...16 m	673
	Δ. 154	25.0	16 50	⊕ irreg R; p s m b M; 2'	657
		....	17 11	B; S; m comp; not m b M; irreg oval; 3'; stars distinct 13 m. [This obs makes the R A 10.3, which I have not allowed to stand against the united weight of the rest. The object was taken at leaving the field, and the slider probably not brought fully home to the stop.]	748
2967	.....	5 43 32.9	111 36 54	v F; S; R or l E; g b M; 15"	647
2968	.....	5 44 11.3	161 24 31	p B; L; p m E; g l b M; has a * 13 m in the middle	523
2969	.....	5 44 25.5	156 58 46	p F; R; g b M; 80"	761
		34.6	58 37	v F; R; 30". The obs in R A is marked as uncertain	760
2970	Δ. 153??	5 45 11.5	159 14 40	e F; p L; l E	657
2971	.....	5 45 14.0	160 42 41	F; R; g v l b M; 60"	673
		19.5	43 7	B; R; g m b M; 40"	751
2972	.....	5 45 15.2	158 36 19	p F; p L; R; v g l b M; 35"	538
		15.8	36 31	F; S; R; g b M; 20"	522
		18.8	36 39	p F; p L; R; v g l b M; 80"	512
2973	.....	5 46 51.2	161 3 0	v F; S; R; g b M	673
		52.7	3 47	v F; R; g b M; 40"	751
2974	.....	5 46 52.1	158 6 11	e F; p L; irreg R	538
2975	Δ. 155	5 46 54.3	159 50 35	A p B cluster nebula 90"	523
		56.8	50 5	F (?) L; R; thick haze	509
		57.2	49 50	F cluster; irreg fig; g b M; 2'; resolved	657
		59.3	50 54	F; irreg fig; r; one star seen; 90"	673
		....	50 16	Irreg oval cluster; v F; 2' diam; v l comp M; almost nebulous. Stars = 16 m. [This obs gives the R A 46° 39'.5 which must evidently be rejected. Taken at leaving field, the eye-piece having remained untouched since No. 42 of the same f. See note on that obs.]	748
2976	.....	5 47 13.3	140 37 35	e e F; v S; n f a triangle of stars 10 m which form part of a bright group	762
2977	.....	5 48 6.8	158 33 43	F; S; R. A star 11 m precedes	759
2978	.....	5 48 10.1	157 29 46	p B; E; resolved. I see the stars in it; 2' 1	522
		10.4	30 21	p F; irreg R; 40 or 50"; v l b M	538
		11.2	29 45	F; irreg R; with small stars	760
		13.4	30 8	p B; S; resolved	512
		14.4	30 25	F; irreg fig; 90" 1; 15" br; r	658
2979	.....	5 48 50.1	159 10 57	A v S, B knot, probably 6 or 8 v S stars wedged into a close group	748
		54.5	10 50	⊕; v s m b M; 15"	657
2980	.....	5 49 30.1	153 42 49	F; R; v g l b M; 60"	539
		30.3	43 27	v F; p L; R; g l b M; 80"	515
—	Nubec.	5 50	158°..159	Here follows a legion of v small scattered stars all indefinite and loose	
2981	Δ. 106	5 50 34.3	160 6 30	B, L neb; 6' l, 5' br; resolved, in part; chief * 11 m taken	513
		34.8	7 2	Cluster 6th class; F; oval or irreg fig; v m comp; st = 15 m	751
		35.1	6 39	p B; L; irreg R; g l b M; 3'; resolved into st 15 m	523
		35.4	7 8	Cl; irreg fig; consists of 3 or 4 disjointed clusters, the middle one the largest and brightest; of 3 or 4 L st and nebulosity; chief * taken.	673
		37.5	6 20	Cl 6th class; irreg R; F; g l b M; 3' barely resolved into v S stars and a few large ones.	657
2982	.....	5 50 43.2	161 31 11	v F; v g l b M; 3'	673
2983	.....	5 51 12.4	155 21 0	p B; v S; R; v g l b M; 12"	515
		13.1	21 9	p B; v S; g m b M; 15"	539
		13.2	21 29	p B; e S; R; g b M; 10"	518

No.	Synon.	R. A. 1830.0. h. m. s.d.	N.P.D. 1830.0. ° ' "	Description, Remarks, &c.	Sweep.
2984	5 51 59.9	116 40 8	e F; S; R; has a * 13 m in centre	530
2985	5 52 14.8	159 31 38	v F; R; 50'; g b M	523
2986	5 52 41.6	159 23 48	B; S; R; 15'	523
	43.2	23 40	p B; v S; R; 12"	657
	43.9	24 14	p F; v S; g m b M	748
2987	5 52 42.6	157 21 53	p F; S; R	653
	42.8	21 58	F; R; g b M; 30"	658
	43.9	21 56	p F; S; R; g b M; 18"	522
	44.5	21 53	p F; R; g b M	760
	46.4	21 35	p B; R; g l b M; 45"	508
	46.9	21 47	F; R; l b M; 30"	538
	48.0	22 23	F; R	512
2988	5 52 59.1	149 56 10	Chief * of a cluster 8th class of about a dozen bright and some smaller stars	665
2989	5 53 51.0	161 12 45	p B; p L; R; g b M; 60"	513
	52.5	12 25	F; R; p m b M; 50'	673
2990	5 53 58.2	157 27 28	p F; S; R	653
	58.3	26 52	p F; R; b M; 30"	538
	58.5	27 21	F; R; g b M; r	522
	58.9	27 31	p F; R; g p m b M; r	760
	59.5	27 15	v F; R; g l b M; 60". Among stars	512
2991	5 54 16.7	161 7 45	B; L; R; g b M; 90"	513
	17.7	7 40	v B; R; g v m b M; 80"; r	673
	18.8	8 14	⊕; B; R; g b M; 40"; r	656
	22.8	8 57	B; R; g m b M; 80"	751
2992	Δ. 160	5 54 21.3	159 31 52	p B; R; 30"; the preceding of 2	523
	22.0	30 52	⊕; p B; R; g m b M; resolved; stars 14 ... 16 m; has a v v F neb n f	748
	22.3	30 48	p B; R; b M; 60"; has a * 10.11 m, n p (thick haze)	509
	24.4	31 15	p F; R; 40". Remarkably situated in a triangle of S stars; the preceding of two.	657
2993	5 54 31.9	155 51 45	e F; S; R; has 3 B at pretty distinct towards the south	515
2994	5 54 38.0	159 30 42	v F; R; 30"; the following of 2	523
	38.9	30 35	v F; R; 25"; the following of 2	657
2995	5 55 11.3	158 37 0	F; l E; g b M	759
	11.4	37 16	p F; irreg R; p s b M	522
	12.3	37 25	p F; R; b M; 30"	538
2996	5 56 25.6	149 7 42	e F; S; R; 20"; has a * 12 m, s f very near	519
2997	5 56 29.4	158 13 29	F; R; b M; 20"; connected with stars, &c	656
	32.1	13 15	v F; R; b M; 30"	538
2998	5 56 37.3	160 56 47	F; l E; r	751
2999	5 56 50.5	140 43 55	e e F; attached to a star 15 m	762
	51.3	44 27	e e F; R; attached to a v S star. [In the obs this is called "rather a doubtful object," but all doubt is removed by the subsequent obs of f 762.]	526
3000	5 57 16.4	159 35 3	F; v S; R; v s b M; stellar	673
3001	5 57 26.2	159 2 8	F; R; b M; 45"	538
3002	5 57 45.8	156 25 1	e e F; R or l E; attached to a * 16 m	761
3003	5 57 55.3	157 16 16	p B; R; g b M; 20" (?)	522
	56.2	16 24	p F; R; v g b M; 90"	760
	56.5	16 19	F; L; R; g l b M; 100"	508
	56.6	16 11	F; L; R; g b M; 90"	512
3004	5 58 5.3	155 28 49	p B; L; R; v g l b M; 80"	539
	5.6	28 33	v F; p L; R; v l b M; 80"; in a rich field	515
	6.0	28 56	F; L; g v l b M; 90"; in a rich field	518

No.	Synon.	R. A. 1830.0. h. m. s. d.	N. P. D. 1830.0. o. i. ii	Description, Remarks, &c.	Seep.
3005	Δ. 196	5 58 39.9	158 28 8	B; S; R; 20"	538
		39.9	27 39	p B; R; g b M; 30"	656
		40.8	27 38	B; R; g b M; 30"	759
		42.3	28 46	F; R; the preceding of three	522
		44.5	28 29	p F; S; irreg R; p s b M; 25"	512
3006	Δ. 161??	5 58 47.4	159 11 56	v B; R; g m b M; 60" (in a f of 1° continued to 6° 4', in which no other nebula occurs after this.)	748
		49.1	12 0	v B; R; g b M; 30"	523
		50.3	12 7	⊕; B; S; R; g m b M; 70"; resolved	673
		50.5	12 10	⊕; v B; R; v g v m b M; r. — [NOTE. The minute of R. A. given by this obs is 59, but this is decidedly mistaken. (See the remark on f 748 above, no nebula under those circumstances, however faint, to say nothing of so conspicuous a one, could by possibility have escaped notice.)]	657
3007	Δ. 193	5 58 58.8	158 38 13	p B; R; g b M; 40"	759
		59.2	38 11	p F; S; R; the second of three	522
		60.3	37 48	p B; S; R; has a * 15 m close to the edge, n f.	538
		63.2	38 24	p F; S; irreg R; p s b M; 25"	512
3008		5 58 59.3	158 17 52	p F; R; g b M; 30"	759
3009		5 59 17.3	172 9 41	F; S; R; g b M; 18"	668
		20.8	9 47	F; irreg R; p s b M; 40"	666
3010		5 59 24.4	153 43 35	F; R; g l b M; 40"; a * 9 m follows in parallel, and 3 more 11 m near	518
		25.7	43 11	v F; p L; R; v g l b M; 80"	535
		25.7	43 14	F; R; v g l b M; 40"	519
3011	Δ. 194	5 59 46.5	158 31 4	⊕; no other description	656
		47.8	30 48	v B; R; p s m b M; 60"	759
		47.9	30 32	v B; R; m b M; 40"	538
		50.6	31 36	⊕; B; R; p s b M; resolved; much compressed; the 3rd of 3	522
		51.6	31 10	v B; R; g m b M; 90"	512
3012	Δ. 223?	6 0 11.6	157 56 54	F; S; R; g b M; 15"	760
3013		6 0 24.8	164 21 25	F; p L; R; g p m b M; 2'	672
3014		6 0 50.0	111 43 46	F; p m E; g l b M; 40"	647
3015		6 1 0.5	158 38 54	p F; R; l b M; 50"	538
		4.5	38 39	v F; L; R; g b M; 2'	512
3016		6 1 7.1	160 43 10	e e F; v L; R; g l b M; 4'	657
3017		6 1 28.9	156 51 16	e e F; R; p L; g b M; 2'	761
3018		6 1 35.2	162 58 40	p F; R; g m b M; 90"	672
3019		6 1 45.3	153 45 49	e F; v S; R; 10"	539
3020		6 1 46.7	157 43 31	F; R; l b M; 15"	653
		48.9	43 42	p F; irreg R; r.	760
3021		6 2 23.8	155 15 8	v F; S; R.	515
3022		6 4 0.6	124 4 15	p F; v m E; g v l b M; 2' 1	663
3023		6 4 36.6	142 29 5	p B; v S; E; v s b M; a ruddy star 9 m prec about 5' in R. A.	765
3024	II. 265	6 4 57.3	111 46 7	F; R; p s l b M; 60"	533
		57.9	45 55	p B; R; g m b M; 40"	647
		58.6	46 20	B; p L; R; p s p m b M. Many stars near it	532
		59.6	46 11	p F; R; g b M; 60"; r.	768
3025		6 5 17.9	159 33 28	Double nebula, pos 12° 5'; larger p B; R; g b M; 40"; smaller v F; R; g l b M.	523
		19.3	33 43	F; irreg R; g b M	673
		20.3	33 40	v F; irreg R; g b M; 50"; r.	657
3026		6 5 41.7	155 3 54	F; irreg fig; g l b M; has 2 or 3 stars in it.	518
3027		6 6 1.6	164 42 15	v F; R; g b M; 2'	672
3028		6 6 23.1	157 4 27	v F; R; 40"	538
		24.7	3 45	v F; R; g b M; 40"	760

No.	Synon.	R A. 1830.0. h. m. s. d.	N P D. 1830.0. o. f. s.	Description, Remarks, &c.	Sweep.
3029	6 8 9.1 12.8	133 ² 36 57 134 ² 37 0	e F; R; v l b M; 40"..... e e F; R. P D mistaken 1° in one or other of these obs.....	528 804
3030	6 8 24.1 25.3	133 ² 39 16 134 ² 38 45	e F; v S; p s l b M; rather a doubtful object..... e F; R; P D 1° mistaken in one or other of these obs.....	528 804
3031	6 8 40.0	163 21 50	F; v S; R; b M.....	672
3032	6 9 6.3	111 19 17	p B; p L; m E in pos = 87° ±; p s l b M; 23' 1, 40" br, to a tolerably well defined round nucleus.	533
3033	6 9 11.3 12.5 12.9	116 42 54 43 18 43 2	p B; E..... v F; R; v l b M; 50"..... p F; R; p s l b M; 25".....	646 530 531
3034	6 9 58±	152 29 23	p F; R; b M; 20".....	756
3035	6 10 28.4	165 23 59	p B; irreg R; v g p m b M; 2'; r.....	671
3036	6 12 41.5 44.5 51.5	159 4 34 4 40 4 11	v B; R; g m b M; 30"..... v B; R; p s m b M; 60"..... v B; S; R; p g v m b M; 35"; not resolvable. [This observation makes the degree of polar distance 158, but the similarity of descriptions and other particulars of general agreement, together with the want of any other observation of such a nebula in a part of the heavens thoroughly examined, in the 168th degree, render it almost a certainty that the nebulae are identical.]	653 673 538
3037	6 12 50.8	163 47 25	v F; L; R; g v l b M; 3'.....	672
3038	6 13 12.6	161 28 58	v F; R; g l b M; 30". A triple star precedes.....	673
3039	Δ. 201	6 13 42.3 42.6	158 12 55 12 38	B; S; R; or l E; resolved into stars 14.... 16 m; 50"..... B; irreg R; or l E; g b M; 80"; r.....	538 653
3040	6 14 20.9	112 0 15	v F; p L; R; v g l b M; 40".....	532
3041	6 14 52.1 54.2	117 10 20 9 28	B; R; p s m b M; 30"..... v B; R; p s m b M; 30"; r.....	626 530
3042	6 16 12.8	154 41 8	A poor, very coarsely scattered, but brilliant cluster of 8th class. Place of a star 8 m = B 1222, the chief in cl.	527
3043	6 17 27.2 28.3 30.1	112 45 27 44 10 46 14	v F; S; R; has a v S star at n f edge, and a double * n f..... F; R; g l b M; has 1 or 2 st on it and a small close double star (dist 3", 12 and 12 m) north. F; L; R; v g l b M; 80 or 90"; has 1 or 2 st in or near M.....	533 532 768
3044	6 17 32.0	147 28 47	v F; l E; v g b M; the preceding of 2.....	519
3045	6 17 32.4	147 26 42	v F; l E; v g v l b M; the following of 2.....	519
3046	6 18 45.3	113 54 30	e F; R; has a coarse D star preceding on same parallel 90° dist.....	534
3047	6 20 24.2	154 22 27	F; R; g l b M; 20".....	539
3048	6 20 .. 20 42.5	154 51 41 52 10	Place doubtful, clouded before transit over wire and bisection, the approx R A given by the obs is 34°.8, which must be too little. e F; v S; R; the preceding of 3.....	518 515
3049	6 20 48.5	154 54 30	e F; S; l E; the middle of 3.....	515
3050	6 21 4.2 4.2 6.2	157 26 51 26 11 25 35	F; p L; R; g v l b M; precedes a double star..... F; p L; irreg R; g l b m; 2'..... F; L; R; 50"; among 10 or 12 stars 10 and 11 m.....	522 653 538
3051	6 21 4.4	154 57 14	e F; S; the last of 3.....	515
3052	6 21 42.4	154 50 48	e F; S; R; near a star 10 m.....	515
3053	Δ. 616?	6 23 2.7 8.9	121 10 17 10 29	p B; R; g b M; 4' diam; r or resolved, among B stars..... p B; R; v g l b M; all evidently resolved into stars, not very rich. Something between a cl and a $\frac{1}{2}$. [This obs makes the R A 24° 8.9, but it is pretty clear that this is a misreading of the chronometer.]	678 645
3054	6 23 51.3 54.1 54.7	158 49 27 49 55 49 14	F; p L; R; 30"..... v F; R; g l b M; 20"..... v F; S; R.....	538 653 673

No.	Synon.	R. A. 1880.0. h. m. s. d.	N. P. D. 1880.0. ° ' "	Description, Remarks, &c.	Swamp.
3055	6 26 47.6 47.6 50.0 50.6	158 48 45 49 4 49 16 48 20	B; p L; R; v g m b M; 50" p B; R; g b M; 50"; has a double star preceding F; R; v g l b M p B; R; g b M; 30"	538 653 522
3056	6 27 52.1 56.9	124 41 51 41 20	e F; R; v l b M; 25' ... 30' e F; l E; 25". Some light in field from rising moon	545 541
3057	6 29 14.9 15.4 17.9	154 12 19 12 11 11 47	F; L; R; v g l b M; 2' p B; L; R; v g b M; r; diam in R A = 17' of time F; v L; R; g v l b M; 3'	663 518 539
3058	6 31 27.9	114 42 28	Not v F; R; or l E; p s l b M; E between 2 v S st, and has two stars 8' m s p pointing to it.	515 530
3059	6 34 24.4	122 19 15	p B; S; R; 20"; has 2 or 3 S st close to it.	678
3060	6 35 47.0 47.8 50.1	113 18 22 18 55 18 30	p F; S; R; in a field with numerous stars. 113° is the right P d F; S; R; g p m b M; 12" p B; S; R; l b M; 20". [This obs makes the P d 112°, but this was ex- amined in f 533, and declared erroneous as above.]	533 768 532
3061	6 35 53.6 55.6 56.6	117 18 4 17 28 18 23	p F; R; p s l b M; 35" F; E; b M; 20" p B; R; g p m b M; 80"; r.	531 530 769
3062	6 38 5.0	117 28 23	p F; L; irreg R; or l E; g b M; 2'	769
3063	6 40 31.8	116 33 58	A double nebula the preceding e F; the following (whose place is here set down) p B; both R; g b M; in a field full of stars, among which is also a third nebula.	530
3064	6 40 50.9	116 32 28	e F; S; R; between stars. A double nebula precedes B; R; g p m b M; 3' all resolved into st 14 m. In the centre is a * 13 m ⊕; p B; R; g b M; 90"; resolved into st 14 m.	530 541 801
3065	Δ 578	6 42 55.1 58.5 59.3	125 48 30 49 17 48 51	B; irreg R; g b M; 3'; resolved into st 14 16 m with stragglers, and some large stars near. ⊕; p B; irr R; g b M; 24'; resolved into st 13 m	663 809
3066	6 43 10.8	153 32 23	v F; R; v g l b M; 30"	539
3067	6 47 34.3	154 4 39	F; v S; R; makes a small triangle with 2 stars	515
3068	6 47 46.0 48.3	154 8 12 7 23	e F; R; 50" v F; p L; l E; in the parallel	539 515
3069	6 48 24.1 24.9	130 39 58 38 40	p B; m E; in pos 43°; p s l b M; 75" 1; among many stars p B; v m E; pos 46° 6; p s b M; 90" 1; 10" br; in a field very full of small stars.	754 529
3070	VII. 14 h. 422	6 51 40.7	103 28 33	A large region full of scattered stars, forming a cluster of which the chief (= 8 m) taken. It seems, however, to be only a clustering part of the milky way which here comes on rather suddenly.	757
3071	6 55 56.4	118 27 43	p B; p L; l E; g b M; r; 2' long	769
3072	6 57 8.8 10.1	131 49 7 49 40	v F; p L; l E; g m b M; in field with many stars F; v S; R; p s l b M; 15"; like a blotted star; in field with many small stars.	804 528
3073	7 0 28.7	102 54 22	A pretty rich cluster; irreg fig; 7' diam; g b M; stars 10 ... 14 m; place that of a D star the chief *	676
3074	7 3 6.8	157 8 25	Coarse loose cluster of about 30 stars; many 11 m; one 10 m taken.	538
3075	V. 21	7 9 39.7	102 54 48	A very singular nebula, much like the profile of a bust, (head, neck, and shoulders), or a silhouette portrait, very large, pretty well defined, light nearly uniform, about 12' diam. In a crowded field of milky way stars, many of which are projected on it. See fig. 4, Pl. IV.	757
3076	VII. 12 h. 440	7 10 1.3	105 20 12	Middle of a fine L; rich cluster not m comp M. Stars 9 ... 12 m; fills field.	675
3077	VII. 17 h. 441	7 11 40.0	114 38 48	The * No. 905 A S C is the chief of a fine cluster of discrete stars, 60° or 70 in number. R; g b M; 8' diam.	530
3078	7 14 40.0 40.1	152 2 17 2 46	p F; p L; g b M; 90" 1; 60" br p B; E; or irreg fig; g l b M	682 524
3079	7 16 6.2	117 12 31	p F; R; v g m b M; 40"; in a rich field.	771

No.	Syden.	R. A. 1850.0. h. m. s. d.	N. P. D. 1850.0. ° ' "	Description, Remarks, &c.	Sweep.
3080	VIII. 35	7 16 8.2	102 56 11	The most comp part of a great sc cl or rather region, more crowded with stars than the rest of the milky way, though hardly entitled to rank as a cluster. The st run in singular lines and curves on a dark ground.	757
3081	.....	7 17 17.7 25.9	110 36 33 31 32	Cluster; irreg R; p m comp 6'. Stars of mixed magnitudes..... Cluster; 7th class; p comp 1 4' or 5' in extent. Stars 12 m. [One or other of these observations seems to have been mis-read by 5' in P. D.]	677 768
3082	.....	7 17 20.1	117 3 —	p F; R; b M; 30"; nearly on meridian of η Canis, or perhaps somewhat preceding.	769
3083	.....	7 17 37.4	110 41 43	A cluster composed of two groups of bright stars separated in R A by a dark interval. Chief * of preceding group taken.	677
3084	.....	46.3	41 21	Place of a D star, chief of a cluster 8th class.....	768
3085	.....	7 18 8.5	152 45 26	v F; v S; R. In a field full of stars.....	524
3085	.....	7 21 45.5	158 40 27	F; p L; p m E; p s l b M; 90"; pos of extension = 117°.....	546
3086	.....	47.7	40 26	B; L; m E; g b M; 2' 1; 1' br.....	538
3086	.....	7 24 0.9	106 50 35	A small but brilliant group of 6 or 8 large stars, 8, 9, and 10 m, within a very small compass.	675
3087	.....	7 28 2.9	151 54 0	v F; L; R; g b M; r. Is no doubt a very distant cluster of 6th class ..	682
3088	VIII. 38 h. 459	7 28 49.6	104 6 50	A very L. pretty rich, splendid cluster, which more than fills the field. Place of the chief * a fine double star. [N.B.—P D by obs 103°, but this is a mistake. The cluster is VIII. 38, and not VII. 38, as misprinted in h. 459.]	757
3089	VII. 67	7 28 51.5	110 14 8	A large fine rich cluster, not much compressed, but nearly filling the field. Stars 11..... 13 m, no conspicuous star, place that of a coarse D star 11 and 11 m.	677
3090	VII. 28	7 29 14.8	103 29 1	A very large rich fine cluster of small stars which nearly fills the field. Place that of a D star, class II.	676
3091	.....	7 31 39.3	137 14 31	e F; L; p m E; v l b M; involves 2 stars.....	553
3092	VI. 36	7 33 21.9	108 41 35	A rather irreg cluster of 8th class; p m comp. The most comp part forms a ridge or body of stars elongated in the meridian. Stars 12..... 15 m with larger outliers.	677
3093	IV. 39 + M. 46 = h. 463 + 464	7 34 1.1 3.8	104 20 50 20 18	O. A very fine PLANETARY NEBULA, oval, uniform in light, and of a very flat appearance; rather faint; diam in R A = 40"; has a * 15 m on it, and one 13 m close to its border. This object is excentrically situated in a superb cluster of stars 12..... 16 m (46 Messier). O. A fine, nearly uniform, slightly elliptic PLANETARY NEBULA, 40" diam. A * 14 m, is excentrically situated in or on it, which is doubtless only superposed and belongs to the fine cluster Mess 46, in which (somewhat north of the most compressed part) this object is situated. A very uncommon and indeed unique combination, if No. 3154 be not a case in point.	676 757
3094	.....	7 34 16.4	121 15 40	A cluster of about 150 st; B; p L; p rich; not much more comp M; 8' diam; has one * 8 m (place taken), one red one 9 m, the rest 12..... 14 m.	535
3095	IV. 64	7 34 20.9	107 49 16	O. An object which, owing to general bad definition to-night, and not being able to follow beyond its transit (being north of zenith), I could not perfectly make out. Certainly not a star; but if a PLANETARY NEBULA, it is one of the less sharply defined ones.	675
3096	.....	7 35 10.8 11.1 13.5 14.9 16.5	158 54 13 53 31 54 13 54 13 53 55	F; S; R; 15"; near 3 B stars..... p B; R; g p m b M; 35"..... p B; S; R; g m b M; 25"..... p B; R; b M; near 3 stars 11 m..... B; S; R; p s m b M; 30"; south of 3 st 11 m.....	546 523 673 557 545
3097	.....	7 36 38.8	159 8 55	A double nebula; v L; v F; position of centres = 40°; diameters 4' and 3' running together, and having a star 13 m at their junction. (N.B.—The R A here set down seems to be that of the preceding neb.)	523
		50.9	8 32	F; v L; m E; 1st g, then p s m b M.....	673
		51.5	8 42	e F; v L; p m E; has a coarse double * (13 and 16 m dist = 12") in middle.	546
		53.2	8 45	F; v L; m E; v s l b M; to a * 13 m, like a very faint atmosphere, about a nucleus 2' 1; 1' br; pos of its extension = 19° 8. I think it has some sort of hooked appendage.—[N.B.—In these three last observations the nature of the object appears to have been misapprehended. In f 523 it was evidently better seen and more satisfactorily made out.]	545

No.	Synon.	R. A. 1830.0. h. m. s.d.	N P D. 1830.0. o. r. s.	Description, Remarks, &c.	Sweep.
3098	.....	7 37 22.9	113 28 30	A fine cluster, scarcely scattered, pretty rich, not much more comp. M. Nearly fills field. Stars 3....13 m.	768
3099	.....	7 39 15.1	127 33 59	The chief star (4' m) of an orange colour, of a very large and very diffused cluster of large stars, too loose to be a fit object for the ordinary magnifying power.	540
3100	.....	7 40 33.0	116 55 49	O. In the field with, and south of a cluster, and on a rich ground is the undefined object of <i>f</i> 769. (See the next observation.) It is no doubt a very faint small round PLANETARY NEBULA, 4', or, at the very utmost, 5" diameter, and = in light to a star 11 m. There is an appearance of elongation, but this is probably owing to one or more e e S stars, as the field is full of such. It is dim, faint, and a very little hazy. All the other stars are sharp, and the definition to-night is perfectly good.	771
		34.5	55 43.1	An object whose nature I cannot make out. It is certainly not a star, nor a close double star; but it is not round, and I should call it an oblong PLANETARY NEBULA, by reason of its decidedly marked though somewhat dim outline, were there not some suspicion of its being double, as if a very close and highly condensed double nebula. It is very small, and rather faint, 8" long, 5" broad, and equals a star 10 m. In a field with at least 60 or 80 stars, all sharp and well defined but this. [N. B.—The P D open to uncertainty, as the telescope rests on the gallery, and I cannot get it low enough for bisection. An estimated allowance of 2' made for this.]	769
3101	.....	7 40 43.1	116 50 ±	A small but condensed cluster, class VII. p Rich, diam 3'. [This is the cluster referred to, as in the field with the Planetary Nebula.]	771
3102	.....	7 41 33.9	110 52 41	Irregular cluster, p Rich, not m comp M, 10', stars 12 m nearly equal. General middle taken.	677
3103	Δ. 535	7 46 8.7	128 7 27	Superb cluster, g b M, 20' diam, much more than fills the whole field. Stars 10 and 11 m all nearly equal.	661
		21.0	5 43	Cluster 6th class; B; L; Rich, not very highly condensed in the middle. Stars very remarkably equal. All 12 or 13 m. Very few 14 m; none 11. A fine object.	540
		.....	....	Viewed. A very beautiful large cluster, very rich; stars nearly equal, and 12 m; g b m; not m comp M; more than fills the field. [N. B.—It is visible in the finder of the equatorial, and in the telescope of that inst appears as a fine cluster.]	659
3104	.....	7 46 33.6	160 59 5	v F; R; l b M; 25"	545
3105	.....	7 47 48.2	117 25 22	Cluster 8th class. L; loose and straggling. A milky way cluster.....	531
3106	VII. 10	7 48 1.3	113 51 16	A very rich milky way cluster, or mass of stars 10, 11, and 12 m; diam 20'. The neighbourhood is rich, but much less so than this cluster.	768
3107	VII. 23 h. 479 Δ. 626	7 49 19.9	119 37 29	Cluster 7th class. R; 5' diam; stars 12 m.....	771
		27.1	38 7	A R; p comp cluster of stars 11....13 m; 6th or 7th class; g b M; pretty rich; 7' diameter.	531
3108	.....	7 50 37.0	103 53 59	F; R; g b M; 30"; in a field full of stars	676
		42.8	54 38	p F; l E; in parallel; g l b M; 25" long. [N. B.—Both observations correctly reduced. Perhaps 5' mistake in one or other.]	687
3109	.....	7 51 25.0	141 50 26	p F; R; v g p m b M; 25"	763
3110	.....	7 54 52.6	101 49 51	F; v S; R; between 3 stars 13 and 14 m.....	687
3111	.....	7 55 16.4	150 21 36	An orange-coloured * 8 m, in middle of a L and magnificent cluster of perhaps 200 or 250 stars 8....16 m. Many of the larger magnitudes, and really a superb object. Very visible to the naked eye, &c.	524
		29.6	24 46	A double star in the same cluster	524
		31.4	24 30	Place of a double star in a fine sc p rich cl of L st, which fills field, and may contain 150 stars, large and small. No other remarkable double star in it.	664
		34.6	23 39	Chief D star in a fine cl 7th class, stars 7....12 m. Fills field, and has outlying stars two or three fields preceding.	764
		61.5	21 16	A star 6 m, one of the chief of a large splendid cluster, coarse, filling field. 20'....25' diam; stars 9....13 m.	681
		62.4	22 7	A star 6 m, in a superb, v L cluster. Rich and brilliant. In the northern part about 20'; following this * is a star 5 m, ruddy. Has two or three neat double stars in it. The whole region round is rich in large stars.	682

No.	Synon.	R.A. 1890.0. h. m. s.d.	N.P.D. 1890.0. ° ' "	Description, Remarks, &c.	Sweep.
3112	VIII. 30 h. 433	7 55 35.2	117 42 45	Cluster 7th class, distinguished among milky way clusters; p rich; bright. The star taken is the chief of a condensed hook in the following part.	771
3113	.....	8 0 7.5	119 24 41	p comp cl sixth class; irreg R stars 13...14 m. One = 8' m near the middle taken.	771
		11.7 :	24 56	Place (R.A. doubtful) of a * 9 m; chief of cl p rich; irreg R; g l b M; 5'; stars 13 m. Belongs to milky way, but is a much more compressed part of it.	531
3114	VII. 11	8 2 42.6	102 19 48	A large, E, rich cl. Fills field; st 12 m ±; a B st (6 m) s f.....	676
		2 43.8	19 47	A fine rich cluster of stars 11...13 m, which fills the field.....	757
3115	A S C. 1001	8 3 17.7	102 25 41	A fine nebulous star 6' m, in the following part of the cluster VII. 11, and almost unconnected with it. The nebula is faint, but I feel confident that it is not the nebulous haze. [NOTANDUM.—Nothing more difficult than to prove a nebulous star of the 6th m and above.]	757
3116	A. 563	8 5 15.5	126 55 1	A cluster 8th class of about 20 bright stars in an oblong 8' l; 3' br.....	540
		21.4	51 48	Chief triangle of stars 9, 10, 11 m of an oblong irreg cl.....	661
		22.9	52 32	A bright group in full part of a B; not rich; irreg oblong cl; 6' l; 3 or 4' br	659
3117	A. 411	8 5 21.4	138 44 9	Chief star 7' m, of a v L, loose, brilliant cl of v sc stars; 1 of 7 m, 2 of 8' m; rest 9...16 m. Fills more than field; 100...150 stars.	526
		56.1	47 23	A L loose cl 8th class of L and S stars, full 20' diam. Has in it about 20 stars above 11 m, and one neat double star. Place that of a star 8 m in the following part.	680
3118	.....	8 10 6.1	116 56 43	p L; F; g l b M; in a field of about 60 stars; one of which = 9 m, and some others also of less magnitudes are involved.	771
3119	.....	8 11 8.9	111 17 3	v F; v S; R; g b M; at least 60 st in field.....	768
3120	VII. 62 h. 503	8 11 44.2	120 6 57	Middle of cluster; not v rich; irreg R; not much comp; 10' diam. Stars 12...15 m, few very minute.	678
		46.8	6 40	A p rich cl of about 60 stars, 12...13 m; irreg R; g l b M; 8' diam....	531
3121	III. 902	8 13 23.4	102 47 0	v F; R; g b M; in a field full of Milky Way stars.....	676
		25.6	46 58	v F; R; g b M; in a field of 50 or 60 stars.....	687
3122	.....	8 14 25.2	125 41 8	A double star, surrounded with very evident nebula which seems to belong to both stars.	786
		27.1	40 51	A double *, or a * and a nebula, very close and involving the star. For pos dist, &c., see Catal of Double Stars. The field contains about 70 stars, of which 8 are 9' m. I cannot be quite positive that the neb extends beyond the large star, or that the small one is not a mere condensation of it. However, I remain pretty well satisfied of its investing both.	541
		27.3	41 5	A neb attached to a star 12 m, but involving it.....	809
		27.9	40 50	A double star (h 4083) involved in p B nebula, which seems to belong to both stars; but of the two the smaller is more nebulous; diam 50"; in a p rich patch of the milky way.	540
3123	.....	8 14 31.2	119 46 31	Cluster 7th class; R; p rich; insulated; 10' diam; stars 12 m, nearly uniform.	771
3124	.....	8 16 25.2	118 56 49	A milky way cluster 7th class; irreg fig; pretty much compressed in middle. Stars 10...13 m; one 9 m.	531
3125	.....	8 16 28.1	122 25 26	A small F cluster of st 15 m; 3' diam; R; g b M; not very rich.....	678
3126	.....	8 24 18.6	157 33 28	F; R; g b M; 30".....	557
3127	IV. 35 h. 513	8 25 33.5	105 33 35	A small cometic or fan-shaped wisp of nebula attached to a * 13 m; there is a * 7 m 10 sec foll; 2' north.	577
3128	.....	8 25 45.5	102 35 42	B; S; p s b M; E; between 2 stars.....	676
3129	II. 266	8 25 51.5	112 23 11	p B; m E; g p m b M; 80" l; 20" br.....	539
		56.9	24 55	B; L; v m E in pos 310°.3; p s l b M; 3' l; 20" br.....	532
		57.8	25 10	p F; m E; p m b M; 40" l; 15" br.....	558
3130	.....	8 26 12.2	150 32 6	A cluster with a double star in it.....	778
		15.0	32 52	A double star, chief of a cluster 8th class of scattered stars, 6' diam; not very rich or compressed.	682

No.	Synon.	R. A. 1630.0. h. m. s. d.	N P D. 1630.0. o. 1. 11	Description, Remarks, &c.	Sweep.
3131	.....	8 29 22.0	130 4 54	A * 8 m involved in a p B R neb, not concentric, the * being somewhat to the northward of the centre, and the nebula not being quite equally dense on all sides, though most condensed in the neighbourhood of the star; diameter of nebula 23'. (No doubt) Pl. VI. fig 12.	554
		22.2	4 57	A * 9 m involved in neb; 3' diam. In the milky way with multitudes of equal stars all round the neighbourhood, none of which are so affected. Sky quite pure, not the slightest nebulous haze. No doubt. The nebula loses itself imperceptibly, the star being (though excentric) yet in the most condensed part.	529
		22.8	4 55	A star 9 m in a decided and perfectly unequivocal nebula. It is not the nebulous haze, as other stars of equal and larger magnitudes are unaffected. Diameter 3'. I showed it to Mr. Maclear and another gentleman who saw it as described.	555
3132	VII. 63 h. 526	8 30 12.4	119 22 28	A fine L, rich, p m comp cluster; irreg E; 10' 1; 7' br; stars 12 and 13 m nearly equal.	531
3133	.....	8 31 47.5	124 9 55	A pretty comp cl of st; irreg triangular fig; much more comp than milky way around it; stars 13 m.	541
3134	.....	8 32 53.5	144 31 28	p B; S; R; has 3 or 4 v S st close to it, preceding, which give it an elongated and resolvable appearance.	552
		53.8	31 36	p F; S; R; has 3 or 4 v S st near it, preceding. Observation taken by Mr. Maclear.	551
3135	III. 49 h. 521	8 33 10.9	75 7 2	p B; l E; p s m b M; precedes a star 10 m.....	688
3136	.....	8 33 20.5	135 37 39	A close group or small cluster of 12 or 13 large and small stars; place of a double star, the chief one.	527
3137	.....	8 36 47.6	134 21 30	Cl VII class; p rich; p L; 12' 1; 8' br; fig irreg; rather branching stars 11....14 m, not comp in M.	685
		49.3	20 15	A L, rich cl; irreg oblong; 15 or 20' long	542
3138	.....	8 37 1.3	136 35 56	Cl VI class; irreg R; g b M; 4'; resolved into distinct stars 14 m	527
		2.7	35 48	Cl irreg R; 3'; not m comp M; stars 13....15 m	553
3139	.....	8 37 35.6	104 40 53	v F; v S; R; b M; near a * 15 m	687
3140	.....	8 40 ±	143 21 ±	Cluster VIII class. A L, poor, loose cl of stars, 10....13 m	440
3141	Δ. 489 or Δ. 490	8 40 1.9	131 16 0	A pretty rich, irreg R cl; not m b M; st 12....13 m; place that of the general middle.	554
3142	.....	8 40 5.6	138 10 1	A cluster 8th class, not rich, nor m comp; 8' in diam; irreg R; stars 13 m	680
3143	.....	8 49 22.2	148 34 34	e F; S; R; p s l b M; difficult, but certain	543
3144	.....	8 49 32.4	114 1 31	p B; R; v g p m b M; borders very dilute	559
		34.7	0 50	F; S; R; g p m b M; 20'	558
3145	.....	8 54 27.9	135 13 57	e e F; L; v v m E; an extraordinary long narrow ray of excessively feeble light; pos 19° ±. The n f end is brighter and narrower than the sp. At least 20' long, extending much beyond the limits of the field. A star 8 m, and one 8' m near it. See Pl. V. fig. 12.	553
3146	.....	9 0 7.5	112 58 10	e F; l E; l b M; rather a doubtful object	532
3147	.....	9 3 25.6	104 7 53	B; E; p s m b M; 40' 1; 30' br.....	687
3148	I. 59 h. 571	9 4 45.3	113 27 51	B; p L; m E; nearly in parallel; p s m b M.....	559
		47.4	30 0	B; L; m E; p g m b M; 4' 1; 90° br; pos = 63° 7	532
3149	.....	9 6 1.8	131 44 5	○ PLANETARY NEBULA; as in f 554; observed with Mr. Maclear and another gentleman.	555
		2.9	43 54	○ PLANETARY NEBULA; p F; exactly R; equal to a star 9 m, but of a dull light. At first I was inclined to think it double, but with 320 it exhibited a uniform round disc; nor did a friend to whom I showed it see any division. Stars to-night perfectly well defined. In a field with leading stars, of which a diagram was made.	554
		4.3	44 42	p B; R; 6' diam; equals in light a star 9' m; a very careful and good observation.	810
		....	....	Viewed past meridian. It occurs in a field with about 40 stars. Diam 4" or 5" at the utmost; 10" is too large certainly. Very like that of f 771, (h. 3101) But now the night is good and it bears magnifying. With 320 the disc is dilated into a dim hazy round nebula; yet there is a peculiarity in its appearance which completely separates it from all nebulae of the same size. A very remarkable object.	772

No.	Synon.	R.A. 1850.0. h. m. s.d.	N.P.D. 1850.0. ° ' "	Description, Remarks, &c.	Sweep.
3150	.....	9 6 10.1	157 14 32	v F; v S; m E in pos 105°.....	537
3151	II. 525 h. 580	9 8 13.0	105 35 48	p B; m E; p s v m b M; 40" l.....	575
3152	Δ. 265	9 8 24.8	154 9 56	⊕; e comp p g v m b M; up to a perfect blaze; diam in R.A. = 26".3; stars 16 m; equal. R.A. doubtful; the mirror being in a spring case (afterwards disused).	430
		38.7	9 56	Superb ⊕; diam = 5'; v m comp M almost to a nipple. Stars innumerable and very small; 13...15 m.	550
		41.0	9 51	A truly beautiful and delicate ⊕; diam in R.A. = 45', that of the most compressed part 15'; g v b M; all finely resolved into perfectly equal stars like the finest dust, which are seen with the left eye without effort, but the right requires to be somewhat strained to discern them. Runs up to a blaze in the centre.	773
		32.6 42.4	10 0	⊕; 4' or 5' diam 1st p g, then p s b M; all resolved into stars 16 m and a few 15 m. A neat D star foll dist 1 field	433
3153	III. 242	9 8 43.0	112 54 51	F; R, or v l E; g l b M; 25".....	559
3154	Δ. 564	9 9 8.6	125 53 51	A very curious object which reminds me strongly of Messier's No. 46 and IV. 59. It is a rich cluster of the VI class; stars 12....14 m; about 8' diameter; g p m b M; all but a sort of vacuity, in which is situated a p B, R, neb; 40" diam; of a character approaching to planetary, having its edges shading off very rapidly, and being but very little brighter in the middle.	787
		9.4	55 5	p B; R; v g v l b M from the edge, where it fades off very suddenly; being all but a planetary nebula. Situated in a sort of vacancy in the preceding part of a fine rich cl of st 11....15 m, which nearly fills the field. It is a fellow object to Messier's 46th, with its enclosed planetary nebula, IV. 59. Pl. V. fig. 8.	809
3155	.....	9 9 20.9	116 7 20	e F; attached to a * 11 m; somewhat doubtful.....	563
3156	.....	9 10 20.1	158 56 17	p F; v S; R; g l b M.....	537
3157	.....	9 11 18.9	158 38 22	F; R; g l b M; 40". Nearly on merid with β argus.....	537
3158	.....	9 11 49.1	152 21 23	F; v S; between two st, in a field full of milky way stars. No doubt of the nature of the object.	682
3159	.....	9 11 51.1	127 18 7	v F; S; R; attached to a star 12 m, s f.....	540
3160	.....	9 12 43.0	129 49 50	⊕; e F; R; v g l b M; resolved into v S, but not very numerous stars; 2 1/2' diam. It is rather a cluster of the 6th class than a ⊕.	810
3161	.....	9 15 49.1	112 25 51	B; S; R; p g m b M; the borders very dilute.....	559
		50.9	28 0	p B; S; R; v l b M; 15".....	532
3162	.....	9 16 21.4	140 22 44	Cluster class VIII. Place of a small compact knot of st.....	586
3163	.....	9 16 33.3	147 35 23	○. PLANETARY NEBULA. R.A. doubtful, being far below the f. Pos of adjacent star = 58°.8; 57°.3; mean 58°.0. Set microm to 51.1, the measure of last night, and carefully examined. It cannot pass as a measure, and must have been a mistake for 56.1 or 61.1; measured to-night with the utmost care; quite calm.	552
		35.2	35 21	○. Perfectly sharp; exactly R; not the least hazy or mottled. At 1 1/2 diam distant from the edge (or taking 12" for the diameter of neb at 24" dist from centre) there is a star at pos = 51°.1; well examined with Mr. Maclear. It bears 320 well, and is quite sharp and uniform with that power. R.A. imperfect being out of the regular f.	551
		37.6	35 35	○. Beautifully round and sharp; just like a small planet 3" or 4" in diam at the utmost. Position of the attendant star = 59°.3; 57°.8; mean 58°.5; dist 2 1/2 diameters from centre. Shown to Captain Henning.	684
		38.5	35 10	○. R; = * 8 m; R; quite uniform in light; quite sharply terminated. Its diameter transits over a wire set to 60° (30 from parallel) in 4'.03, by a mean of 5 transits; has a * adjacent; pos = 60°.7; dist = 1 1/2 diam from the edge. About 40 stars in the field, among which two are 9 m. [This would give 16" but the wire was much too thick.]	664

No.	Synon.	R. A. 1830.0. h. m. s. d.	N. P. D. 1830.0. ° ' "	Description, Remarks, &c.	Sweep.
		38.6	34 55	O. The finest PLANETARY NEBULA I ever remember to have seen for sharpness of termination; 3" diam; exactly R; no more haziness about them than would be about a star of the same magnitude to-night (which is a favourable one). Light, a pale white = * 9' m. Pos of companion * = 59.8; 57.7; 58.4; mean 58.6; * = 15 m. A very remarkable object. Showed to Stone, who distinctly perceived the total difference of appearance between it and a star 9' m very near it. A second companion * suspected (at about half the distance of the 1st by diagram, and at an estimated position of 330° ±) among multitudes of L and S stars.	415
		38.8	35 13	O. Diameter 8"; perfectly uniform in light; sharply terminated, just like a small planet. Position of attendants star = 60°.7, by mean of 2 measures; dist 1½ diam; 14th mag.	764
		39.2	35 47	Quite sharp and round; 8" diam; = a * 8 m; pos of a star 14 m; dist 1½ diam from edge = 60°.3, by a mean of 3 measures. There are 56 stars in field with it, of which the largest is 9' m.	543
		....	....	Observed with Mr. Maclear, April 2, 1834, out of the meridian. Quite round, well defined, and about 3" or perhaps 4" diam. Much better seen (between clouds) than last night. (f 435.) The small star is still 1½ diam from edge. It has therefore not moved perceptibly, and is therefore not a planet.	
3164	.....	9 18 15.3	123 21 55	A v F, S, cluster, class VI; v g l b M; resolved so as to see the stars which are 15 m; almost to be called a v F, large nebula.	787
3165	.....	9 18 46.3	121 0 55	e e F; 50"	770
3166	.....	9 18 52.7	117 17 23	p F; R; s m b M; very dilute at edges; 30"	564
		54.8	18 2	v F; R; g p m b M; 15"	771
3167	.....	9 19 20.4	114 4 0	F; S; R; b M; 15"	532
3168	.....	9 19 28.8	153 4 51	F; S; R; p s b M; 15....20"; has 3 stars near, prec	568
		31.8	4 23	F; S; R; g p m b M; 20"	773
		....	5 6	F; S; R; g b M; near a bright *. (N. B.—The R A by this obs comes out 12°.9; but the mirror having been put by inadvertence into a case with springs, the zeros fluctuated, and the observation is entitled to no weight, the collimation having been neglected.)	430
3169	.....	9 21 47.0	145 22 1	F; p L; R; g l b M; 80". At least 80 stars in field	552
		....	22 57	No description	784
3170	.....	9 22 57.6	119 38 58	F; S; v l E; p s b M; 15". Very dilute at the edges	564
3171	.....	9 24 20.0	142 9 ±	Cluster of loose stars; p rich; stars 11...15 m; has rather a vacancy in the middle; fills about ½ of field.	439
		55.5	11 56	Cluster, class VII.; p rich, L, and fine. Stars 10...13 m, in irregular lines and tracing. The chief * 10 m, taken near the most compressed part. See also "Omitted observations"	763
3172	.....	9 26 26±	110 6 ±	e F; S; R; the preceding of two	770
3173	III. 597	9 26 35.9	110 10 13	v F; p L; l E; the following of two	770
		42.8	9 54	F; l E; g l b M. This obs makes the degree of NPD 109. But as there can be no doubt of the identity of this neb with my Father's III. 597, his degree (110) is preferred. The right ascensions in this sweep are bad.	561
3174	.....	9 27 2.5	165 52 54	p F; p L; R; g b M; 45"	782
3175	.....	9 27 7.6	105 38 52	p B; R; 20"	675
3176	.....	9 27 56.7	179 34 14	Neb Polarissima Australis. F; R; g l b M; 25". Situated nearly half way between a * 10 m south of it, and a small triangle of st 11, 13, 13 m north. Being so near the pole, the R A may err many minutes of time.	781
3177	.....	9 27 57.6	142 41 26	A pretty rich cluster, 8th class; a D * (one of the chief) taken	763
3178	II. 556	9 28 48.4	110 22 15	p F; R; g p m b M; 40". The obs makes the degree 109, but 110 agrees with my Father's place, and with that of f 561, and is preferred.	770
		52.6	22 34	p B; v S; g m b M; l E; 25" 1, 20" br. (R A not good.)	561
3179	.....	9 29 ..	136 11 ..	This is about the middle of an enormous cluster of a degree or degree and half in diameter, very rich in stars of all magnitudes, from 8 m downwards, which merits registry as a sort of telescopic Presape. It may perhaps be regarded as a detached portion of the milky way, which is here very much broken up.	776
3180	.....	9 29 52.6	121 16 6	F; S; R; g l b M; 20"	559
		53.0	17 40	F; S; R; g l b M; 2 or 3 small stars near	532

REDUCED OBSERVATIONS OF

No.	Synon.	R. A. 1830.0. h. m. s.d.	N P. D. 1830.0. ° ' "	Description, Remarks, &c.	Sweep.
3181	.....	9 31 5.5	74 18 5	v F; R; 20". Another suspected 6" south, nearly on the same meridian ..	688
3182	.....	9 31 ..	74 24 ..	Suspected nebula. (N.B.—These suspicions have been so constantly verified on re-observation, that I have little hesitation in registering it as an object in the catalogue.)	688
3183	Δ. 397	9 34 12.6	139 33 26	A small p comp cluster; irreg fig; 4' in extent. Not rich stars, 13 m	680
3184	.....	9 35 42.3	133 25 31	A cluster of about 20 stars 11 m, and 2 of 10' m, forming an oblong nearly in parallel; place of preceding * 10' m.	774
3185	III. 289	9 35 43.8	109 41 45	p B; R; b M; r	770
3186	.....	9 37 37.2	107 36 14	F; R; g b M; precedes a coarse D star	675
3187	.....	9 38 4.7	110 48 34	v F; S; has a * 20 m r' following	561
3188	V. 50	9 38 13.2	120 24 26	F; v L; first v g, then v s m b M, to a nucleus (exactly like Halley's comet) as now (Feb. 16, 1836) seen in the equatorial; R; diam in R A = 24'.o. Has a * 11 m, s p just at the edge.	678
		14.6	24 48	p B; v L; R; v s l b M, to a pretty distinct round nucleus 4" diam. Diam of nebula = 15' of time. The nebulous atmosphere extremely dilute. A very remarkable object.	535
3189	.....	9 38 21.4	143 59 49	Cluster VIII. class; at least 20 st 11 m and upwards, and many smaller ..	784
3190	.....	9 38 51.4	119 39 48	F; R; 50"; attached or contiguous to a * 12 m; pos = 320° ± by estimation from diagram.	564
3191	.....	9 39 ..	139 39 ..	A small irreg cl of a long triangular diverging figure; contains perhaps 50 stars 12...15 m. Observed for Δ 397, and place only rough. Possibly the same object with f 680, No. 27, which see above (No. 3183).	442
3192	.....	9 41 34.6	110 57 1	e F; v S; R; north of a * 9 m.	559
3193	.....	9 41 53.1	108 23 19	F; S; R; l b M; 15"	561
3194	.....	9 43 2.4	145 37 18	irreg R cl, 8' diam, of 50 or 60 st, 11 and 12 m. In the milky way, but sufficiently rich and distinct to be registered as a cluster.	552
		2.7	37 28	The * B 2686, in the midst of a great number of stars 11 and 12 m.	784
3195	.....	9 43 45.0	116 13 45	F; R; l b M; 30'	565
3196	II. 98	9 43 46.6	72 31 34	⊕; F; L; R; v g l b M; 21'; resolved with left eye	688
3197	.....	9 44 15.6	151 33 51	The chief star 10 m, of a cluster class VIII. of sc st 10' diam. It is on the borders of the milky way.	777
3198	.....	9 45 13.8	107 50 39	v F; R; l b M; 30". (R A correctly reduced.)	561
3199	.....	9 45 40.8	116 32 1	p F; R. R A precarious; a hurried observation	562
3200	III. 600	9 46 14.8	72 45 38	v F; l E; g b M; 25"	688
3201	.....	9 46 20.1	116 29 31	p F; S; R; g b M; 20"	562
3202	III. 272	9 46 25.7	107 50 19	p F; L; R; g b M; 50"	561
3203	.....	9 46 53.7	117 30 13	p B; S; R; v s m b M; has a * 10 m almost contiguous; pos from neb = 203°.8.	564
		56.3	30 9	p B; R; 25"; attached to a * 12 m.	771
3204	III. 601	9 47 0.9	72 21 37	e e F; R; 20"	688
3205	.....	9 48 11.8	163 7 50	F; L; irreg R; g l b M; 3'; many v S stars near and in it	547
3206	III. 273	9 49 21.5	108 32 20	v F; R; g l b M; 40"	770
		22.6	32 19	v F; E; g l b M; 60' 1; 50" br	561
3207	.....	9 49 41.7	74 45 26	v v F; forms an appendage to a * 14 m; a * 11 m follows	688
3208	.....	9 50 6.3	107 21 55	e F; S; R; 15"	675
3209	II. 268	9 50 42.7	116 6 51	B; R; g m b M; 30"	562
3210	.....	9 51 20.4	119 33 18	v F; S; R; close to a double star. Requires verifying	564
3211	.....	9 51 23.7	116 19 35	v F; S; R; attached to a * 13 m, s f.	563
3212	.....	9 51 25.7	108 42 24	v F; v S; R. P D liable to some uncertainty	561
3213	.....	9 51 46.3	123 25 13	p B; S; R; p m b M; between 2 st 13 m	541
3214	.....	9 51 58.8	117 30 17	p F; R; 60'; has 2 or 3 v S st involved, and a * 8 m; 2' dist. foll.	771
3215	II. 293	9 52 14.0	108 49 19	p B; p S; the preceding of two	561
3216	.....	9 52 33.6	120 44 19	F; L; E; v g v l b M; 3' 1; 2' br	678
3217	.....	9 52 37.5	108 49 24	e F; R; l b M; follows II 293. (Place somewhat uncertain.)	561
3218	.....	9 53 7.9	120 51 3	p B; R; 30"; g p m b M	678

4018 →

← 4018

No.	Synon.	R. A. 1830.0. h. m. s. d.	N. P. D. 1830.0. ° ' "	Description, Remarks, &c.	Sweep.
3219	.....	9 54 39.2	143 58 19	A rather remarkable S oval cl of v S stars, with a train of large stars running out of it, s. p.	440
		46.5:1	57 :1	A small close clustering knot of st. 13....16 m; oval; a great train of st 12....13 m on the sp side	439
3220	.....	9 54 54.9	120 51 32	F; S; R; g b M; 15'	678
		60.8	51 20	F; S; R; l b M; 15'	535
3221	.....	9 55 17.5	115 20 45	F; v L; v m E; 10' l; 90° br; place of a * 12 m in or near the centre	563
		18.0	20 51	v F; v L; 12' l; 2' br; l b M; pos of axis 82°.3. See Pl. V. fig. 9.	562
3222	.....	9 56 41.7	117 37 34	e F; L; 3'; makes an obtuse angled triangle, with 2 st 8 m; one nearly on the parallel, the other nearly north.	771
3223	I. 163 h. 668	9 56 44.1	96 54 13	v B; L; v m E; v s v m b M; observed among clouds.....	697
3224	A. 297	9 56 54.9	149 11 19	An enormous congeries or clustering region of stars 2 or 3 fields in diameter, constituting a decided cluster. Stars 9....14 m, the larger magnitudes predominating. There must be many hundreds. The place taken in the centre of a bright equilateral triangle.	543
		2.6	21 33	The chief * 9 m of a v L, loose, brilliant cluster, which fills many fields ..	432
		74.8	21 30	The chief * 8 m of a v L, loose cl of stars, 9....13 m, which fills many fields. [As both this and the last observation are distinctly written and correctly reduced, no doubt they belong to two distinct and nearly equal stars on the same parallel.]	435
3225	.....	9 57 56.0	123 23 55	F; R; g b M; 40'	809
3226	.....	9 58 36.8	108 24 54	F; L; R; l b M; has a fine double * exactly S.....	561
3227	.....	9 58 52.1	119 5 42	p F; R; v g b M; 25'	771
		55.6	7 18	F; R; g b M; 20'	564
3228	.....	9 59 48.8	129 36 45	O. PLANETARY NEBULA, with a * 10 m in centre; v B; very well defined, and perfectly equable all over in light, there being no condensation up to the centre. The star is sharp; the nebula velvety, or like infinitely fine dust; a star 14 m at a distance rather more than a radius of neb from edge (by diag); has its position from centre = 333°.8.	810
		52.7	36 7	PLANETARY NEBULA; v L; v B; elliptic; has in it a * 9 m somewhat excentric. Its light is exactly equable, i. e. not increasing towards the middle; yet I cannot help imagining it to be closely dotted. It is just like a star out of focus in certain states of the mirror and atmosphere. Three stars near, a = 9' m; b = 9' m; c = 14 m. A very extraordinary object.	554
		53.6	36 33	Well seen, as described in f 554, and shown to Mr. Maclear and another gentleman. The star in the nebula is 9 m, very sharp, full, and distinct. Six stars 9' m in the field; one companion = 13 m.	555
		55.9	36 2	A perfectly well defined bright elliptic disc, diam in R A = 4'.0; major axis: minor: 5:4. In the middle is a * 9 m, which is quite sharp, but which I think has a small disc. This * is somewhat excentrically placed. See Pl. VI. fig. 9.	772
3229	.....	10 1 ..	158 33 ..	B; R; b M; place only a very rude approximation.....	538
3230	.....	10 1 8.8	118 13 37	v F; l E; 25'	771
3231	.....	10 1 23.0	156 32 54	p B; R; g b M; 40'	556
		23.9	32 39	p B; R; g b M; 40'; south of a * 13 m	557
3232	.....	10 1 40.4	97 39 6	F; v s b M to a * 16 m; diam 1' or 1½'; s p the * g Sextantis, which occasioned its being taken by mistake for Halley's comet, and the consequent loss of that comet.	697
3233	.....	10 4 6.7	120 47 15	v F; E; 30'; has a * 8' m s p	535
		....	....	Looked for but not found by this. However, as no R A is noted, perhaps it was looked for too late. The obs of f 535 is positive, and correctly reduced.	678
3234	.....	10 5 26.0	169 35 7	F; l E; v l b M; 25'; has a * 15 m in it, excentric	549
3235	.....	10 6 46.8	116 50 51	e F; S; R; precedes 2 B st (one very near it)	562
3236	.....	10 6 56.7	118 2 19	p B; L; m E; g p m b M; 3' l	771
		57.0	2 3	B; L; m E; g v l b M; 2' l; pos 50°.3	564
3237	.....	10 7 56.3	104 57 2	p B; p L; g p m b M; seen through haze	687

No.	Synon.	R. A. 1830.0. h. m. s.d.	N. P. D. 1830.0. ° ' "	Description, Remarks, &c.	Sweep.
3233	Δ. 445	10 10 38.0 40.4	135 32 54 33 24	⊕; irreg R; g b M; not v m comp; 6'; res into at 13....15 m..... ⊕; irreg R; 7' diam, but the outliers extend to at least 10 or 12'; g p m b M, but not very much compressed; all resolved into stars 13....16 m.	695 776
3239	.....	10 10 38.4	147 6 5	v B; v L; 10' 1; of a concave or crescent form, sharply terminated inwards, fading away outwards. In a field of about 80 stars. The place is that of a * 13 m, about the middle of the crescent, or rather nearer the head. (See fig. 5, Pl. IV.)	543
		41.7	8 9	p B; v g b M; of a falcated or semi-lunar shape, extending over 2/3 of the field. The place is that of a double star in its vertex or southern extremity.	552
		42.9	8 9	Place that of the double star near the cusp of the great falcated nebula, whose extent in P.D. is = 1.3 rad of field = 9'.75. In a rich field. A clustering group follows.	784
		46.4	4 30	A v L and very remarkable nebula, which is brighter to the s f part, and dies off to the n p, having a curved form and forked tail. In the head of it is a double star. The neb is p B; v L; fig. irreg; 8' l, 4' br. Among a vast number of milky way stars.	435
3240	.....	10 10 41.9	115 51 20	p B; S; p m E; b M; 25" l. This obs makes the minute of R.A. = 11, but f 562 makes it 10, which is preferred, that the observation may not be lost in future by looking out too late.	563
		42.4	51 21	p B; E; g b M; 25"	562
3241	.....	10 11 4.2	170 1 46	PLANETARY NEBULA; R, or v l E; a very little hazy at the edges, but still pretty well defined with 240. Viewed long and with much attention, being a very remarkable object. I am positive of the existence of two brighter portions near the edges. (See fig. 2, Pl. VI.) Companion stars a = 11 m, pos = 274°.7; b = 13 m, pos = 271°.5; c = 14 m, 204°.8. The star a precedes the centre 14 sec, which is also the diameter in R.A. of neb.	780
		9.1	0 49	○; p B; not quite uniform in its light, having two brighter patches; 1 E towards a * (a); slightly hazy; diam = 15 or 18" (in R.A. 13'.0 of time). Pos of a = 265°.7, dist = 0.7 diam from edge, 11 m; of c, pos = 210.7, dist = 1 1/2 diam from edge. [N.B. 13' in time = 35°.74 in arc.]	549
3242	.....	10 12 18.0	151 49 56	○; PLANETARY NEBULA; delicate, exactly round, = * 10 m a little dim at edges; white; with 320 considerably hazy. In field with at least 150 stars.	777
		20.5	49 18	○; perfectly R; very well defined, with a perfectly uniform light, not at all mottled; = a * 10 m, of which brightness there are 5 or 6 more in the field, and not less than 150 others less bright. Examined by both Mr. Maclear and myself with 240, which shows it proportionally magnified; quite round and planetary; a little hazy at the edges, but not more so than is due to the decidedly bad definition of the night, and the imperfect figure of the mirror, which has been injured by careless polishing on too soft a polisher.	778
3243	.....	10 14 0.0	123 23 59	p B; v L; v l E; p s l b M, to a centre; diam 2'	541
3244	.....	10 14 7.4	123 50 27	v F; R; p g m b M; 40"	571
3245	Δ. 586	10 15 ±	140 52 ±	A group of 9 L, and a few so small stars	438
3246	IV. 10 h. 710	10 15 53.5	71 59 1	A star 9' m, affected with a nebulosity, chiefly on the following side. Imperfectly seen in the haze of a S E drift.	688
3247	.....	10 16 26.5 28.9	110 55 56 55 50	e F; S; R; 15"; near a * 12 m	559 553
3248	IV. 27	10 16 33.1	107 46 55	e F; S; R; near a star	770
		33.7	46 39	PLANETARY NEBULA. Viewed past merid; place from Piazzis' Catalogne. Somewhat hazy, with a slight nebulous atmosphere. Colour a decided blue; at all events a good sky-blue. Elliptic; pos of axis = 140°; diam in R.A. = 2'.5. Has 2 companion stars (a) pos = 173°.0; (b) pos = 137°.8.	561
		37.5	46 48	○; of a decided pale blue colour, but not so full a blue as the planetary nebula 11h 42m 146° 14'; oval; pos of the longer axis = 135° ±; 30" l, 25" br; uniform and v B; but not quite sharp at the edges.	560
		38.0	46 40	A very fine, large Planetary Nebula, 25" in diam, a little elliptic; v B; uniform, but owing to a hot wind too ill defined for detailed examination.	675
				○; v B; decidedly elliptic; a little dim at edges; colour very decided pale blue; diam in R.A. = 3'.0. Pos of longer axis about 130°; pos of the nearer of two companion stars = 172°. (Plate V. fig. 5.)	675
3249	.....	10 16 35.3	121 36 25	F; p m E; g l b M; has a * 11 m n p	678
4019	.....	10 18 2.5	128 67 18	F; above a * 11 m, dist 11'	571

No.	Synon.	R. A. 1830.0. h. m. s. d.	N. P. D. 1830.0. ° ' "	Description, Remarks, &c.	Sweep.
3250	10 28 3±	146 61 30	A curious object. Stars involved in evident nebula. R A only observed to the nearest minute.	435
	146 57 ±	A decidedly nebulous group. No R A, and P D very rough, being observed 5 or 6 fields past meridian.	784
	146 59 4	There is a nebulous appearance, which merits re-examination. Observed much past merid, and no reliance on the P D.	436
3251	10 28 46.2	124 5 32	e F; p L; R; v g v l b M; 60"	541
3252	10 19 ±	129 5 ±	p B; R; p s b M; 30"; has a * 13 m n f.	542
	19 4.8	4 38	p B; R; g p m b M; 25"	547
	6.2	4 20	p B; R; g b M; 40". Either a double neb, or has a v F star 45° n f.	555
	7.0	5 15	p B; R; g p m b M; 25"	573
	9.0	4 24	B; p B; R or v l E; first v g, then p s b M; 90" or 2' diam. [N.B.—The nebula has evidently been seen to better advantage in this than in any of the foregoing observations.]	810
3253	10 20 28.9	149 48 42	A very compressed knot or cluster of milky way stars. 4' in diameter, somewhat insulated from the rest. Stars... 15 m.	543
3254	10 20 35.3	133 1 43	p B; R; S; g b M; 20"	686
	36.4	1 59	B; R; g m b M; 25"	542
3255	10 21 7.2	124 47 32	e F; v S; R. The first of a group	541
	7.9	47 47	v F; R; p s b M; 10"	448
	12.1	46 ±	v F; v S; R; s b M; 10". The preceding of a group	447
3256	10 21 12.9	124 43 47	v F; R; p s b M; 12". The second of a group	448
	14.7	45 6	F; S; R; 15"	541
	18.6	43 0	v F; S; R; s b M; 12"	447
	18.8	44 7	F; R; p s l b M	572
3257	10 21 26.4	124 43 7	e F; l E; l b M; 5". The third of a group	448
	28.7	45 1	v F; v S; R; near a star 12 m	541
	31.1	42 40	e F; v S; R; s l b M; 6"	447
	32.0	43 7	v F; R; p s l b M	572
3258	10 21 46.6	133 47 3	F; S; R; 15"; entangled among 2 or 3 st, but is certainly a nebula.	686
3259	10 21 48.7	124 44 18	F; R; p s l b M; 12". The 4th and last of a group. (The minute by this obs is 22, but both the diagram and the obs of 541 prove this to be a mistake for 21.) (See Errata: Notanda.)	448
	52.6	45 0	e F; e S; R; l b M; 10". The 4th and last of a group	541
3260	10 21 51.6	133 19 58	e F; S; R.	542
3261	10 21 57.1	133 15 23	F; m E in pos = 280° ±; p s b M; 20"	542
3262	10 22 13±	124 29 ±	e F; v S; R. By a diagram made out of meridian in which 4 nebulae are delineated, two of them being those determined in f 446 Nos. 6 and 7.	571
3263	10 22 16±	124 30 ±	F; S; R. By diagram, &c., as in the case of the nebula immediately preceding, to which this is contiguous.	572
	18±	30 ±	Place concluded from those of the nebula, Nos. 6 and 7 of f 446, by the aid of a diagram made out of meridian, in which also 4 nebulae were seen, but of which only 3 are identifiable with those of f 571; the small nebula contiguous to and preceding this, not having been seen owing to haze, and a 5th more remote and brighter, being now for the first time laid down.	446
3264	10 22 20.1	124 20 23	F; S; R; b M; 15"; one of a group of 3 or more	572
	21 37	F; R; 20"	572
	Observed also in f 571 and 572; which see above	446
3265	10 22 25.0	124 29 53	F; S; l E; b M; 15"; one of a group of 3 or more	572
	32 ±	p B; p m E; p m b M, as per diagram, &c., taken out of meridian. See Remarks on the 4 nebulae immediately preceding. Seen also in f 571.	540
3266	10 23 11.9	125 51 49	F; l E; p s b M; 20"	574
	15.3	52 33	F; L; R; p s l b M; 60"	573
	Seen past merid; too late for place or description	555
3267	10 23 38.6	129 4 40	F; S; has a * 8 m, n p	554
3268	10 24 6.0	129 4 16	F; S; R; s p a coarse double star	555
	8.0	5 25	F; R; has a double star n f.	555

No.	Synon.	R. A. 1830.0. h. m. s. d.	N. P. D. 1830.0. ° ' " "	Description, Remarks, &c.	Sweep.
3269	.....	10 24 13.0	123 58 52	e F; E; g l b M; 60" l; 40" br.	447
3270	.....	10 25 33.6	116 34 37	p F. The first of a group scattered over more than one field.	689
		37.1	35 26	p B; E; g b M.	562
		38.6	34 28	p B; R; g b M; 40"	564
		39.2	35 20	p F; S; R; g b M; 15"	563
3271	.....	10 25 35±	135 22 50	p F; S; R; g b M; 25". R A coarsely taken by an auxiliary star.	776
3272	.....	10 26 26.0	124 25 17	e F; R; 15"	572
3273	III. 55 h. 727	10 27 35.1	74 57 2	p F; S; R; g p m b M.	688
3274	.....	10 27 57.6	121 57 48	e F; S; R.	678
3275	.....	10 27 59.9	121 29 25	v F; S; R; 15"	535
3276	.....	10 27 ±	147 19 -	A fine, bright, rich, not very L cluster. (Equatorial zone review)	
3277	.....	10 28 14.0	116 17 1	v F; S; R. The 2nd of a group scattered over more than one field.	562
3278	.....	10 28 16.9	116 43 22	e e F. The 3rd of a group. [P D by MS 38'; but there is some confusion in the entry, the figures being roughly written over, and no doubt being left by the diagrams that the most visible writing is 5' wrong, and that 43 is the true minute.]	689
3279	.....	10 28 22.9	116 33 52	The 4th of a group.	689
		23.5	32 28	One of a group; 7 of which were seen and laid down in a careful diagram for identification.	564
		24.6	33 25	F; S; R.	563
		24.6	34 31	F.	562
3280	.....	10 28 36.6	116 38 38	A double nebula, or rather two distinct nebulae near together. By diag, both p L, R pos about 10° n p or s f, and nearly equal. It is not stated which was taken. Presumed to have been the preceding.	564
		36.7	39 0	The preceding neb of a double neb; 2 or 3 stars also near.	563
		35±	37:31	B; L; double; a hurried obs, R A taken only to the nearest minute, and a mistake (rectified in the reduction) of 10' committed in the P D.	562
3281	.....	10 28 45±	116 40 ±	The following neb of a double one. Place deduced from that of the preceding one by a measurement of the diagram.	564
3282	.....	10 29 3.3	116 44 25	v F; p m E; the last of 4 in the field at once with two stars 6 m near them, one above and one below them (which serves to identify the object beyond doubt), P D only correct to the nearest minute.	563
		5.2	....	F; E; g b M. No P D taken, a hurried observation, and the wire mistaken (rectified in reduction). This nebula is the 7th of the group in fact, though in this observation called the "5th or 6th."	564
3283	.....	10 29 15.4	116 47 31	The 8th of a group.	562
3284	.....	10 29 33.4	116 42 47	p F; S; R; b M. The last of a group of 9 neb.	689
		36.0	43 8	....	564
		36.5	44 30	v F; R. [N.B.—This numerous and very interesting group has been made out by a careful collation of diagrams made in 564 and 689, for the purpose of identification, from which it appears that though in each diagram only 7 were seen and laid down, yet there are in reality at least 9 in the whole group. Several mistakes of reading appear to have been committed in the hurry of observation unavoidable in attempting to determine at once so many objects; but, on the whole, the group appears to be satisfactorily made out.]	563
3285	.....	10 29 45.1	130 45 0	F; R; g l b M; 60"	810
		48.8	45 15	v F; p L; p m E; g v l b M; 2'	554
3286	Δ. 322	10 30 54.6	147 44 30	A double star involved in nebula, which is one of the outliers of the great nebula about γ Argus. It extends to a * 6.7 m half a field distant southwards, and almost as far north; p B; irreg fig; fine object.	435
3287	Δ. 355	10 31 49.3	143 14 45	The chief * (9 m) of a poor cluster of 20 or 30 stars.	438
3288	.....	10 32 4.4	125 9 56	e F; v S; m E; appended like a tail to a * 15 m.	541
3289	.....	10 32 18.9	116 52 21	v F; p L; l E; g l b M.	562
3290	V. 7	10 34 34.8	74 13 49	v F; L; R; v g v l b M; 3' or 4' diam. A soft globe of light, resolvable with the left eye.	688

No.	Synon.	R.A. 1850.0. h. m. s.d.	N.P.D. 1850.0. ° ' "	Description, Remarks, &c.	Swamp.
3291	.....	10 34 59.6	125 28 11	Not v F; R; s l b M; 15". The first of 3	448
		61.3	28 46	B; m E; a nucleus with v F arms nearly in merid	541
		61.9	27 7.1	p F; R	572
		64.3	28 14	p F; S; R; v s m b M to a * 12 m	446
3292	.....	10 35 46.7	125 28 21	v F; S; l b M; 8". The 2nd of 3	448
		17.9	31 10	p B; p L; R; p s b M; 40"	541
		19.2	28 59	v F; S; l E	446
		23.4	27 7.1	e F; R	572
3293	.....	10 35 48.7	125 28 45	F; v S; R; close to a v S star; the last of 3	541
		50.7	30 27	v F; l E; the 3rd of a group	572
3294	.....	10 37 44.8	132 49 18	F; E; g b M; close to a * 6.7 m. The minute of R A doubtful. The written record makes it 47; but as this is impossible from the context, 37 is assumed.	686
3295	A. 309	10 38 24.8	148 46 57	The * η Argus, with the Great Nebula about it, of which see the monograph and detailed description.	432
		28.7	47 40		435
		28.8	47 21		543
3296	.....	10 38 51.1	129 8 ±	p B; R; b M. Out of limit of f. Place rough	540
		59.8	7 26	F; R; g l b M; 30"	810
		60.2	8 18	v F; S; R; g l b M; 15"	574
		73.8	7 5	v F; R; g l b M; 25". [No doubt of a mistake of 10 seconds in reading the chronometer.]	573
3297	.....	10 39 12.2	113 32 11	F; p L; R; l b M; 50"	559
		14.4	32 10	F; p L; irreg R; g l b M; 40"; C	558
3298	.....	10 40 8.3	120 39 17	p F; S; p m E in meridian	444
3299	.....	10 40 14.0	114 16 40	F; R; b M; 20"	563
		15.8	15 31	F; S; R. Precedes two bright stars	562
		17.3	16 22	p F; R; p s b M. Has 2 stars 10 and 11 m, following	689
3300	.....	10 44 23.5	72 19 59	e F; v L; v g v l b M; 3' or 4' diam. Has a bright coarse double star (9 m) s p.	688
3301	.....	10 44 32.8	134 15 31	The chief * (9 m) of a cluster class VIII., 7' diam; not rich or comp. Stars 10....13 m.	774
		44.6	14 8	A cluster VIII. class; not rich; irreg fig; 7'; st 9...13 m	686
3302	.....	10 44 55.9	122 1 27	F; S; R; 15". Has a * 6.7 m s f	444
3303	.....	10 44 58.1	109 56 43	v F; L; R; v g l b M; r; 90"	560
3304	.....	10 45 24.9	130 52 41	F; S; R; b M; 15"	559
3305	.....	10 47 3.1	115 14 25	F; R; g l b M; 20"	563
3306	.....	10 48 29.6	103 23 47	e e F; S	700
3307	.....	10 50 51.6	117 34 12	p F; S; R; b M; 15". Among stars	452
3308	.....	10 50 56.0	135 39 46	e F; S; R; g b M; 30"	553
3309	II. 100 h. 824	10 51 1.9	74 15 2	F; L; R; g b M; 2½' diam. Has a * 11 m 6' south, and a little preceding.	688
3310	.....	10 52 58.7	149 25 9	Place of a small double star in the following part of a loose, rich, pretty large cluster of stars 13 m, 8' or 10' diameter; a fine object; a very much condensed milky way group.	432
3311	.....	10 54 19.1	148 56 10	Three very close stars, 10 m, in a nearly straight line, and a double star north of them, the whole involved in very faint nebula, so faint as to leave some doubt.	435
3312	.....	10 54 20.9	104 34 47	p F; S; R; g l b M. Has a star 14 m near	700
3313	.....	10 55 21.5	107 52 2	v F; p L; R; v g v l b M	560
3314	.....	10 57 5.9	150 26 58	Chief star of a pretty rich cluster, class VII.	432

No.	Synon.	R.A. 1830 A. h. m. s.d.	N.P.D. 1830.0. ° ' "	Description, Remarks, &c.	Sweep.
3315	Δ. 323	10 58 10.5	147 49 26	A glorious cluster of immense magnitude, being at least 2 fields in extent every way. The stars are 8, 9, 10, and 11 mag, but chiefly 10 m, of which there must be at least 200. It is the most brilliant object of the kind I have ever seen.	543
		59 16.8	45 18	Chief * of a v L, R, loosely sc cl of st 8....12 m, which fills 2 or 3 fields. A fine bright object.	434
		59 19.0	45 20	The chief star of a superb cluster, which has several elegant double stars, and many orange-coloured ones. [N.B.—The observations are correctly reduced, but owing to the very great extent of the cluster, there is no reason to suppose any error in the observation of f 543, which (as no particular star is mentioned) belongs probably to the general middle of the whole.]	435
		....	....	Viewed with Mr. Maclear, Feb. 26, 1835	551
3316	III. 824	10 58 48.7	108 33 22	F; S; R; p s l b M; 20". The preceding of 2	560
3317	.....	10 58 51.2	108 37 37	e F; S; R; v l b M; 15". The following of 2	560
3318	.....	10 59 20.7	126 15 18	e e F; attached to a v S star	574
3319	.....	11 1 54.5	126 37 33	v B; R; p g m b M; 30". The first of a group of 3	574
		55.3	36 35	p B; S; R; b M	573
3320	.....	11 2 31.3	126 37 23	p B; S; R. The second of 3	574
		31.7	36 35	F; S; R; b M. On the same parallel with No. 3319. [N.B.—The chronometer reading, as set down in the sweeping book, would make the minute of R A 3, instead of 2; but the context of the immediately subsequent observation proves this reading to have been impossible, and unquestionably one minute too late.]	573
3321	.....	11 2 36±	126 32 33	F; R; near 3 bright stars. R A concluded roughly, from an estimated Δ R A, with 574, No. 12.	574
		44.6	32 20	e B; p L; involving several stars. The last of 3	573
3322	.....	11 3 14.6	125 55 47	e F; R; g l b M; 20"; precedes 3 st 11 and 12 m, nearly on the same parallel.	572
3323	.....	11 3 16.5	149 19 8	Middle of a tolerably rich cluster, class VIII.	432
3324	.....	11 4 36.8	150 27 12	F; oval. The first of a group of 6. Place by collation of diagrams. Pl. IV. fig. 10.	433
3325	.....	11 4 38.4	150 18 30	F; oval. The 2nd of 6. Place by collation of diagrams	433
		42.4	18 7	R, s b M, by diagram. Place by collation, &c. Pl. IV. fig. 10	432
3326	.....	11 4 45.4	150 23 25	Fanshaped, adhering to a star. The 3rd of 6. Place by direct observation.	433
		49.4	23 2	A * 12 m, with a fan nebula attached. Place by direct obs. Pl. IV. fig. 10.	432
3327	.....	11 4 57.9	150 20 52	A * 11 m in centre of a round nebula. (The 4th of 6.) Place by direct observation.	432
		59.2	20 46	R; has a * in middle. Place by collation of diagrams. Pl. IV. fig. 10 ..	433
3328	II. 269	11 4 59.9	115 50 20	v B; p L; p m E; forms equilateral triangle with two stars 8 and 8.9 m following, distant 6' or 7'.	563
		60.9	49 52	v B; p L; E; v s v m b M; has an elongated nucleus; 90" long, 60" broad. Pl. IV. fig. 10.	689
3329	.....	11 5 3.2	150 17 10	F; L; oval; b M. Place, &c., by collation of diagram. The 5th of a group of 6. Pl. IV. fig. 10.	433
		7.2	16 44	L, b M, E in merid. Place, &c., by collation of diagram	432
3330	.....	11 5 14.2	150 25 18	S, oval, E in pos 160 ± by diag. Place by collation of diagrams; the last of a group of 6. Pl. IV. fig. 10.	432
		15.4	26 10	e F; oval. Place by direct observation. [N.B.—This close and very remarkable group not admitting direct observation of all the individuals in two sweeps, their places have been made out by a very careful collation and independent measurement of two diagrams made in sweeps 432, 433, for that express purpose. In the first obs only 5 were noticed. In the other a 6th was seen and laid down. See fig. 10, Pl. IV.]	433
3331	III. 529	11 5 34.5	103 10 2	v F; R; 30"; v l b M. [N.B.—The MS. makes the degree of P D 102; but the nebula having been looked for and found by the working list as III. 529, 103 is doubtless the correct degree.]	700
3332	.....	11 5 42.7	149 52 33	A close, p rich, comp, oval cluster somewhat insulated	543
3333	.....	11 6 20.7	112 47 56	v F; R; b M; much diluted at the borders; 30"	559

No.	Synon.	R. A. 1830.0. h. m. s.d.	N. P. D. 1830.0. o. p. s.	Description, Remarks, &c.	Supp.
3334	.....	11 7 50.3	150 19 52	A red star 10 m, the centre of an excessively condensed group of stars 15....18 m, with a nebulosity extending over 2' diameter.	432
	.....	....	....	Viewed the neb. of f 432, No. 21, which is a very remarkable object. The centre, when examined with powers 240 and 320, decidedly not a star, and the nebula about it all resolved. Perhaps it is a globular cluster v s v m b M.	433
3335	.....	11 8 3.3	122 54 7	e F; R; S; g b M; 15".....	572
3336	.....	11 9 31.3	115 12 7	F; S; R; g b M; 20".....	689
3337	I. 241 Δ. 617	11 10 2.6	121 52 57	p B; v L; oval; v g v l b M; r; 5' l, 3' br.....	444
3338	.....	11 10 21.6	165 17 29	F; p m E; g b M; 50".....	782
3339	III. 530	11 15 6.6	102 53 40	F; S; R; g b M. The preceding of 2.....	687
3340	III. 531	11 15 37.3	102 54 22	p F; R; 20"; has 3 st 10 m near it, with the two following of which it makes an equilateral triangle.	700
		45.4	54 55	p B; l E; p s b M; 20"; the following of 2. <i>The RA awkwardly taken.</i>	687
3341	.....	11 16 51.7	115 48 37	F; v L; v g l b M. Several S stars near, and one = 7 m nearly south, at 6' distance.	689
3342	Δ. 481	11 17 28.9	132 18 0	Cluster VIII. class; 60 or 70 st 11....13 m in a comp R space, 10' diam	542
		32.9	17 56	Not very rich, but a good cluster; g comp M; L; R; very sc; almost fills field; at 10....14 m.	774
3343	II. 159 h. 891	11 17 38.8	72 11 40	p B; R; p g m b M.....	688
3344	III. 532	11 19 38.3	102 15 2	F; p m E in parallel; g p m b M; 20".....	700
3345	.....	11 20 12.3	149 1 10	B; p L; irr R; p g p m b M; 90"; r. Almost resolved. It is, however, by no means a mere knot of the milky way.	435
3346	.....	11 21 25.1	125 27 36	p B; R; p s b M; 15".....	448
		26.3	26 56	B; R; p s m b M; 60".....	541
		27.4	28 29	p B; R; p s b M; 20".....	446
3347	II. 562	11 22 57.8	103 17 52	p F; S; R; v g l b M; 15".....	700
		58.9	17 37	p B; S; R; g b M; 15".....	687
3348	.....	11 23 7.2	119 15 32	p F; S; m E; attached like a wisp to a * 13 m.....	445
		8.6	22 47	p B; S; m E; attached to a *. [N.B.—The observations disagree much in P. D., but it seems probable that a part at least of the discordance arises from the star having been taken in one observation and the nebula in the other. Still an error of 5' in one or other reading must have been committed.]	444
3349	III. 935	11 26 6.3	103 9 12	e e F; R; g b M; difficult, but a good obs.....	700
3350	.....	11 27 8.4	127 1 0	p B; p L; R; g l b M; 40".....	573
		9.5	0 18	F; l E; g b M.....	574
3351	.....	11 27 30.5	127 2 55	p B; l E; g l b M; 40".....	573
		31.9	2 43	v F; E; g v l b M.....	574
3352	Δ. 289	11 27 53.6	150 38 38	The preceding of two chief stars of a fine, large, loose, R cl of st 8....12 m; g p m b M; fills field; 150....200 stars.	432
		28 44.5	40 28	A very fine cl class VII.; nearly R; 8' diam; l comp M stars 9....15 m; place that of an orange star 9.10 m following M.	434
3353	.....	11 30 7.6	139 45 54	e F; R; 20"; in a field with 50 or 60 small stars.....	566
3354	.....	11 30 38.1	126 47 53	p B; R; v s b M, almost to a star. It is n p a * 9 m.....	574
		38.3	47 45	B; R; p s b M; precedes (to n) a * 9 m.....	573
3355	h. 934	11 31 20.3	73 43 33	e F; R; adjoining to, or in the prolongation of, No. 41, f 688. This observation sets at rest the doubt in my former catalogue, and shows the erroneous observation to have been that of f 419.	688
3356	II. 103 h. 936	11 31 23.8	73 42 33	v F; l E; g b M; has another R neb at its extremity. See fig. 79 in my Northern Catalogue. See also the remark above (on h 934) as to the erroneous R A of f 419 in that catalogue.	688
3357	.....	11 33 38.2	102 54 37	F; l E; p s l b M; 40". [N.B.—It is just possible that by a double mistake of 1" in R A, and 1" in P. D., this nebula may be h 957. Both observations are correctly reduced.]	700
3358	.....	11 37 49.2	145 25 48	v F; l E; has two stars in it.....	437
				See also "Omitted observations."	

No.	Synon.	R. A. 1830.0.		N. P. D. 1830.0.		Description, Remarks, &c.	Sweep.
		h.	m.	s.	d.		
3359	III. 823	11 38	14.5	116	58 52	p B; l E; p s b M	689
			15.0		58 16	p B; S	562
3360	I. 120 h. 9.9	11 38	24.2	105	54 52	p B; L; R; v g p m b M; r (?); 90"	700
3361	II. 555 h. 9.81	11 39	21.5	100	0 21	p B; R; p L; 45"; 1" g; then p s b M	591
3362	.....	11 40	30.0	126	34 20	p F; R; or l E; g v l b M; among stars	573
			33.1		34 23	p B; R; or v l E; v g l b M; 35"	574
3363	II. 864	11 40	38.6	118	22 27	p B; R; p s m b M; 15"	452
3364	.....	11 41	5.3	137	19 23	Place of a D * in a v L; not v comp cl; class VII., well defined and insulated; has about 50 or 60 st 9....12 m, with a few 13....14, all loosely sc; little or no compression in M; more than fills field.	776
		....		22	±	A fine, large, but coarse cl class VII.; stars 9, 10, 11 m; two double stars are in it.	553
3365	.....	11 41	54.8	146	14 8	PLANETARY NEBULA. Perfectly round; very planetary; colour fine blue; a very little ill defined at the edges; has no "satellite stars;" very like Uranus, only about half as large again and blue. Diam in R A = 1'.5.	784
			55.8		14 19	○; diameter 8....10"; perfectly round and well defined, and of a fine blue colour.	692
			56.1		14 9	○; a perfect planetary disc 6" diam; quite sharp, with not the least haziness. It is of a most decided independent blue colour when in the field by itself, and with no lamp light and no bright *. About 10' north of it is an orange coloured * 8 m. When this is brought into view the blue colour of the ○ becomes intense. Shown to my attendant, John Stone, who, on being asked what colour, said at once "blue."	436
			56.9		14 3	○ = in light to a * 7 m; diam in R A = 1'.3; viewed with all the powers; very beautiful; decidedly blue.	437
			59.01		14 2	○; colour a beautiful rich blue, between prussian blue and verditer green. The light is fully = that of a * 8 m diameter; 2'.0 in R A; 12" by careful estimation. When kept steadily at rest its outline is sharp and clean, and perhaps a very little elliptic. A feeble lamp light gives it a deep indigo contrasted colour. Do. if a red star n p, about 15' dist, be brought into the field with it. My attendant saw it and declared <i>proprio motu</i> that the light has quite a green cast in it. About 90 stars are in the field, none above 11. 12 m, and only one of that magnitude (meaning when the neb is central). It has none but stars 16 m near it. (R A possibly not good being beyond the f).	545
		....		....	....	Feb. 26, 1835. Viewed with Mr. Maclear after f 551, the blue planetary nebula. Blue colour very conspicuous. Has one small companion certain [pos by diagram about 250"] dist = a full diameter, another nearly certain [at about half the distance by diagram, and pos about 135"]. The field is full of stars. Total light of ○ = a * 6 or 6' m. A very little oval in pos, about 160" or 165".	551
3366	I. 259	11 42	26.6	117	54 42	p B; E; m b M; v r; 20"; has a v s * s p involved	452
			27.3		51 27	B; p L; l E; g l b M; 80" l; 50" br; r; both polar distances are rightly reduced; one may have been 5' misread.	449
3367	.....	11 43	44.8	115	57 21	v F; v m E; 2' l; 15" br; pos of extension = 59°.3	562
3368	III. 290	11 45	25.3	109	37 29	F; p L; m E; g l b M; 60"; pos 236°.8	561
3369	Δ. 349	11 46	±	144	46 21	Cluster VI class; p rich; irreg fig; R, with long appendages, g p m b M; 9'; stars 13 m. See also "Omitted observations."	784
3370	I. 67	11 46	0.2	103	1 28	v B; R; p s m b M; 40"; forms a triangle with 2 st 10.11 m	687
			1.2		1 32	B; S; R; v g b M; 20"	700
3371	II. 296	11 50	51.3	108	19 24	⊕; F; p L; R; 2'; resolved; stars barely seen; but in a better night for definition would no doubt be clearly resolved into st 16 m.	561
3372	III. 279	11 52	18.6	105	0 12	e e F; p L; R; has a * 9 m o.9 rad of field dist; 45° ± n f.	700
3373	.....	11 54	28.4	152	14 12	Cluster VII class; loose and scattered, but pretty rich.	778
3374	.....	11 55	33.5	156	21 31	v F; R; 40"; has a v s * in centre; in a field of at least 80 or 90 stars.	557
3375	III. 754	11 56	52.3	115	34 42	p B; R; g b M.	689
3376	.....	11 57	12.0	103	35 27	e F; L; p m E; v g b M. The direction of elongation points between two stars 11 m; very near, and n f the centre.	700

No.	Synon.	R. A. 1830.0. h. m. s. d.	N. P. D. 1830.0. o. i. s.	Description, Remarks, &c.	Sweep.
3377	Δ. 291	11 57 54.2	150 18 10	A * 10 m in centre of a pretty rich close cluster; 5' diam; irreg R; stars 10....13 m.	435
		56.2	17 48	Middle of a rich, p L, irreg R cluster; poor VI. or rich VII. class stars 10....14; diam 5', with stragglers.	432
		56.8	17 48	Cluster class VII; pretty rich and compact; stars 10....12 m, and nearly =; diameter 5'; the whole field is in a state of wavy fluctuation, owing to the S E wind, and so bad that each star is dilated into a large puff ball.	434
3378	II. 865	11 57 56.8	118 51 42	The first of a double nebula (pos 111° 2, by mean of 2 meas) B; R; p L; p s b M; r; 25'. Δ R A of this neb, and a * S of it, = 2' 0.	452
		57.6	49 8	p F; R; g b M; 30"; r. The 1st of a double neb, pos = 120.3.....	449
3379	II. 866	11 58 1.8	118 52 2	The 2nd of a double neb B; R; p L; p s b M; r; 25".....	452
		2.6	49 18	F; R; g b M; 20"; r; the 2nd of a double neb.....	449
3380	.....	11 58 22.9	129 15 17	F; l E; g l b M; under a curve of 3 B stars.....	810
		24.0	15 18	F; S; R; at the end (or forming the continuation of an arc of 3 stars respectively, in order 8, 9, and 10 m.).....	554
3381	III. 533	11 58 28.7	103 14 22	F; S; R; g b M; 15".....	700
3382	.....	12 0 9.0	98 5 11	F; v g l b M; p m E in parallel; 25".....	697
3383	III. 534	12 3 58.5	103 4 37	v F; p L; R; v g b M; 60".....	700
3384	.....	12 4 39.8	151 46 11	Cluster class VI.; v F; almost nebulous.....	778
3385	.....	12 7 30.7	132 22 33	p F; p L; l E; v g l b M; 50" l.....	458
		32.5	22 36	p F; p L; p m E; v g b M; 2' 1, 45" br.....	455
		34.1	23 0	p B; L; p m E; v g b M; 2' 1, 1' br.....	456
		36.6	22 45	F; R; g l b M; 30".....	788
3386	.....	12 8 6.2	144 21 20	Cluster class VI. F; p L; irreg; 6'; resolved into st 13, 14, 15 m. Place of a * 12 m, chief and near middle of cl.	784
3387	.....	12 13 17.8	122 31 54	v F; p L; R; v g l b M; 90"; r.....	443
3388	.....	12 14 46.4	147 10 30	A p rich cl; not m comp M; stars 12....14 m, in curved branches. A fine double star follows.	435
3389	Δ. 292	12 14 58.5	150 55 38	A large loose cl of small st 12....14 m; irreg R; not v rich; l comp M; diam 10'.	434
		15 16.3	57 56	Chief * 10 m, of a fine rich cl which fills field.....	432
		15 19.1	58 0	Cluster class VI. v L; v B. A star about 3.9 m taken; but the brightest part of the cluster is about 4' n p. Fills field; not m comp M; stars 12....15 m. This cluster was found by Mr. Maclear in this <i>sc</i> made with him, not being aware at the time of its having been before seen in <i>sc</i> 432.	778
3390	Δ. 67??	12 16 7.4	161 43 20	⊕; v F; L; v g b M; 6' diam; resolved into st 15 m; rich in stars; a delicate and faint object; has a * 45" n p, dist 5' from centre. Almost perfectly insulated in a very large space almost entirely devoid of stars, being the smaller and southern lacuna below the great "coal sack."	567
		8.0	42 32	cl, class VI. Rich; F; L; R; v g l b M; 8' to 10' diam; stars discrete, 12, 13....16 m; insulated; has a * 6 m just out of it, n p.	583
3391	.....	12 16 21.0	128 48 13	p B; S; R; p g v m b M.....	458
3392	Δ. 300	12 19 16.8	149 9 8	cl taken for Δ 300; a semi-elliptic group of stars 11....12 m, diameter 2' ..	434
3393	.....	12 19 31.8	132 19 8	e F; L; R; v g b M; 3' diam.....	686
3394	.....	12 20 8.8	119 9 43	e e F; v S; attached to a * 13 m. (No doubt of the nebulous character of the object.)	564
3395	.....	12 20 22.7	153 51 3	cl VIII. class; poor; scatt. The northern of 2 st 8 m taken.....	581
3396	III. 764	12 20 26.7	112 13 25	p B; p m E; s p m b M; 60" l.....	588
		29.7	14 0	p B; E; s b M; pos of elongation 130°.....	690
3397	.....	12 23 3.3	129 1 59	F; L; R; v g l b M; 90".....	456
		23 5.4	2 43	e F; p L; R; v g l b M; 40".....	458
3398	II. 771	12 23 31.4	96 36 43	v F; L; l E; g v l b M; 2' 1 by 100" br.....	697
3399	.....	12 26 33.6	128 58 13	p F; S; R; p s m b M to a * 16 m.....	458
		34.3	58 4	p B; S; R; p s m b M to a * 16 m.....	456
3400	.....	12 27 0.6	128 29 53	F; R; or l E; g l b M.....	574
3401	.....	12 28 29.4	132 41 18	v F; S; almost exactly south of a * 10 m, 30" dist.....	686
3402	.....	12 28 41.6	124 34 7	v F; L; l E; v g l b M; 60" l, 40" br.....	572
3403	.....	12 28 42.7	129 36 3	F; p m E; 25" l, 15" br; follows 2 stars.....	458

No.	Synon.	R. A. 1850.0. h. m. s. d.	N. P. D. 1850.0. ° ' "	Description, Remarks, &c.	Sweep.
3404	M. 68	12 30 30.1	115 48 50	⊕; irr R; g b M; diam in R.A. = 12...15 sec. All clearly resolved into stars 12 m; very loose and ragged at the borders.	689
3405	.....	12 31 46.2	129 59 3	e F; L; R; p s l b M. The first of 2.....	458
3406	.....	12 31 53.7	130 2 8	F; L; R; v g b M; r (?). The following of 2.....	458
3407	Δ. 572	12 32 29.3	152 2 14	cl class VII. Stars 11...13 m; about 6' long and 4' br; has 10 stars 11 m, and some 20 or 30 smaller. It occurs in the midst of the black space following α Crucis, which is by no means void of stars.	778
3408	.....	12 33 7.2	129 44 16	e F; v S; R; s p a star at the edge. The first of 2.....	456
3409	.....	12 33 26.4	129 48 36	p F; S; R; p s l b M; 15". The following of 2.....	456
3410	II. 772 h. 1393	12 33 37.5	96 6 16	v F; l E; g l b M.....	697
3411	II. 773 h. 1594	12 33 38.4	96 1 31	v F; R or l E; g l b M.....	697
3412	.....	12 34 43.7	130 48 53	p B; S; p s b M; 12".....	458
3413	.....	12 35 3.5	129 47 42	v F; R; b M; r. Wind violent. [Right reduced. The degree of P D certainly correct.]	460
3414	II. 558	12 35 49.8	99 9 0	e F; attached like a wisp to a * 16 m; a * 9 m precedes.....	591
3415	.....	12 36 ±	130 10 ±	F; R; p L; g b M.....	456
3416	.....	12 36 57.8	130 47 3	e F; S; R; v g b M. [Right reduced. See No. 3413.]	458
3417	.....	12 37 14.2	97 42 52	v F; R; g l b M; 30".....	697
3418	.....	12 37 39.8	130 40 3	F; l E; v g b M.....	458
3419	.....	12 37 58.1	128 38 13	e e F; p L; R; 60". (No doubt.)	574
3420	.....	12 38 2.9	100 42 42	e F; S; has one or two small st entangled in it.....	591
3421	.....	12 38 6.8	132 24 58	p F; S; R; g b M; 15".....	686
3422	.....	12 38 24.5	130 37 33	e F; S; R; v g b M; 60"; n f a small star.....	458
3423	.....	12 38 24.9	99 7 38	p F; E; g v l b M; 45" l.....	698
3424	Δ. 510?	12 39 33.7	130 22 38	p B; L; R; g b M; 2' resolvable.....	456
3425	L. 129 h. 1437	12 40 12.5	97 43 58	v B; R; v s v m b M; 2½'; r to left eye.....	697
3426	III. 524 h. 1438	12 40 16.5	100 28 43	p B; m E; v l b M; 30° l, 15° br.....	698
3427	.....	12 40 36.9	130 21 58	v F; v S; R; p s b M; 10".....	456
3428	Δ. 511	12 40 47.9	130 26 23	p B; R; g b M; 30". (More nebulae hereabouts.)	456
3429	.....	12 42 52.3	130 28 3	F; R; g b M.....	458
3430	.....	12 42 ±	130 10 ±	The first of 3.....	458
3431	.....	12 42 ±	130 10 ±	The second of 3.....	458
3432	L. 133	12 42 57.0	99 31 44	A star 9 m, with a strong burr about of very small extent; diam 10". It is the best specimen of the class of "stellar nebulae" that I remember to have seen. A star s f, 10 m, dist 1½'; has no burr.	591
3433	.....	12 42 58.3	130 8 53	F; L; E; g b M; has two more nebulae preceding, a little to south....	458
3434	.....	12 43 27.3	131 44 38	B; R; first v g, then v s b M; 50".....	686
3435	Δ. 501	12 43 36.7	149 25 28	ε Crucis. Place of the largest, central, red star.....	454
		37.1	25 30	The same red star taken. Several others laid down, of different shades of green.	435
		.....	25 36	The central star (extremely red) of a most vivid and beautiful cluster of from 50 to 100 stars. Among the larger there are one or two evidently greenish; south of the red star is one 13 m, also red; and near it is one 12 m, bluish. (For a more particular description of this beautiful cluster of variously coloured stars, see the monograph figure, Pl. I. fig. 2, and the accompanying description.) The R.A. given by this observation is 45 12.6, an error induced by the slider of the eye-piece not having been pushed home to its final bearing.	432
		.....	.....	Viewed, and roughly figured for future reference.....	433
3436	.....	12 44 31.2	128 48 27	B; S; l E; p s m b M; 25". Wind violent.....	460
		33.6	48 3	p B; p L; l E; g m b M; 40".....	574
		.....	.....	Viewed in its place by working list; p F; S; R; not 1st class.....	573
3437	II. 559	12 45 13.1	98 16 50±	v F; S; R; v l b M; the preceding of a double nebula.....	697

No.	Synon.	R. A. 1850.0. h. m. s. d.	N. P. D. 1850.0. ° ' "	Description, Remarks, &c.	Sweep.
3438	.....	12 45 14.1	98 16 29	v F; S; R; v l b M; 15"; has a * s f; the following of 2. [N.B.— II. 559 is not noticed as double in Sir W. Herschel's description.]	697
3439	.....	12 45 35.7	137 49 6	v F; S; R; g l b M	553
3440	.....	12 47 2.3	118 35 13	F; R; g v l b M; 40"	564
3441	.....	12 47 26.2	130 52 33	e F; R; g b M; 40". The preceding of 2	458
3442	.....	12 47 26.3	130 54 3	e F; R; g b M; 30"; 90" dist from the foregoing pos = 170°.9	581
3443	.....	12 47 31.6	154 1 36	Cluster; R; p S; resolved; irreg; g b M; 3'; stars 13... 18 m.	568
		33.0	2 1	Class VI.; p rich, irreg fig; g b M; 3'; stars v S; comparatively insu- lated; has 2 bright stars 8.9 and 9.10 m.	431
3444	Δ. 164	12 47 56.7	159 56 50	Cluster, VII. class; 5' diam; stars 10... 15 m. The foll of 2 B st taken ⊕; B; L; R; g b M; stars 14 m, and one 7 m n p the centre; a fine object.	567
		36.2	2 25	⊕; p B; L; p rich; at first g, then v s p m b M; diam of the bright part 3', of the loose stars 10'; stars 12... 16 m, and one large one 7 m, 3' or 4' north of the centre. [N.B.—There seems to have been some indocision in the first obs whether to take the large star or the central portion of the nebula. I presume the R. A. to be that of the star; if it be not that in one or other obs, the moveable wire has been taken for the fixed.]	584
		48 25.1	57 25		
3445	II. 549 h. 1484	12 47 58.8	97 35 50	B; L; m E in merid; g p m b M; 3' l	697
3446	.....	12 48 26.8	128 49 50	p F; v S; R; s b M to a * 17 m; pos from * 10 m (distant 60") = 250°.3.	456
3447	.....	12 48 29.0	116 22 27	F; R; g b M; 25"	689
3448	.....	12 48 32.6	135 29 21	F; m E; v g b M; 90" l, 25" br	695
		34.8	20 23	B; L; m E; g l b M; 21' or 3' l, 1' br; pos = 157° ±	455
		....	21 —	F; m E in pos 147°; v l b M; 2' l. Taken beyond the meridian, and out of reach in R. A.	776
3449	Δ. 311	12 49 49.8	148 40 58	A very poor cluster of about 70 stars 11... 15 m, very loosely scattered over a space about 15' long and 8' br.	434
		68.0	40 38	Cluster VII. p rich; L; irr R; 10' diam; 80 or 100 st, 10, 11, 12 m, with a stippling of much smaller ones.	790
3450	.....	12 52 6.6	120 2 18	v F; R; 30"; attached to a star; the preceding of 2	564
3451	.....	12 52 13.6	120 0 18	v F; v S; R; s l b M. The following of 2	564
3452	.....	12 52 28.2	131 51 11	e F; precedes 3 or 4 st, 11... 12 m	456
3453	II. 190	12 54 9.5	97 9 48	v F; R; g l b M; 30"	697
3454	.....	12 54 34.1	130 30 3	v F; R; precedes 2 st 8.9 and 9 m (with which it makes nearly an equila- teral triangle by diagram).	458
3455	.....	12 54 59.8	136 18 20	e e F; S; R; the preceding of 2; a * 7 m, just at the northern edge of the field.	776
3456	.....	12 54 59.8	119 36 40	p B; R; S; b M; 15"; has a * 6 seconds following	450
		61.3	36 48	p F; R	564
3457	.....	12 55 15.4	136 19 40	F; S; R; 15". The following of 2	776
3458	II. 561	12 55 22.6	99 25 58	p F; L; R; g p m b M; 60"	698
3459	Δ. 411	12 55 30.4	138 22 24	B; v L; v m E; v g l b M. Length much more than a diameter of the field, or than 15". Its light extends to a * 14 m beyond the parallel of B 4299. Position of elongation = 38°.7.	566
3460	.....	12 55 50.0	132 41 3	B; R; g p m b M; 60". The preceding of 2	686
		51.1	41 15	p B; S; R; b M; 20"	455
3461	.....	12 55 54.9	124 25 24	p L; F; R; v g l b M; 50"	446
3462	.....	12 55 58.1	132 36 25	e F; S; R. The following of 2; barely perceptible, but a sure obser- vation.	455
		59.1	35 43	e F; R; p s l b M; 80"	686
3463	.....	12 56 38.5	126 38 40	v F; p S; among stars; wind furious	460
		....	39 ..	Viewed; a diagram made representing it as round, with three small stars, one distant about 1 semi-diameter from border; pos about 295°; another dist 3/4 diameter; pos = 75°; the 3rd dist 1 1/2 diam; pos = 300°.	573
3464	.....	12 56 48.2	118 50 33	F; R; g b M; 35"	564
3465	I. 130	12 56 58.1	97 6 8	v B; p L; p m E; p s m b M; 90" l	697

No.	Synon.	R. A. 1830.0. h. m. s.d.	N P D. 1830.0. o. s. s.	Description, Remarks, &c.	Sweep.
3466	.....	12 57 55.9	117 18 41	v F; v L; oval; v g l b M; 3' l; 2' br	449
		55.9	19 14	e F; v L; oval; v l b M; 3'	450
3467	.....	12 58 0.7	112 46 5	F; p L; R; g l b M; 60"	690
3468	.....	12 58 56.0	138 35 44	B; R; g m b M; 80"	566
3469	.....	12 59 51.9	117 44 18	e F; R; 30"	564
3470	.....	13 0 12.6	132 11 36	v F; S; E; possibly a small group of stars, but I think it is nebulous	455
3471	.....	13 0 39.3	111 38 30	p F; R; s l b M; 35". Among stars	690
3472	I. 42 h. 1540	13 0 49.1	96 54 49	p B; R; v g p m b M; 60"	697
3473	.....	13 3 8.0	132 12 6	p B; p S; R; g b M; 15"; in a curve of 3 or 4 stars	455
		8.2	11 8	p F; S; R. The middle object in an arc of stars	458
		11.1	11 10	B; S; R; p g b M; 12". In the middle of an arc of 4 st	456
3474	.....	13 4 28.7	132 3 23	p B; R; b M; 40"	458
		31.8	3 25	p B; p L; R; g b M; 50"	456
		32.5	3 15	p B; p L; R; g b M; 50"; has a * 7 m; 3" n f; dist = 72'	788
3475	.....	13 6 4.0	152 30 51	A great cluster, or a surprisingly rich portion of the milky way. It contains 34 stars 11 m, and perhaps 150 or 200 more of less magnitudes in the field.	596
3476	.....	13 6 4.1	149 9 35	Cluster VIII.; oblong; 10' by 7', of loose sc at 11 m	790
3477	.....	13 6 18.5	113 4 55	F; L; R; v g v l b M; a star 9 m; 2' north; precedes 10'	690
3478	.....	13 6 47.6	117 31 18	p F; R; has another neb n f; $\Delta R A = 20^\circ \pm$; $\Delta P D = 5' \pm$	564
3479	.....	13 7 8.1	117 26 13	The following of 2	564
3480	I. 138	13 8 47.7	115 57 30	B; p S; R; p s b M; 12". A star 9 m follows 10'.5	453
		50.7	56 59	v B; R; b M; has * 10 m 11' following; 30" south	689
3481	.....	13 8 53.2	122 25 43	e F; v S; R; near one or two stars	446
3482	.....	13 8 53.1	122 31 58	e F; v S; E. (? if really a nebula)	446
3483	.....	13 9 0.7	137 0 50	p B; S; R; p s l b M; 25"	776
3484	II. 566	13 10 31.0	116 30 47	p B; S; p m E; p s b M; has a * 7.8 m following	453
3485	.....	13 10 47.7	132 48 7	v F; S; R	455
		47.8	48 55	v F; R; 20". The 1st of a group of 4	788
3486	.....	13 11 11.3	132 49 55	e F; R; 15". The 2nd of a group of 4	788
3487	.....	13 11 19.0	132 49 12	B; p L; R; 60"	455
		21.3	49 5	p F; R; 30". The 3rd of 4	788
3488	.....	13 11 21.5	132 50 7	F; l E. The last of group; attached to the preceding one	455
		27.3	50 35	v F; R; 20". The last of 4	788
3489	III. 117 h. 1576	13 11 31.9	101 51 21	v F; S; R. The 1st of a group of 3 nebulae	698
3490	II. 193 h. 1577	13 11 33.9	101 46 18	p B; S; p m E. The 2nd of a group of 3	698
3491	III. 118 h. 1578	13 11 38.9	101 48 18	F; S; R. The 3rd of a group of 3	698
3492	.....	13 12 22.9	125 44 40	v B; R; s v m b M; 50"	573
3493	II. 567	13 12 24.6	116 32 7	v B; p m E; g m b M	689
		25.3	32 7	B; R; p L; p s m b M to a star	453
3494	.....	13 13 32.1	121 27 7	e e F. The preceding of 2	701
3495	.....	13 14 32.3	121 27 7	F; l E; p s b M. The following of 2	701
3496	.....	13 14 39.5	152 31 23	Cl class VI.; oval; 4' l; 3' br; stars 12...16 m; an extremely rich clustering patch in the milky way, which is here superb.	596
3497	III. 115	13 15 0.8	101 24 3	p B; S; R; or l E; definition bad; doubted at first if it really was a nebula, but remained satisfied.	698
3498	.....	13 15 3.1	126 47 32	B; R; p s v m b M; 30"; r; probably a dimly seen \oplus	460
		4.8	48 10	p B; R; p s b M; 20"	573
3499	.....	13 15 21.6	119 25 37	e F; S; l E	449
		22.5	25 20	v F; S; E	450
3500	.....	13 15 25.0	119 27 30	v F; v S	450

No.	Synon.	R. A. 1850.0. h. m. s. d.	N. P. D. 1850.0. ° ' "	Description, Remarks, &c.	Sweep.
3501	Δ. 482	13 15 28.7	132 8 3	[A nebula consisting of two lateral portions, and] no doubt of a small streak of nebula along the middle of the slit or interval between them, having a star at its extremity. See fig. 2, Pl. IV. Position of the slit, 124.7; of the star, with another * near the nebula and south of it, 332.3; other stars also laid down (see description of the figure). A most superb calm night; objects admirably defined. Shown to a bystander (J. R.) who saw it as figured and described.	458
		29.5	8 8	[Two nebulae, or two portions of one separated by a division or cut.] The cut is broad and sharp. The two nebulae are very nearly alike. Perhaps the slit is larger towards the n p end, where there is a star between them. There is certainly a very feeble trace of nebula, an island as it were, running from this star between the sides of the slit. N.B. No "moonlight effect" seen between the edges. Night very fine. Pos of the slit, 120°.3. The place taken is that of the star within the slit.	455
		31.7	7 30	A figure taken (which represents the internal faint nebula), but no description.	457
		33.1	7 17	A most wonderful object; a nebula v B; v L; 1 E; v g m b M, of an elliptic figure, cut away in the middle by a perfectly definite straight cut 40' broad; pos = 120°.3; dimensions of the nebula, 5' by 4'. The internal edges have a gleaming light like the moonlight touching the outline in a transparency.	454
3502	.....	13 16 16.5	118 56 48	p B; S; E	451
3503	Δ. 312?	13 16 20.2	148 6 59	General middle of cluster VIII. class. p B; L; irr; so; 30 or 40 stars 11.12 m, and many smaller; pretty well insulated, though on a ground rich in v small stars.	582
		30.1	7 39	Cluster VII. class; rather a fine cluster; rich, but loose and straggling. Fills field. Stars 11 and 12 m.	790
3504	Δ. 440	13 16 36.0	156 35 10	⊕; ω Centauri; v v B; v v L; v v g m b M; all clearly resolved into stars of two magnitudes, viz., 13 and 15; the larger lying in lines and ridges over the smaller. Near the centre are two distinct darkish spaces formed by a deficiency of the larger stars 13 m within, and an excess without. This most glorious object fills the whole field with its most condensed part, and its stragglers extend 2/3 of a field beyond it either way. It is very conspicuous to the naked eye as a dim comet looking star, 4 m or 5 m.	776
		38.9	35 38	⊕; ω Centauri; diameter full 20'. It much more than fills the field. When the centre is on the edge of the field, the outer stars extend fully half a radius beyond the middle of it. The stars are singularly equal, and distributed with the most exact equality, the condensation being that of a sphere equally filled.—Looking attentively, I retract what is said about the equal scattering and equal sizes of the stars. There are two sizes 12 m and 13 m, without greater or less, and the larger stars form rings like lace-work on it. One of these rings, 1 1/2' in diam, is so marked as to give the appearance of a comparative darkness like a hole in the centre. There must be thousands of stars. To the naked eye it appears as a * 5 m or 5.4, rather hazy. There is a * 9 m on the sp border of it, about 4' or 5' south of centre, and several 8 m are scattered far away. My attendant (J. S.) called up, who saw the hole and darkness, and described it as I have done above. On further attention the hole is double, or an oval space crossed by a bridge of stars. Position of axis = 150°. Altogether this object is truly astonishing. (See Pl. V. fig. 7.)	695
3505	.....	13 16 44.9	122 59 7	p F; R; g l b M; 25"	572
		47.4	60 6	e F; S; R; g b M; 12"	446
3506	.....	13 18 9.3	152 32 3	A portion of the milky way broken up into clustering masses of astonishing richness. There must here be at least 200 or 300 stars in the field, none greater than 10 m.	596
3507	.....	13 18 11.2	118 40 28	p F; S; R; b M; has a * 2' fol; pos by diag = 67°	451
		12.6	41 39	F; S; R; p s l b M; 15"	449
3508	.....	13 18 23 ±	118 45 ±	The preceding of a double nebulae; the individuals are =; R; v F; S; p s l b M	449
3509	.....	13 18 24.2	118 44 28	p F; S; the following of two equal neb.	571
3510	.....	13 18 28.5	138 1 25	p F; irr R; or triangular; g b M; r; 40"	449
		31.2	1 19	p B; l E; g l b M; has a * 8 m 5' dist; pos sp	693
3511	.....	13 19 38.0	122 17 2	p F; L; p m E; v g b M; r; 4' 1'; 2' br; with left eye feebly stippled	566
					701

REDUCED OBSERVATIONS OF

No.	Synon.	R. A. 1880.0. h. m. s.d.	N. P. D. 1880.0. o. e. n.	Description, Remarks, &c.	Sweep.
3512	.....	13 20 6.0	150 3 21	Place of a double star in centre of a rich, much comp but v F cluster; g b M; 4' diam; st 15 m; a remarkable object. [N.B. By a singular coincidence of errors the R. A. of this obs has been mistaken 1", and the P. D. 12". Both are corrected. The P. D. 149" could not have been observed in 596.	790
		6.8	1 59	A small but very rich milky way cluster; 3 1/2' l, 3' br; st 13....16 m. Place that of a double star.	596
3513	.....	13 21 11.2	117 16 38	v F; p L; R; 50"; has a * 7 m n f; dist = 10'.....	564
		12.8	15 21	v F; p L; l E; a v L * follows 12' ± dist.....	453
3514	Δ. 252?	13 21 37.1	155 5 51	A very strange object. See fig. 1, Pl. VI. A nebula of oval fig, but having a central and brighter axis somewhat curved, and terminating in two masses brighter than the rest; diam about 90" or 100". It involves 3 stars, one of which with 320 is double. The principal * is 10 m, the others e S; a multitude of other stars in field.	568
3515	.....	13 21 48.0	123 54 46	F; p L; R; g l b M; 45".....	446
		50.6	54 2	F; p L; l E; v g l b M; 50".....	572
3516	.....	13 22 15.6	122 21 7	p B; S; R; first g, then p s b M; 45".....	701
3517	III. 507	13 23 17.9	97 53 56	v F; S; R; g b M; 15".....	697
3518	.....	13 23 30.4	137 15 22	F; p L; R; v g b M; 50"; on a ground faintly stippled with minute stars	464
3519	.....	13 25 28.3	122 36 22	e F and S; has 2 st less than 1 diam of neb, distant one (by diagram) s and one p.	701
3520	.....	13 26 —	135 2 ±	v F; S; R; has a * near lower edge.....	455
3521	.....	13 26 17.8	122 34 57	v F; S; R; precedes a * 10 m, dist 1 1/2 diam by diag.....	701
3522	.....	13 27 2.3	138 57 44	e e F; l E; 30". Requires a newly polished mirror, and a night such as this is to be seen.	566
3523	Δ. 628	13 27 26.1	119 0 18	185 Bode Centauri. E; pos of axis = 55°.1, which is also that of one of the 2 stars involved in it = 10 m. (See fig. 5, Pl. IV.)	451
		27.9	0 16	v B; v L; s b M to a centre = a star 9 m, diam 8", of a resolvable character like a ⊕, surrounded by an immensely L, extremely dilute almost equable light 7' or 8' diam, somewhat oval, and passing with excessive suddenness into the central light.	449
		28.5	0 20	F; v L; E; v s v m b M to a sharp nucleus (ill seen, owing to clouds) ..	450
		30.1	0 8	v L; v B; m E; v s v m b M to a nucleus; diam in R. A. = 17.5 sec = 3", 49" in arc; a small * involved; pos with nucl 80° ± by a rough diagram made at the time.	564
3524	.....	13 27 33.1	131 59 3	v F; p L; l E; g l b M; 90" l.....	458
		33.7	59 20	F; p L; R; g l b M; 40".....	457
		35.3	58 30	F; p L; oval; v g b M; 60" l; 50" br.....	455
		36.4	58 14	F; p L; R; v g l b M; 40".....	456
3525	.....	13 28 27.6	134 58 15	e F; S; attached to a * 13 m. (Certain).....	464
		31.3	61 17	v F; S; R; v g l b M; has a * at its edge.....	454
3526	II. 638 Δ. 623	13 30 18.2	120 46 22	v B; m E; p s m b M; 2 1/2' l; 2' br.....	701
3527	.....	13 30 37.2	100 37 43	p B; L; p m E; g l b M; 2' l; 1 1/2 br.....	698
3528	.....	13 32 2.3	119 3 18	v F; R; v l b M; 80".....	564
3529	.....	13 32 37.5	137 19 3	B; R; v g l b M; 45"; has 3 st 14 m near.....	463
		38.0	18 2	B; p L; l E; g l b M; r; 3 v small st near.....	464
3530	.....	13 32 53.1	152 2 50	Cl class VII.; poor; L; loose irreg fig; fills field; st 12 m.....	578
		67.4	2 26	A fine rich milky way group, or rather, outlying cl of a much finer cl following it.	596
3531	Δ. 273	13 34 47.5	152 3 0	Cl class VII. Small, compact irr R; 1 * 8 m, and 15 or 20 smaller in a knot. No. 1, 578, is an outlier of it.	578
		54.2	2 16	A brilliant, compact, milky way cl. Rich; irreg fig; g b M; 10'; stars 10, 11, 12 m.	596
3532	.....	13 35 15.7	148 20 17	Cl class VIII. L; v rich; loosely sc; st 7.8....16 m; it is an outlier of the milky way, but very rich and much insulated.	790

No.	Synon.	R. A. 1830.0. h. m. s. d.	N. P. D. 1830.0. ° ' "	Description, Remarks, &c.	Sweep.
3533	Δ. 388	13 35 44.3 45.4	140 31 1 30.57	⊕; B; R; v g b M; resolved; diam 2'; st 16 m; a B st 7 m in field .. ⊕; v B; g m b M; 2½' or 3' diam; resolved into st 15 m; has one * 12 m, s f; the centre near the edge. It is in the field with B. 4618 a star 6 m.	693 566
3534	.....	13 36 39.6 42.6	153 50 16 50 6	A F, oblong, elliptic cl of st 14 m; g l b M; 4' l; 2½' br A S, irreg R, very compact knot of M way; g v l b M; stars 14 m; a * - 8 m precedes.	568 581
3535	.....	13 37 43.9	119 32 8	v F; R; v l b M; follows a B double star.	451
3536	.....	13 37 59.0	120 4 8	p F; R; g b M; 20"; has 2 or 3 stars close to it.	564
3537	.....	13 38 49.8	149 35 39	Cl VII. class; much more than fills field; a very L and rich milky way cl, quite insulated on the prec. n, and foll sides, and nearly so to the S; forming a kind of peninsular projection, but much richer than the main body of the milky way.	790
3538	.....	13 38 57.5	119 35 18	F; R; g b M; 30"	564
3539	.....	13 39 40.5	119 38 18	F; R; g b M; 30"	564
3540	II. 306 h. 1671	13 40 17.8	96 22 26	F; R; p s b M; 20"	697
3541	.....	13 40 18.3	140 21 33	PLANETARY NEBULA. A very singular object. At first I thought it an ill seen double star; 12. 13 = 12. 13 m; dist 2'; but not being able to get it into focus I applied 320; which showed it as a hazy, rather elon- gated, planetary nebulous disc, as if a double * all but obliterated. It is positively not a star. The field is full of stars, two of which (Nos. 6 and 7 in the figure), are equal to this object in light, but 320 shows them both quite sharp. It is a difficult object to find, and unless in a good night for definition (this is superb) it could not be reco- vered. The place is well taken. The stars in the neighbourhood [laid down in a diagram made at the time] are—1 the neb; 2 = 3 = 4 nearly equal, and 14 m; 5 = 15 m; 6 = 7 12 m. It is the smallest and most difficult planetary nebula I have ever seen. Fig. 15, Pl. VI, exhibits its appearance with power 320. [N.B.—By this figure it would seem rather to belong to the class of double nebulae or double stellar nebulae of the utmost remoteness, than to that of planetary nebulae, properly so called.]	693
3542	Δ. 282	13 42 3.2	151 0 40	Cl VII. class; 14 stars 11 m, and 30 or 40 smaller in a round space 8' dia- meter. The general middle taken.	578
3543	III. 923	13 43 14.5 15.1	117 38 23 37 28	B; l E; s b M; 20"	564
3544	.....	13 43 47.6	137 39 36	p B; R; l b M; 20"	451
3545	.....	13 45 50.2	159 33 5	v F; v S; R; 6'; has a * 8 m; 3' f in parallel	464
		86.3	35 45	Cl VIII. class; v L, loose; straggling; stars L and S; fills field. The star taken is a double one.	584
3546	.....	13 46 15.4	119 29 58	Cl VIII. class; irreg fig; 8' diam; consists of about a dozen stars 11 m, and a great many 12, 13, 14 m.	598
3547	.....	13 47 25.3 26.3	133 5 58 5 35	p F; R; g l b M; 20"; exactly in M between 2 st 10 m	564
3548	.....	13 47 29.9	129 8 53	p B; v S; R; g b M; 15"	686
		32.6	8 20	p F; S; R; p g m b M; in a group of small st	788
		33.7	8 49	Place hurried and imperfect. Shown to Mr. Maclear and friend. A D * h 4636 involved in neb.	461
		34.1	9 23	Double star involved in neb. See fig. 10, Pl. VI. For meas of the D star, see Catal of those objects. Adjacent stars laid down, b and c = 13 m; pos of 1 = 28.3; a = 9 m; the nebulosity is very evident. No. 3 has no such nebula; neb at least 2' or 2½' diam.	573
		.....	.....	A close double star in a v L, B, luminous atmosphere, 2' diam. The * a, which is quite as bright, has no such atmosphere. The atm is v l b M. The star was not noticed as double till too late for a good meas after I had showed the object to my attendant J. S., verified with 240 and 320. A furious hot north wind, but the definition of stars excellent. It is no illusion, other stars are sharp and brilliant, and have not the least nebulous appearance.	460
		.....	.....	Neb seen as above. Careful obs taken of the stars in and adjoining it, which see in the Cat of D stars.	574
		.....	.....	v F; 2' diam; a * 9 m following, is about 4' dist, is unaffected with neb. Measures taken. See Cat of D st.	718
		.....	.....	Viewed past meridian, seen as above, and a diagram made and measures taken of the double star, which see.	462

REDUCED OBSERVATIONS OF

No.	Synon.	R. A. 1830.0. h. m. s. d.	N. P. D. 1830.0. o. 1. 2.	Description, Remarks, &c.	Sweep.
3549	.....	13 48 39.0 69.5	148 46 52 44 27	Cl VI.; F; rich; highly comp; consists of p L and e S st; fig oblong; 10' 1; 7' br; place that of chief * 9 m. Cl VIII. class; 8' 1; 5' br; stars 12 and 13 m. [N.B.—It is evident that in this obs, probably from defective weather, the e S stars of this cl were not seen.]	790 582
3550	.....	13 50 50.6	118 2 28	v F; R; g l b M; 25".....	564
3551	.....	13 51 10.9	123 7 34	v F; S; R; g b M; 15".....	792
3552	.....	13 51 26.5	122 14 32	p B; p L; R; v g b M; 90".....	701
3553	.....	13 53 1.7	130 35 20	e F; E between 2 v S st a little s f.....	457
3554	.....	13 53 37.6 39.6 40.8	123 9 26 8 43 8 47	p B; p L; R; g p m b M; 50"..... p B; p L; R; g b M; 50"..... p B; R; g m b M; 25".....	792 446 572
3555	Δ. 431	13 56 5.9 39.6 41.7	137 31 13 30 9 29 11	A region of L. B st 8, 9....&c. m; a very coarse cluster. Place that of a brilliant group, one of which is a double star class III. A region of L stars very loosely distributed, but which yet decidedly form a cluster. Place that of a pretty close double star (4") in the middle of a group of 8. The cluster is 30' diameter, and is divided into distinct groups. [N.B.—The two double stars taken in this and the foregoing observation are not the same.] Place of a double star [the same as that of f 695] in a semi-elliptic group forming part of it, but insulated in a large scattered cluster or tract of bright stars.	463 695 464
3556	.....	13 57 17.5	119 11 48	p F; S; R; p s l b M; 15".....	564
3557	.....	13 59 55.2	132 30 43	p F; v L; R; v g b M; 4'.....	686
3558	.....	14 1 ±	122 50 ±	F; R; near and to the north of a * 8 m.....	792
3559	.....	14 1 15.3 18.0	135 16 43 17 14	F; S; R; p s b M; 10"..... e F; R; g l b M; 20".....	463 564
3560	.....	14 2 31.9	119 51 13	p B; L; R; g b M; r. Stars barely seen in the nebula, besides several others about it.	464
3561	.....	14 2 40.9	116 18 18	v F; S; R; b M; n p a star.....	453
3562	.....	14 4 59.3 59.5	137 18 36 19 20	F; S; R; near 2 st 12 m; a small D * foll; 5'..... p B; S; R; p s b M; 15".....	464 463
3563	.....	14 7 49.5	132 35 5	A star 12 m, perfectly sharp in the centre of a very dilute, very gradually fading atmosphere, p m E; 90" 1, 40" br. A very remarkable specimen of its class.	788
3564	.....	14 10 40.2	118 27 58	e F; L; 2' diam; has some small stars involved.....	451
3565	III. 924	14 14 3.7	117 53 38	p F; E; g v l b M; 25".....	564
3566	.....	14 14 9.8	144 1 35	A poor, coarse, oblong cluster, which is the most condensed part of a rich region of stars 10 m. Place of a double * in the following part.	468
3567	.....	14 14 50.6	167 37 48	v F; E; g b M; with a feeble appearance of stars, but I have hardly a doubt of its being a nebula.	587
3568	Δ. 313	14 15 26.1	148 51 44	A small close group of large and small stars, forming a cluster.....	713
3569	III. 120 h. 1798	14 15 56.1	102 24 12	F; p L; R; g v l b M; 90".....	702
3570	Δ. 302	14 17 9.0 11.5 11.6	149 57 12 57 25 56 39	Cl VII. class; irr fig; not m comp M; L; 10' diam. There are perhaps 100 stars, 11 and 11.12 m; with a good sprinkling of 12 and 13. Cl VI. v rich; irreg R; p m comp M, but sc at borders; 15'; there are 3 st 10 m, 5 or 6 11 m; the rest below 11 m. L, p rich, irreg cl of sc st 8....14 m; fills field.....	582 578 715
3571	.....	14 19 49.8	118 59 23	e F; R; 20".....	564
3572	Δ. 469	14 21 45.2 45.8	133 26 22 26 27	p F; L; R; v g l b M; has many stars intermixed..... p B; L; v g b M; 2'; r, or with stars.....	455 454
3573	Δ. 342	14 22 59.4 60.9	145 48 34 49 3	Place of a red star, the chief and centre of a fine bright, but not rich cl, of about 30 stars 9....13 m. This red or high yellow star is 8 m. Large, p brilliant, coarse, sc cl VII. class, which more than fills field; 50 stars more or less 9....13 m; chief * 7 m, yellow, somewhat insulated, taken for place of cluster.	694 577

No.	Synon.	R. A. 1880.0. h. m. s.d.	N. P. D. 1880.0. ° ' "	Description, Remarks, &c.	Swep.
3574	.....	14 24 30.4	135 12 38	v F; S; l E; between 2 stars 13 and 14 m, forming northern side of a trapezium of 4 stars; one of the others is 3 m.	463
		33.3	12 20	v F; E; between 2 stars (by diagram), and has a large star s p.....	695
3575	.....	14 28 32.0	134 17 52	not v F; S; v g b M; 25"; among stars.....	454
3576	II. 196	14 30 19.9	115 47 45	v B; p L; R; p s b M; 1st class; 20"; r; several stars near. [N.B.—In the R. A. the wire is not set down. The 1st presumed.]	453
3577	Δ. 333	14 31 4.5	146 49 0	Cluster VII. p rich; st 11....13 m, irreg so 10' diam; rather more comp M.	469
3578	III. 508 VI. 8?	14 33 2.6	98 16 31	F; p L; p m E; g b M; with an appearance of resolvability, arising as I imagine from a few small stars accidentally on it, as I hardly think it can be reckoned a cluster in the sense of class VI. Re-examined working list. It is III. 508. VI. 8 does not exist in the space assigned to it in catalogue.	697
		5.6	16 8	F; p L; g b M; irreg oval; r; 2½' by 2'. If this be not VI. 8, there is no other near the place. [N.B.—It does not agree with the description of that cluster in my Father's catalogue, which states it to be 8' or 9' in diam; rich; v comp. The * 26 x Virgins, by which its place is there determined, is a mistake for 577 of Mayer's catalogue.]	698
3579	.....	14 35 44.8	103 13 7	v F; E; p s l b M; 20".....	702
3580	Δ. 356	14 36 49.7	143 48 29	cl VII. class; p rich; loose; irreg fig; 8'; st 10 and 11 m.....	468
3581	.....	14 38 15.2	104 8 17	p B; p m E; g p m b M; 80".....	702
3582	.....	14 41 38.5	141 57 53	A small elongated close group of v S milky way at 3' l, 1½' br; so close and faint as to approach very near to the character of a nebula.	468
3583	.....	14 48 1.5	131 20 ±	F; m E. In field with and n p A S C 1693 (ε Centauri). Place very rude Viewed, found in place, and seen, as described in f 456.....	456
3584	.....	14 48 52.6	161 45 10	e F; S; R; b M; 15".....	457
3585	.....	14 49 59.1	141 14 12	a p L cl VII. class; coarse; not comp; chief D * taken.....	569
3586	.....	14 51 32.3	103 29 32	v F; S; E; g l b M.....	468
3587	I. 71	14 51 50.9	96 46 6	v B; S; p s v m b M; 15"; almost stellar.....	702
		54.3	46 21	p B; R; s v m b M; 30"; hardly bright enough for a first class nebula..	697
3588	.....	14 52 51.6	143 40 12	cl; v L; coarse, but rich and fine; diam in R. A = 2 fields in P D 2½ (30' and 45'); st 9, 10, 11, 12. General middle taken.	711
3589	.....	14 53 7.9	144 55 6	cl VII. class; a fine L cl of separate stars 13....14 m, 10' diam; not m comp M; nearly fills field.	694
3590	.....	14 54 26.7	162 12 12	p F; p m E; g l b M; 35" l, 20" br. In a field full of st.....	597
		28.1	12 10	v F; l E; g l b M.....	598
		38.4	11 33	e F; p m E; 25".....	569
3591	.....	14 56 19.8	154 0 55	p B; R; v g v l b M; 60".....	581
		20.1	1 14	p B; R; v g v l b M; 70".....	785
3592	.....	14 56 48.8	125 40 9	v F; R; v g l b M; 20".....	792
		49.2	39 58	e F; E; v l b M; r; 15" l.....	448
3593	III. 736	15 4 23.9	103 37 27	B; p m E; p s m b M; involves a * 14 m to northward.....	702
3594	.....	15 5 15.8	135 0 51	○; a most elegant and delicate PLANETARY NEBULA. Diam in R. A = 1'.35 by many observations. Long contemplated with 180, 240, and 320. The disc is magnified by the power in due proportion. It is = a * 3.9 m; perfectly sharp, not the slightest haziness. A very fine object. It has no "satellites." My attendant, to whom I showed it, said it was like the moon, only smaller, and not in the least like a star.	464
		19.5	0 32	○; a clear round planetary white disc; at most 4" diam. Has two stars 14 m near; one at dist 90", pos 108.8; the other dist 120", pos 60°.2. See fig. 8, Pl. VI.	695
3595	III. 116	15 5 53.0	99 26 18	p F; L; R; v g b M; 3' diam.....	698
3596	VI. 19	15 7 39.1	110 22 59	⊕; p F; v irr R; v g b M; all resolved into st 12....16 m; diam 5' to 5½'.	722
3597	III. 138	15 8 8.2	113 25 ±	p B; R; p g b M; 15". (P D :: tube resting on gallery.) [True P D = 113 29 40 probably. See the next nebula.]	453
3598	III. 139	15 8 38.4	113 22 ±	B; R; p g b M; 20". (Tube resting on gallery.).....	453
		39.7	26 40	p F; R; g p m b M; 30".....	793
3599	III. 374 h. 1918	15 12 5.1	91 57 27	v F; l E; g b M; 25" l, 20" br.....	608

No.	Synon.	R. A. 1830.0. h. m. s. d.	N. P. D. 1830.0. ° ' "	Description, Remarks, &c.	SwEEP.
3600	.....	15 12 12.7	102 28 12	B; S; R; g l b M; 15". The preceding of 2	702
3601	.....	15 12 17.2	102 32 37	F; l E; g l b M; 25". The following of 2	702
3602	.....	15 12 27.4	96 44 32	e F; S; p s b M; 10'	609
3603	Δ. 357	15 14 43.8	143 56 5	A remarkable cluster, 20' diam; R; very discrete, and composed of small groups of 2, 3, 4 stars, chiefly 11, 12, and 13 m, sufficiently insulated from the rest of the pretty rich neighbourhood to be considered a cluster.	469
		56.9	55 37	A most numerous and beautiful milky way group or cluster covering a space of 13 or 2 fields diameter (20' or 30'), entirely composed of double and triple stars, and distinct groups of 4 or 5 nearly of a size (10 and 11 m), on a black ground. Perhaps 100 or 150 st in field.	468
		81.3	53 47	cl VIII. class. The field uniformly covered with insulated stars 11...14 m, forming a rich cl of 8th class, remarkable for the total darkness of the ground and absence of minute stars. Cl much more than fills the field.	599
3604	Δ. 389	15 15 45.7	140 4 19	⊕; B; L; R; g b M; diam in R A = 16 sec. Comes up to a B blaze in M. Resolved by left eye. Stars 17 m.	467
		47.2	4 20	⊕; p B; fine highly condensed; v g b M; 3' diam; clearly resolved. I see all the stars (15 m) well.	693
3605	.....	15 20 46.4	156 16 19	F; S; among a crowd of milky way stars. No doubt as to its nebulous character. All that is starry in field is clearly resolved.	709
3606	II. 401 h. 1926	15 21 55.5	92 14 35	p B; S; R; g b M; 18"	608
3607	.....	15 23 9.6	140 5 3	Not v B; S; g l b M; 90"; resolved into st 16 m, with one of 12 m, at or a little beyond the s p edge.	467
		10.9	5 2	p B; R; v g b M; 60"; a faint * involved	693
3608	.....	15 27 37.9	165 7 12	F; p L; R; v g b M; 2'	704
3609	.....	15 29 29.3	119 59 46	v F; L; R; g b M; r; 90"	794
3610	.....	15 33 22.0	150 40 55	PLANETARY NEBULA. Not B; p F; S; R; with something like a protuberance, which may arise from an accidental star, on or close to the edge. Not quite sharp; a little furred; light not quite uniform; an odd sort of mottling like a resolvable light; taken at first for a v F double * out of focus; 12" diam, but seen with 240; 320 is too high a power for it. See figure 7, Plate VI.	578
		24.6	40 47	○; seen, and a diagram of the adjacent stars made, but the stars are too dreadfully ill defined to-night to state any particulars further than that it is decidedly not a star, but has a disc 8" ± diam.	716
		....	39 53	○; transit just missed; R; 5" diam; about equal in light to a * 9 m; of a feeble intensity of light, nearly equable; under 320 it is not <i>nebulous</i> , but indistinct at the edges; a very singular kind of appearance—not "mottled," not "curdled," but yet not planetary. In a field with about 100 or 150 st.	596
3611	Δ. 552	15 34 55.8	127 13 15	⊕; v B; R; v g b M; diam in R A 10'; all stars; a * 10 m follows centre 4' 6, and is involved; 3 st 13 m in M.	462
		56.8	13 17	⊕; fine object; p g b M; diam 15' 0; composed of distinct st 13...15 m; one * 10 m is eccentric, and 3 of 13 m in centre nearly.	461
3612	Δ. 343	15 38 45.9	145 57 0	cl VI. class. A p rich l cl; R; l comp M; 12'; st 12...14 m; nearly fills field; M taken.	469
3613	.....	15 38 58.9	103 13 32	e F; S; R; follows a v S *; 25"	702
3614	.....	15 39 40.8	118 51 38	v F; S; R; s b M	451
3615	Δ. 354	15 42 5.3	146 56 16	cl VI. or VII. class; p m comp; irreg fig; 5' or 6' diam; st 12...16 m.	696
		12.0	54 49	cl; S; irreg R; g b M; a group, or rather small oval p m comp cl of st 16...17 m. A few = 15 m.	694
		15.6	55 14	A milky way cl; but so densely concentrated as to merit notice as a fine cl VI. class; irreg R; g b M; st 11...15 m. [This obs makes the minute of R A 41.]	469
3616	Δ. 304	15 49 17.4	150 0 40	L, brill cl VII. class; fills field; not rich; st 9, 10, 11 m, with smaller. Chief * 8 m taken; in the southern part of cl.	582
		18.4	0 41	VII.; loose; sc; brill; stars large; much more than fills field; 46 st counted above 12 m; chief * 7 m taken.	575
		20.0	0 55	Chief * 8 m of a coarse, p L, cl of st, 8...11 m, which fills the field....	717
		21.2	0 45	Chief * 7 m of a L, oblong, B, sc cl; st 7...10 m	578
3617	.....	15 50 23.1	124 3 23	F; S; R; 15"; g p m b M. There are 3 st forming a triangle about 60", n p the neb.	792

No.	Synon.	R. A. 1850.0. h. m. s.d.	N. P. D. 1850.0. o. s. d.	Description, Remarks, &c.	Sweep.
3618	Δ. 359	15 54 24.1	143 33 24	cl; a small, compact, knot of st 11....14 m, in a magnificently full field and zone.	599
3619	Δ. 360	15 59 58.2	143 46 31	The chief * in middle of a most superbly rich and L cl, 20' at least in diam, as it much more than fills field; not m comp M; st 10....12 m.	469
		59.5	45 30	Chief D star of a superb cl; 15' diam; g m comp M; irreg R; st 10....15 m.	696
		....	45 30	Place of a neat D star in centre of a superb cl; very L and rich; composed of equal stars 12 m, a fine object. Much more than fills field.	694
3620	.....	16 1 47.0	125 47 53	p F; R; v g l b M; 60'; with left eye slightly mottled, but not resolved	791
3621	.....	16 4 37.5	123 48 20	e F; E; l b m; 25"	791
3622	Δ. 326	16 4 46.1	147 28 0	cl VIII. class; L; loose; brill; irreg fig; fills field; chief * 7' m taken	575
		49.7	28 4	cl VIII.; L; coarse; B; fills field; st 7, 8, 9, 10 m; * 7' m taken.	717
				N.B.—This obs makes the minute of R A 5, instead of 4	
3623	Δ. 68	16 6 29.7	161 47 39	⊕; L; F; R; v g l b M; all resolved into st 15....18 m; 4' diam, with stragglers. A delicate and beautiful object.	598
		30.2	47 4	⊕; p B; L; irr R; g b M; resolved into st 15....16 m; rich; p comp; diam 5' or 6' by estim; 50' ± in R A. A fine object. [N.B.—This obs makes the minute of R A 7, instead of 6.]	605
		38.3	47 12	F; L; irr R; v g b M; 7' or 8' diam; all res into stars	606
3624	.....	16 6 54.8	112 33 26	⊕; v B; R; s v v m b M to a blaze; diam in R A = 10'.5. Stars 15 m, all well seen.	793
		55.0	32 27	⊕; v m comp M; p s v m b M; diam 12'.0; st = 14 m; all resolved. Fine object.	588
3625	.....	16 11 24.8	141 32 21	A part of the milky way, so immensely rich as to be one vast cluster of clusters.	468
3626	Δ. 514	16 13 58.4	130 15 46	cl; B; L; loosely sc; not m comp M; fills nearly a field; consists of about 50 or 60 st 9....11 m.	479
		....	....	Viewed; a brilliant cluster class VII.; p rich L; irreg sc; fills field; st 8, 9, 10, 11 m.	456
3627	Δ. 412	16 15 3.1	138 44 48	A p rich, loose, L; roundish cl of st 12....14 m; 7' diam; not m comp M	465
		10.6	45 36	VII. class; rich; L; g l comp M; irreg R; 12'; st 13, 14, 15 m; nearly fills field.	693
3628	Δ. 536	16 16 12.5	128 27 20	p B; R; p g b M; r; with left eye I can barely discern a few of the stars	461
		13.9	27 10	B; R; p g b M; r; 2'	460
		14.7	26 0	v B; R; p L; p g m b M; 2½. Evidently a ⊕, but > v B and near full, and I cannot see the individual stars.	459
		....	26 25	B; R; p s b M; 200"; r. [R A by this obs 20'.5, but the eye-piece has been considerably deranged by a blow.]	462
3629	VI. 10	16 16 53.3	115 38 51	p L; oval; g b M; resolved	453
3630	.....	16 18 9.1	162 52 58	v F and S; is pointed to by 2 small stars 9 m and 14 m; the * 9 m is the only one of that magnitude within 6'.	606
3631	.....	16 19 30.3	142 14 53	A large and coarse milky way cluster, tolerably insulated, composed of large stars.	468
3632	.....	16 19 57.2	150 13 31	p F; R; g p m b M; 45"; in a field full of small stars.	596
		61.8	14 25	p F; l E; g l b M; 50" l	578
3633	.....	16 21 10.1	137 44 ±	Neb violently suspected immediately preceding a double star	463
3634	.....	16 21 27.7	137 47 19	F; S; l E; v g l b M; 35"; certain; follows a D *	463
3635	Δ. 400	16 21 35.7	139 23 47	L irreg cl of loose st 11....14 m, which fills field; place that of a * 8 m in preceding part.	693
3636	.....	16 21 59.9	133 40 17	Cluster; place of a * μ Normæ in it.	454
3637	VI. 40	16 23 2.5	102 40 17	⊕; v rich; g p m b M; diam in R A = 20'.0; that of the most comp part 4'.5; stars well separated.	702
3638	.....	16 23 22.5	135 15 40	Middle of a small group of p B stars	472
		31.1	15 4	Chief * 9 m of a SB clustering group of from 12 to 20 p L st, with stragglers.	695
3639	16 23 47.2	159 1 0	v F; e S; R; g b M; 10"	579

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3640	Δ. 413	16 27 ±	138 40 ±	The brightest part of a v L f, diffused, branching nebula, which involves in its n f part the * B 5789, and extends into the cl Δ 413, which it in part surrounds. No doubt about the nebula, which in the brightest part of it precedes the cluster about 1" of time. The following stars behind the double *, and quite free of nebula. I presume the neb and cluster to be unconnected.	693
3641	Δ. 483	16 28 18.0 26.7	133 1 39 1 27	A coarse but rich cl of st 11...12 m, which leaves dark lines unoccupied, forming sections. (See fig. 4, Pl. V.) cl VII. p rich; irreg R; g b M; 10'; st 12...14 m; a straggling group.	455 454
3642	Δ. 413	16 28 37.8	138 25 19	cl VIII. class; consists of about a dozen st 10...11 m, and perhaps as many less, with stragglers, which fill field. In its p part is a fine D * (place as here set down), and yet more p is a v L, faint nebula, in which the p part of the cl is involved.	693
3643	.....	16 31 37.7	137 8 13	A great space full of milky way stars, so thickly sown as to merit being called a cluster.	463
3644	Δ. 442	16 33 42.9 66.0	136 41 55 42 15	cl moderately comp VIII. class; st 11...12 m; s f is a brilliant knot of st, one of which is 8 m, and the others 9 m. A singular shaped cl. Irreg R; comp VII. class, set as it were in a nearly rectangular frame of stars detached from cluster. See fig. 6, Pl. V.	463 695
3645	.....	16 34 52.3	162 17 8	e F; p L; v g v l b M; 2' diam; quite hopeless, except in the clearest and finest night, and with the mirror bright. Found in the place, and viewed. It is very visible, and the P D is right per index.	605 606
3646	Δ. 364	16 35 49.6 60.5	143 26 23 33 42	A pretty insulated milky way cluster, class VII. of large stars; 8' diam; st 9...12 m. Cluster, class VII.; rich; not m comp M; more than fills field. Stars 11...14 m, but chiefly small.	468 599
3647	.....	16 36 29.1	148 41 24	p F; R; v g l b M; has a yellow * 5 m preceding it, 1" 19' ±, Δ R A, and 3' or 4' south.	717
3648	Δ. 454	16 37 9.4 10.0 12.3	134 25 7 24 50 24 42	A round cl of st 13 m; g b M; 4'; with two appendages of st, n and s, making together a long cluster. p rich; R; p comp M; v l b M; 4' diam; stars discrete 12...15 m A p rich cl of S st, 11 m and under, broken up into 2 or 3 groups; fills 2/3 of field.	463 472 454
3649	.....	16 38 1.5 7.6	148 54 27 54 57	⊕; p B; p L; R; g b M; 2 1/2'; barely resolvable p F; L; R; g l b M; 80" ⊕; viewed in place, but clouded over before any description could be made.	712 582 717
3650	.....	16 38 32.1	134 25 13	A v L, v rich cl; not brilliant; not materially comp M; full 20' diam; st 12...13 m.	455
3651	.....	16 39 46.8	130 55 24	A star 5 m in a great cl, or an immensely rich milky way patch	456
3652	Δ. 499	16 42 8.6	131 30 26	A fine B, L cl; p rich; class VII.; 10'; st 10...13 m. Place of a D * 5 m, the p but one of 7 B st in M.	479
3653	III. 584	16 43 13.5	111 52 37	p comp; S; 2'; rather triangular than R; m b M; resolved into st 14...16 m.	588
3654	Δ. 520	16 43 58.3 61.8	129 13 9 12 15 13 46	Cluster VI. class; B; L; rich; discrete; 12'; irreg fig; v l b M; fine object; place of a red * 9 m; rest 11 m; white. A fine, L, rich cl; class VII.; at 9...12 m; fills field; place of a red * 8.9 m in centre. A p rich brill cl of st 10...12 m, with one 7.8 m near middle	461 462 456
3655	.....	16 45 23.6 24.5	134 29 57 30 30	cl VIII. class; coarse; p rich; st 9...12 m VII. class; p rich; loose irreg fig; L and S st, 9...15 m; 10' l, 7' br.	454 472
3656	16 45 28.8 30.2	135 38 56 39 40	cl VIII. class; loose and straggling; place that of a D * in central more condensed group; has a * 8 m s f, 5' dist, and another 7 m more remote. The chief and central group of a L loose cl, whose outlying st are = 8 m, the central ones = 12 m; a double * taken.	463 464
3657	Δ. 374?	16 45 41.0	142 25 50	A small triangular cl, 2' diam; st = 13 m	468

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3658	16 48 7.1	126 51 0	⊕; e F; v L; v g l b M; 4' diam; perceived with the utmost attention to be resolved into v S stars 20 m.	461
		8.1	50 10	VI. class. A v L neb. or rather v F, R cl VI. class; v F; irreg R; v g l b M; 4'.	462
3659	M. 10 h. 1972	16 48 13.4	93 48 35	⊕; fine. L; R; B; g m b M; diam 5'; with stragglers, several of which are of larger sizes, to about 12' diam; all resolved into st 11....15 m, very comp.	608
3660	Δ. 456	16 48 22.0	134 22 42	A superb, v L, v rich cl, which fills field; R; v g l b M; st 11...12 m, thickly sown at intervals from each other from 10" to 20".	454
		27.9	24 0	v L; v rich; fills more than a field; has one or two straggling appendages p and s; stars 11 and 12 m, nearly equal. See also <i>Quitted observations</i>	472
3661	M. 62 Δ. 627	16 50 21.9	119 50 48	⊕; B; L; R; g m b M, but not to a nucleus; st 15 m; v fine; diam in R A = 13'.0. [Semi-diam—See f 794.]	477
		23.6	50 42	⊕; superb; v B; R; p s v m b M; about 7' diam; all resolved into stars 15 m, very equal.	723
		24.2	50 18	⊕; v B; L; R; p g v m b M; perfectly resolved with left eye, hardly with right. The most condensed part is a perfect blaze, but not quite in the centre. The southern part runs out farther. A beautiful object. (See figure 13, Pl. VI.) Diam = 13'.5 in R A. [No doubt semi-diameter.]	451
		25.9	51 2	⊕; v B; L; R; g v m b M, to a blaze; diam in R A = 27'.0; st 14....16 m; superb.	794
		26.6	51 23	B; L; R or I E, towards the n f side, where there is even some feeble appearance of another centre of condensation; p s b M, almost to a nipple; st 15 m.	478
3662	Δ. 521	16 50 21.0	129 28 10	cl; rich; p L; brilliant; 8'; st irreg ac 10....12 m; place of a D * in the following angle of a triangular condensed group.	456
		23.2	27 41	A p rich irreg cl of nearly = st 10 m; not m b M; 7'.....	479
3663	M. 19 h. 1975	16 52 7.9	116 0 51	⊕; v B; R; diam 10'; resolved into st 16 m	453
		9.8	0 52	Superb ⊕; g m b M, but not to a nucleus; diam of B part = 12'.0, of whole cl to edge = 17'.0; resolved into st 14, 15, 16 m.	474
3664	Δ. 556	16 53 14.3	127 38 12	A p rich, L, p B, cl VII. class, of loose st 9, 10, 11 m, which fills 2 of field.	461
3665	VI. 11 h. 1976	16 54 4.0	114 30 57	⊕; B; R; g b M; diam = 7'.0; resolved into st 16 m	453
3666	II. 195	16 54 55.3	112 27 29	⊕; irreg R; g p m comp M; 3' diam; barely resolved into st 16....18 m.	588
3667	VI. 12 h. 1977	16 59 35.6	116 21 30	⊕; B; R; p s b M; diam 7'.0; resolved into st 16 m	453
		39.8	20 36	⊕; p B; R; p s v m b M; 3 1/2'; resolved into st 15....16 m	723
3668	.....	17 1 3.7	152 36 49	F; R or I E; v g l b M; diam in R A = 23'; has in it 2 stars and a 3rd, with 2 or 3 more outlying.	600
		4.7	36 35	F; v L; R; v g v l b M; 5'; has several stars, one = 11 m; involved but being on a rich ground there appears no connection.	480
3669	.....	17 3 9.1	148 58 5	v F; v S; R; g l b M; 12'.....	712
3670	I. 147	17 3 45.7	119 15 27	⊕; B; R; g b M; diam in R A = 6'.0; res into st 16....17 m.....	477
		46.4	14 32	B; R; at first s, then v g l b M; brighter part 2' diam; but there is a much fainter portion which extends a good deal further; st 16....17 m.	478
3671	I. 45	17 5 54.6	117 56 12	⊕; p B; S; R; p g v m b M; 2'; resolved into st 16....17 m	723
		57.4	56 17	⊕; B; R; g b M; r; 90"; has 2 small st very near	475
3672	Δ. 522	17 6 ±	129 15 ±	cl VII. class. Rich; p L; R; g b M; st 12....14 m; not a ⊕	456
3673	.....	17 6 35.9	132 41 33	Coarse B cluster VII. mainly included within an equilateral triangle formed by 3 B st 5 and 6 m. The n f of these taken.	455
		37.3	41 7	v L cl VII. class, of loose st, on a v rich ground of S st. The chief *, 6 m, at the n f edge taken.	454
3674	.....	17 7 0.4	154 49 31	v F; v S; I E; l b M; 15" l, 12" br	600
		3.3	49 9	v F; R; g b M; 15".....	581

No.	Synon.	R. A. 1830.0. h. m. s. d.	N. P. D. 1830.0. ° ' " "	Description, Remarks, &c.	Sweep.
3675	.....	17 7 17.4	141 33 8	PLANETARY NEBULA. A perfectly uniform, quite round, planetary disc; like a star out of focus. A very little uncertain at the edges, like a star on a dewy unsettled calm night, when the stars look large without being decidedly ill defined. Diameter = 5'; light = a * 9.10 m. There is positively no bright point in the centre. It has two very small attendant stars, one 14 m; pos from centre = 352°.3, dist from edge = 1/2 diam; the other also 14 m, pos 96°.7 dist from edge = 1/2 diam. Occurs in a field full of milky way stars. [N.B.—Referring to the description of Δ 381, I see no ground to suppose that this can by possibility have been the object intended by that place and description. At all events, the remarkable planetary character has escaped notice by the author of that description.] See fig. 6, Pl. VI.	789
		21.2	33 40	○; delicate; F; v S; diam = 6" or 7"; exactly R; perfectly uniform [as respects the gradation of the light from the centre to the edges], but the light a very little curdled. Not the slightest haziness, but like a star out of focus. 320 shows rather more fur at the edges than I think it would to a planet of equal size and light. Its light is = a * 10.11 m. It would be quite useless to look for this object under less favourable circumstances—of instrument and sky. A night of gloriously perfect definition! It is in a very rich place. There are 40 or 50 small stars in field. Measures of the two companions; 1st pos = 351°.0, dist = 1 diam from edge, * = 14 m; 2nd pos = 91°.4, dist = 1/2 diam, * = 13 m. Showed it to my attendant, J. S., who saw it well.	599
		....	....	Viewed. I can barely discern that the attendant stars are as in 599, but it is so faint that (the stars being all blotchy and dreadfully defined) I could not be sure it was the object, till too late to take its R. A. and P. D. on the wires. However, it was just in the middle of the field at the time expected, and set to the place at once.	714
3676	.....	17 7 41.6	113 33 43	p F; R; g b M; r; 60°. No doubt it is a ⊕	588
3677	M. 9 h. 1979	17 9 12.4	108 20 55	⊕; B; R; g m b M; 4'; resolved into st 14 m	699
3678	.....	17 9 30.4	125 52 36	p B; v L; v irr oval, in which, though excentric, is a * 8 m, whose place is that taken. One side of the neb is brighter than the other.	791
		32.2	53 12	v F; v L; v g l b M; 5' 1; 4' br; out of M is a * 8.9 or 9 m, whose place is taken. The densest part of the nebula follows this * 4'.5 on the same parallel.	792
3679	.....	17 9 41±	129 58 ±	The whole lower end of the zone is strongly affected with nebulous patches	794
3680	.....	17 10 35.8	128 17 42	ANNULAR NEBULA. A delicate, e F, but perfectly well defined annulus 15....20" diam. The field crowded with st, two of which are on the neb. (See fig. 3, Pl. VI.)	461
		37.0	18 28	A beautiful delicate ring, of a faint ghost-like appearance, about 40" diam; in a field of about 150 st, 11 and 12 m and under. In it is one * 12 m very conspicuous, and one 15 m much less so. Near it are 2 st 14 and 15 m, and s of it at dist 60" is another.	718
		37.6	17 50	e e F and difficult object; among a crowd of milky way stars. My attendant, J. S., saw the darkness in the centre and the stars as described. [N.B.—Set by working list to P. D. of last f, and entered the field bisected by the horizontal wire.]	462
3681	I. 46	17 13 24.6	116 10 50	v F; L; R; g b M; 2' diam; res at 18 m	453
3682	.....	17 13 29.2	124 1 14	F; L; E; v g l b M; milky nebulosity; 2' 1; 1' br; close to and almost involves a D *.	792
3683	I. 48	17 13 38.5	107 38 30	⊕; v B; R; v g v m b M; 90"; resolved into stars barely discernible with left eye. A beautiful softly shaded object.	699
3684	Δ. 225	17 14 17.2	156 54 28	⊕; B; L; R; v g m b M; diam in R. A. = 50"; diam 7' or 8'; stars all seen, 12....16 m with outliers extending a good way.	612
		19.5	53 37	⊕; irreg R; p B and L; g b M; 4'; all sharply resolved into stars 14..17 m	709
—	.....	17 14 33.2	132 39 37	The edge of the milky way is here quite sharp and definite, forming a telescopic promontory and bays, all above which is a mass of stars, and all below vacant to some considerable distance. See Pl. V., fig. 3.	454
3685	.....	17 14 33.1	119 49 47	A portion of the milky way which is decidedly nebulous, and by no means rich in L stars. The nebula is in patches of very great extent.	478
3686	IV. 11 h. 1981	17 19 2.0	113 36 35	ANNULAR NEBULA. Exactly round; p F; 12" diameter; well terminated, but a very little cottony at the edge, and with a decided darkness in the middle; = a * 10 m at the most. Few stars in the field; a beautiful specimen of the planetary annular class of nebulae, (fig. 4, Pl. VI.)	793
3687	.....	17 21 0.7	122 27 15	Cluster VIII. class; 3' or 4' in extent; a bright * (= B 6125) taken	794

No.	Synon.	R. A. 1850.0. h. m. s.d.	N P D. 1850.0. o s s	Description, Remarks, &c.	Sweep.
3688	.....	17 22 43.1	128 56 33	A star 9 m, with an extremely F nebulous wisp or tail, extending northwards about 1'.	718
		....	....	A star 9 m, with a very evident e F nebulous wisp 90" 1; 30" br. [The wisp by the diagram is fan-shaped, and extends in the n p direction from the star. See fig. 18, Pl. VI.]	461
3689	.....	17 23 36.2	122 26 31	A star 7 m with a cl of st 12 m assembled about it. The great * occupies the centre. A very remarkable object.	791
		36.6	27 50	A curious cluster consisting of one L * 6.7 m, and some 15 or 20 small ones 13 m clustering close around it. See also "Omitted observations"	478
3690	Δ. 457	17 23 51.6	134 36 26	⊕; v B; R; first p g, then p s v m b M; 4' diam; easily resolved with left eye into st 17 m; more difficultly with right eye into 18 m; excessively close and comp; shading off insensibly in borders into the general ground of the heavens.	463
		52.0	37 48	⊕; v B; R; at first p g, then p s v m b M to an intense almost nuclear light. The right eye does not resolve or barely makes it resolvable; the left resolves it completely into stars 17....20 m. A superb object on a rich ground of milky way.	455
3691	.....	17 24 37.6	159 39 42	p F; S; R; g l b M; 20"; 50 stars in field.....	597
		38.7	40 19	F; S; R; g l b M; 20"; has a * 13 m s p (one radius of neb from edge by diagram.)	598
3692	Δ. 366	17 26 50.4	143 34 15	⊕; fine, L; B; R; g b M; not v comp; 5' diam, but stragglers extend a great way. In M is a more comp group of much smaller st. The stars at circumference are larger than in M; at n f border is a D *.	468
		51.9	33 22	Beautiful ⊕; L, rich, somewhat coarse; 10' diam taking in all outliers; rather irreg R; v m comp M where, however, the st are v S, while every where else they are 13 m.	789
		....	....	Viewed past merid; a fine, L, rich cl; not v m comp stars 13 m. In the s f part is a delicate double *.	696
3693	.....	17 26 51.1	124 53 31	Cluster VIII.; small; 5'; place of chief D *.....	791
3694	.....	17 27 2.8	151 34 51	e F; S; R; almost certain it is not a small D *. Definition much improved. It is certainly a nebula, and, with long attention, I see another, still fainter, exactly on parallel, and 30' follows.	716
3695	.....	17 27 33.1	151 34 51	e e F. The following of 2	716
3696	Δ. 568	17 27 59.9	126 49 53	Cl class VII. p rich; p L; irr R; 8'; st 9....10 m	461
3697	I. 44 h. 1982	17 28 14.4	113 47 46	p B; R; v g b M; 25"; a * 13 m involved, following the centre	453
		17.3	47 49	p B; R; v g b M; 25"; has a * 11 m, rather following the middle	793
3698	M. 14 h. 1983	17 28 41.0	93 7 55	A most beautiful and delicate ⊕; not v B, but of the finest star-dust; all well resolved, especially with the left eye; v g m b M; diam in R A = 15 sec; excessively rich. All the stars = and 15 or 16 m.	608
3699	M. 6	17 28 58.6	122 5 52	Chief * 7 m of a fine L, discrete cl of st 10....11 m; one * is 7 m, one 7.8. Fills field; VIII. class.	478
3700	.....	17 29 31.9	150 38 31	e F; S; R; l b M; 15"; near 3 st	480
		....	....	Found in place, and seen as described.....	481
3701	.....	17 29 55.0	175 23 48	p B; R; v g b M. R A rudely taken, and may be very erroneous.	595
3702	Δ. 612	17 32 ±	124 55 30	A great Nebulous projection of the milky way	791
		17 33 6.2	122 14 33	Cl class VIII. of st 11 m; fills field; not rich; stars in zig-zag lines	478
		17.5	17 15	Coarse, rich, v L cluster. More than fills field. Stars 8....12 m; one of 8 m taken.	794
		17 34 31.4	123 36 35	A most remarkable, well insulated, semi-nebulous milky way patch of a branching rounded fig., within the limits of the field, quite insulated on the p, n, and f side, and only connected on the S side by a narrow isthmus with a branch of the milky way, which runs meridionally to a great extent. It forms a VI. class cluster of the utmost tenuity, barely resolvable, not resolved. See fig. 1, Plate V.	792
3703	.....	17 35 59.8	121 27 4	Small cl VIII. class; 8' diam; has 20 or 30 st 10....12 m, nearly insulated.	478
3704	.....	17 37 39-	125 22 ±	A very decided, tolerably defined semi-nebulous mass in milky way, with abundance of v S st, forming altogether a telescopic magellanic cloud. It fills about a field, and has branches and sinuses, and is altogether a very remarkable object.	791

4020 →

← 4020

No.	Synon.	R A. 1830.0. h. m. s. d.	N P D. 1830.0. o. f. u.	Description, Remarks, &c.	Sweep.
3705	Δ. 557	17 38 38.5	126 59 10	⊕; v B; R; v g b M, up to a blaze. In field with γ Telescopii, and nearly on the same parallel; with left eye I barely see it resolved into st 18 or 20 m. The whole ground of the heavens, for an immense extent, is thickly sown with such st. A beautiful object.	462
		40.2	59 16	⊕; B; R; 90"; v g b M; r (barely so); a very regularly graduating neb or cl; in field with γ Telescopii.	461
3706	Δ. 597?	17 38 55±	124 48 ±	A v fine L, rich so cl of st 12...13 m; P xvii. 254.....	791
3707	VI. 13	17 39 40.2	120 9 45	p rich; irreg R; st 13 m; a cluster with a great black cut across it; 6' diam, with many outliers.	794
		50.0	9 11	A remarkable cluster, divided into two by a broad vacant straight band; irreg R; 8' diam; st 12...15 m. See fig. 5, Pl. V.	478
—	.....	17 40 0±	118 42 ±	Here begins an enormous region of stars, crowded beyond counting, in the milky way.	723
3708	M. 7?	17 40 ±	124 34	A highly condensed nebulous mass, 3' diam, or an irreg R neb; p m b M; r.	792
3709	.....	17 40 37±	120 20 ±	A very extensive nebulous clustering mass of the milky way. The stars of excessive smallness, and infinite in number.	791
3710	.....	17 42 39.6	124 46 21	A brill coarse cl VIII. class, of about 60 st 7.8.... 12 m, which fills field. Irreg fig. A * 8 m taken.	592
		....	45 40	cl VIII. Very fine and brilliant; stars of very large and mixed magnitudes. Fills field.	791
3711	.....	17 42 41.1	112 18 46	A pretty rich insulated milky way cluster; place of a coarse double * in it. The milky way hereabouts is very poor.	793
3712	.....	17 43 0±	119 5 ±	Nebula. No description. It is probably only a nebulous portion of the milky way.	723
3713	.....	17 43 8.3	153 37 31	F; S; E; b M; between 2 st 10 m 45° s p and n f (diagram)	708
—	.....	17 43 40.9	120 23 22	An extraordinary B nebulous portion of the milky way, on a black ground v L; an angle taken where there is a * 12 m. [See fig. 2, Pl. V., copied from a diagram made at the time, which represents this remarkable and instructive object as marked by a well defined contour.]	794
—	.....	17 44 28.8	120 19 37	The milky way here is so sharply terminated, that the southern half of the field has few stars, while the northern is so full as to be almost nebulous.	478
3714	.....	17 45 27.2	156 24 18	p F; S; p m E, in direction of the parallel; precedes a * 12 m, which is all but involved.	612
3715	Δ. 460? Δ. 461?	17 46 40.0	134 13 18	A distinctly nebulous insulated group; m E; 2' 1; 90" br; many stars of considerable size, mixed.	455
		40.5	13 37	cl v rich; irreg R, inclining to triangular; v g l b M; 4' or 5' diam; with many large and small st in it. Nebulous.	454
3716	.....	17 47 19.5	155 23 29	v F; 30"; involves 2 or 3 stars	708
		21.1	23 47	The following star (14 m) of a v F double * 11 m is nebulous. The nebula is excessively faint, but I am sure of its existence. The preceding star is free.	600
—	.....	17 47 57.5	119 22 49	The southern extremity of a great nebulous promontory of the milky way, which projects into the field as the Cape of Good Hope, on a map, does into the southern ocean.	478
3717	.....	17 49 20.0	114 38 4	A very loose but very rich cluster, which fills many fields. Stars small..	474
3718	IV. 41 h. 1991	17 52 4.9	113 1 21	The triple star in the trifold nebula	793
		6.6	1 32	One of the most remarkable nebulae, and must be very carefully delineated. It is very large, and has many outlying portions and sinuses. See fig. 2, Pl. II.	588
3719	II. 199	17 52 34.9	98 55 52	p B; R; g p m b M; 40"	721
		35.8	56 58	⊕; F; R; p s b M; 90"; r; with left eye I discern the stars in it	591
3720	I. 49	17 52 41.7	120 1 12	⊕; B; R; g v m b M; in a nebulous portion of the milky way; resolved; stars 16...17 m.	794
		41.9	1 26	⊕; p B; S; R; 80"; resolved into st 16 m. (See the remark on II. 200. R A 17 ^b 54".)	478
3721	VII. 7	17 52 45.0	117 53 22	A pretty compact cl class VII. of st 9....13 m; irreg so diam 4'	723
3722	M. 8	17 53 25.1	114 21 0	A * 6 m (A c 2074) within the arch of the great nebula M 8	453
		27.6	21 4	A noble nebula; to be monographed. The star taken is A c 2074 = 9 Sagittarii 7 m. It is followed by a great cluster VI. 13 of which with the nebula fills many fields.	474
		53 30.1	21 13	Superb nebula. The star A taken. See Pl. I. fig. 1	793

No.	Synon.	R. A. 1830.0. h. m. s.d.	N. P. D. 1830.0. ° ' "	Description, Remarks, &c.	Sweep.
3723	II. 200	17 53 54.2	120 2 58	⊕; p B; R; g b M; resolved into st 16..17 m; in a nebuloïd of the milky way.	794
		58.3	3 36	⊕; B; S; R; g l b M; resolved into st 16 m. Both this and I. 49 occur on a ground so astonishingly rich and stippled over with stars 17 in individually discernible, as hardly to admit a pin's point between the stars, and this fills more than the whole field or many fields.	478
3724	Δ. 569	17 54 ±	126 18 ±	A large milky way patch, much compressed, one portion much more so....	792
3725	.....	17 54 14.4	114 19 11	Cl L and B; just fills field; a D * taken. This cluster follows M 8	453
		17.1	20 34	A B, p Rich, irreg R cl; place that of a double * in the following part of the cluster, which is itself involved in the great nebula M 8.	474
3726	Δ. 473	17 55 39.8	133 44 31	⊕; B; R; g b M; diam in R A = 6'; easily resolvable. The left eye resolves it. [Query semi-diameter.]	455
		41.0	42 17	⊕; B; R; e comp; v Fine; diameter of most comp part = 11.0 of time in R A; st 15..16 m. The scattered stars extend to three times the diameter and die away very gradually. See also "Omitted observations"	454
3727	.....	17 55 52.2	153 47 30	e e F; v v v S; R; 4". This is the smallest nebula I recollect to have seen. Its light is not greater than that of a * 14 m. A diagram made for security of finding it again. See fig. 16, Pl. VI. * No. 1 = 10 m; 2 = 3 = 12 m; 4 = 13 m; 5 = 6 = 7 = 14 m; 8 = 16 m.	600
3728	.....	17 56 50.7	166 36 50	v F; R; g l b M; 15".....	607
3729	.....	17 56 58.1	113 14 —	The middle of a great and rich cluster in the milky way	793
3730	VI. 12	17 58 52.5	115 56 23	⊕; v F; a little oval; v g l b M; barely r; st 20 m; one * 14 m; diam in R A = 7.5.	453
3731	.....	17 59 13.1	121 46 42	⊕; p B; irreg R; g m b M; composed of st 16 m, on a milky way ground of mixed L and v S stars. [P D by obs 120, but this is an obvious mistake, as both the other obs make it 121.]	794
		15.8	46 29	⊕; p B; R; g b M; 80"; resolvable or resolved in a field very full of milky way stars.	619
		16.6	47 41	⊕; not v B; R; g l b M; 2'; resolved. The stars barely discernible ..	478
3732	.....	17 59 16.7	117 32 58	Cl VI. An oval patch comprised within limits of the field, barely resolvable into infinitely minute points, but which, without attention, appears as a great neb 15' l; 12' br; hardly b M.	723
3733	h. 1996	17 59 34.4	114 7 47	v F; L; oblong; 5' l; 3' br; place of a D * involved; 6 other st near. Query, if involved.	793
3734	.....	18 0 48.2	123 54 15	PLANETARY NEBULA; 1 elliptic; hazy at borders; seen as last night. [See next obs.]	792
		48.6	53 6	A L F, oval, PLANETARY NEBULA, about 60" l; 50" br; or 55"; considerably hazy, or rather indistinctly terminated at the borders, but not b M; a star 6.7 m precedes it, just 1 diameter of the field and nearly in the parallel.	791
3735	VII. 30 h. 1998	18 2 32.8	111 39 27	Cluster VIII. class; loose; sc; fills field; is decidedly richer than any part of the milky way that has occurred to-night.	588
3736	II. 201 Δ. 619	18 2 35.1	121 51 39	⊕; p B; L; R; g l b M; 4' diam; resolved into st 15 m	478
		36.7	50 52	⊕; v B; L; R; g b M; 3'; resolved. In milky way	619
		36.8	51 18	⊕; p B; R; v g l b M; 31'; resolved.....	794
		....	51 30	Found in equatorial in a zone review for double stars, where it appeared as a F R neb 1' diam. July 16, 1836.	
3737	Δ. 376	18 5 0.6	142 16 0	⊕; B; R; g m b M; entirely resolved into st 16 m; easily seen.....	468
		0.9	15 14	⊕; p B; R; g p m b M; 23' or 3' diam; easily resolved with left eye into st 15 m.	789
3738	.....	18 5 3.1	153 51 44	e F; S; among st. A * 6' m s p 10' distant	708
3739	VII. 31 h. 2001	18 5 34.1	112 11 2	Oblong cluster, not v rich nor v comp, but well insulated; st 13 m; 5' l; 4' br.	793
	.....	18 8 10.1	121 59 55	Milky way superb. I cannot count the field, but by estimating the number in a small space, there can hardly be less than 1000 stars in it. By the best judgment I can form, they are not more than 20' asunder.	478
3740	VIII. 15	18 8 33.3	102 17 40	A poor cl class VIII. having coarse stragglers to a great distance. The chief * 7' m taken.	617
3741	.....	18 8 52.4	153 17 42	F; S; R; p g b M; 15".....	708
		54.8	19 5	e F; S; R; or v l E; v l b M; it follows a * 9 m about 7 or 8' of time, and is about 3' S of it.	600

No.	Synon.	R.A. 1890.0. h. m. s.d.	N.P.D. 1890.0. ° ' "	Description, Remarks, &c.	Sweep.
3742	I. 50	18 12 44.2	120 25 32	⊕; v B; R; p s v m b M; diam in R.A. = 5'.0; all clearly resolved into stars barely discernible.	619
		47.0	26 48	⊕; B; S; R; p s m b M; diam 6' in R.A.; barely resolved so as to be sure it consists of stars.	478
		47.3	26 4	⊕; B; R; at first g, then p s v m b M; 3½' or 4' diameter; clearly resolved into st 16 m; a fine object.	794
3743	M. 28 h. 2010	18 14 4.6	114 57 1	⊕; v B; R; v m comp; g b M, but not to a nipple; diam in R.A. = 12'.0; resolved into st 14...16 m; a fine object. Occurs in the milky way, of which the stars here are barely visible and immensely numerous.	474
3744	II. 204?	18 15 24.0	113 17 19	p B; v S; 4" at the utmost in diameter; a good deal furry at the edges, and ? if not a little brighter in M. It is not a "Stellar Nebula," but rather a link between a O and a ⊕; is probably a v distant and highly comp ⊕; has a * 9 m 3' dist, s f; night superb and vision perfect. This is one of the smallest if not the very smallest nebulous object I remember to have seen. It is a very remarkable object.	793
3745	.....	18 16 20.2	153 23 18	p F; S; R; g b M; 15'.....	708
3746	.....	18 17 42.7	102 7 36	cl VII. class; p rich; 5' diam, with appendages, at 12...15 m. Much richer than any part of the milky way seen to-night.	719
3747	M. 69 Δ. 613	18 20 14.1 16.3 16.7	122 27 51 27 11 27 43	⊕; B; R; v g b M; resolved into st 14...15; diam 10'.0 in R.A. ⊕; p B; R; 3' diam; st 14...15 m ⊕; v B; R; g v m b M; 3½'; all clearly resolved into stars 14...16 m. A blaze of stars.	477 478 619
3748	I. 51?	18 20 25.4	115 35 57	B; S; R; p s b M; diam in R.A. = 4'.5; barely resolved; a very delicate object; doubtless a ⊕.	474
3749	II. 205 h. 2012	18 21 36.2	113 35 23	⊕; p B; R; g p m b M; 2'; resolved into visible, but v S stars 15...16 m.	793
3750	.....	18 23 22.8	163 24 7	v F; l E; g l b M; 20".....	605
3751	.....	18 24 4.6	100 30 43	cl VIII. class; a small well insulated group of a roundish figure, 5' diam; st 12...13 m; one * 9 m, at the southern edge.	591
3752	Δ. 607	18 24 31.5 32.3 35.0 36.9	123 6 40 5 47 6 43 6 1	B; p m E in parallel; g m b M; 60" l, 35" br; all clearly resolved ... v B; S; 40" res. Among close st, which give it an elongated appearance, but do not seem to belong to it. p B; S; l E; 90" l, 75" br; stars 15 m v B; p L; E; g m b M; resolved into st rather large for the size of the neb. It is much like an oval cluster nebula, of which there are plenty in the Nubecula Major.	476 619 478 791
		....	6 30	Observed July 16, 1836, in equatorial zone rev; p F; E; 1' l.....	
3753	M. 22 h. 2015	18 26 4.1	114 2 13	⊕; v B; v L; v m comp; v g v m b M; 7' diam. The stars are of two magnitudes, viz., 15...16 m, and 12 m; and what is very remarkable, the largest of these latter are visibly reddish; one in particular, the largest of all (= 12.11 m) s f the middle, is decidedly a ruddy *, and so I think are all the other large ones.	793
		4.6	2 7	⊕; fine; v rich; v m comp; g m b M, but not to a nucleus; diam in R.A. = 35'.5; consists of stars of two sizes, 11 and 15, with none intermediate, as if it consisted of 2 layers, or one shell over another. A noble object. [N.B.—Comparing this place with A 2015, a suspicion of proper motion arises.]	474
3754	γ III. 12	18 27 27.1	98 21 19	A cl of Lst. It is the commencement of the bright milky way, which here comes on suddenly in its main body.	609
3755	.....	18 29 13.8 14.0	152 26 55 27 16	p F; R; p s b M; r; 25'..... Not v F; R; p s b M; 15...20".....	480 481
3756	M. 70 Δ. 614	18 32 5.7 8.3 8.8	122 26 46 26 35 26 54	⊕; B; R; g m b M; diam in R.A. = 7'.0; resolved into st 14...17 m. ⊕; B; R; g b M; resolved into st 15 m Seen, and place taken; no description. [N.B.—This is no doubt M 70, though the P.D. of that object is stated at 121°, which (all the above observations agreeing) must be the wrong degree.	477 478 619
3757	.....	18 32 9.9 12.8	155 21 25 20 26	B; R; p s v m b M; 40"; has a * 6.7 or 7 m, 5' or 6' n p v B; R; first v g, then p s m b M; 90"; a * 6.7 m, 7' s p.....	727 708
3758	.....	18 35 53.8	99 33 39	cl VII. class; p rich; irreg R; p well insulated; not much comp M; 10' diam; st 12...15; one 9 m taken.	591
3759	.....	18 37 32.9	147 29 36	p F; l E in parallel; p s l b M; 40" l, 30" br.....	471

4021 =>

No.	Synon.	R.A. 1830.0. h. m. s.d.	N.P.D. 1830.0. ° ' "	Description, Remarks, &c.	Sweep.
3760	.....	18 40 46.2	153 21 38	Neb. No description	708
3761	.....	18 41 33.6	144 0 31	F; S; 1 E; 18"	710
		38.1	1 1	F; 1 E; v g b M; 80"	789
		....	....	v F; v S; R; g b M; 12". [This P.D. was read off = 144° 2' 38", but being already 2 fields past the meridian, this will require a large swing correction, which will bring it nearly to the value determined in the other regular observations.]	468
3762	I. 47	18 43 50.9	98 54 10	⊕; p L; F; R, rather irreg; v g l b M; 6' or more in diam; all resolved. A fine object, the st being very close and numerous.	591
3763	M. 54 Δ. 624	18 44 10.7	120 41 5	⊕; B; R; g m b M; diam in R.A. = 9'; clearly resolved with left eye..	476
		10.7	39 39	⊕; B; p L; v l E; g b M; 2½' diam; resolved into st 15 m, with a few outliers 14 m.	477
		11.1	40 54	v v B; R; p s v m b M, to a large nipple; diam 2½'; pos of a * 13 m, almost involved = 147° ±.	619
		....	39 30	Obs in equatorial zone rev, July 16, 1836, on a neb. B; s b M; 90"....	
3764	.....	18 44 24.0	156 19 17	v F; R; g l b M; 20"; a * 9 m 5' dist; pos = 220°	603
		25.2	19 28	e F; g l b M; 20"	612
3765	.....	18 44 49.7	158 49 27	v F; L; R; v g v l b M; 60'; R.A. :: being by an auxiliary *	603
		....	48 58	e F; R; 40'; too late for R.A.; same neb as No. 3, / 603	612
3766	III. 145 h. 2022	18 44 51.9	112 54 24	Close, to the south of, ² Sagittarii; a very small clustering knot, with perhaps nebula. A doubtful object. I see 3 or 4 of the st, but there is also a nebulous appearance.	793
3767	.....	18 46 16.8	147 59 1	p F; R; p s b M; 30"; the central brightness comes almost to a nucleus.	471
3768	.....	18 47 2.8	155 7 37	p F; S; E; g l b M; 15'; 2 st 8 m precede; the nearest about 8'. Both are nearly on the parallel, or a little south of the neb, by diagram.	708
3769	.....	18 48 ..	144 9 48	e F; p L; R. The R.A. not observed, but the observations immediately preceding and following being 48" and 55", it is probably between those limits.	468
3770	Δ. 573	18 48 4.1	126 51 0	⊕; B; L; R or v l E; v g b M; diam 5'; perfectly resolved into st 14...16 m, with stragglers extending to 8' diam.	485
3771	.....	18 49 17.8	159 9 8	v F; S; R; p m b M; 10" diam; s p a * 7.8 m; a great many st 12 and 13 m in field.	614
3772	.....	18 50 28.4	152 26 1	e e F; v g l b M; 20"; a very difficult object	481
3773	.....	18 50 31.1	155 42 5	v F; R; g l b M; 20"; the preceding of 2	708
3774	.....	18 50 46.6	155 40 35	e F; R; g l b M; 25"; the following of 2	708
3775	.....	18 52 22.4	151 36 39	p F; v S; E; p s b M; 12' 1; has 3 stars preceding	480
		24.3	37 6	F; v S; 1 E; follows 2 st 14 m	481
3776	Δ. 262	18 53 34.5	154 6 22	p B; R; at first v g, then s v m b M; total diam 2', but that of the B part = 15'.	600
		35.2	6 37	B; R; g p m b M; 60"; r	708
3777	.....	18 54 46.3	152 13 10	e F; R; g l b M; 30"	726
3778	Δ. 295	18 55 44.0	150 14 6	⊕; B; R; p rich; p s m b M; 5'; stars of 2 sizes, viz., 11.12 and 15...16; s p is an elegant first class D star.	726
		48.6	14 16	⊕; B; rich; p s m b M; 7'. The stars are of 2 magnitudes, the larger 11 m, run out in lines like crooked radii. The smaller, 16 m, are massed together in and round the middle.	480
		49.5	15 16	⊕; B; L; R rather irreg; rich; st 11...16 m; comes up to a blaze in the middle; semid in R.A. = 25'; fine; one star 7.8 m is s p out of the cluster.	471
		49.6	14 21	⊕. The central mass consists of smaller stars than the outside	481
		49.9	14 13	⊕; B; irreg R; p s v m b M; all resolved; st 11...15 m; diam 5'; has a * 7 m 4' s. and 14' prec.	716
3779	.....	18 57 4.9	147 18 9	p B; R; g b M; 80"	712
3780	.....	18 58 13.1	140 55 1	p B; p m E in pos 63°; v g l b M; 60"	789
		14.8	53 27	e F; p m E in parallel; g l b M; 90° 1 [sic in MS.]	468
3781	.....	18 59 45.5	146 35 10	p B; R; 20"	710
3782	.....	19 1 53.3	140 55 9	e F; R; p L; 50"	468
		56.4	56 56	v F; irr R; 40"	789

<= 4021

No.	Synon.	R A. 1830.0. h. m. s.d.	N P D. 1830.0. o. i. s.	Description, Remarks, &c.	Sweep.
3783	.....	19 4 13.3	150 47 14	v F; R; 1 b M; 20". The 1st of 3	726
3784	.....	19 4 25.8	150 47 44	e F; 15". The 2nd of 3	726
3785	.....	19 4 26.8	150 49 24	e F; 20". The 3rd of 3	726
3786	.....	19 4 45.6	130 28 41	v F; S; R; p s l b M	479
3787	.....	19 7 32.2	154 11 30	p B; R; p s b M; 15"	600
3788	.....	19 8 49.0	146 4 54	v F; L; R; v g l b M; 90"	710
3789	.....	19 8 59.0	150 13 41	v F; R; p s l b M; 40"	726
		61.3	14 16	Not v F, or p B; R; p s m b M; 30"	471
		61.9	13 41	v F; R; 1 b M; 20"; has a * 9 m 2' south	480
3790	.....	19 9 47.5	155 55 38	e e F; S; has one or 2 st 9 m, 5' or 6' dist	612
		55.4	56 47	e e F; p L; among small stars	603
		.....	58 18	Viewed; e e F; but it is a nebula. [No R A observed, and the P D not to be put in competition with those of regular observations.]	610
3791	.....	19 12 2.5	145 17 2	p F; m E; p s l b M; has a * near s p end. [N.B.—By obs the minute of R A is 13; but as another obs makes it 12, the earlier minute is preferred.]	710
		5.7	16 44	p B; p m E; S; follows a * 11 m	469
3792	.....	19 16 21.0	129 13 10	e F; R; v g v l b M; 40"	483
3793	.....	19 18 18.1	146 15 19	e F; v S; 1 b M; makes a lozenge with 3 v S st near it	710
		20.3	15 4	e F; S; R; within [partly within] a small triangle formed by 3 st 11, 13, and 14 m.	469
3794	.....	19 25 10.5	161 1 14	p B; p m E; g b to one end (or by diagram a double neb). A star 8 m follows on the parallel.	614
		11.9	1 25	Not v F; 1 E; g b M; 25"	604
3795	.....	19 25 12.6	132 40 6	e F; v S; appended to a * 14 m	489
3796	.....	19 25 16.0	128 55 20	e F; R; v g b M	483
		.....	.....	Well looked for, but only a small star-group found. N.B.—Sky murky ..	485
3797	.....	19 29 9.5	149 2 36	R; v g b M; 30"; haze thickening rapidly	471
		9.9	2 51	B; m E, in position 169°.2; p s b M; 90"	470
3798	M. 55 Δ. 620	19 29 12.3	121 21 6	⊕; p B; v L; R; v g l b M; diam in R A 30.0"; all resolved into separate at 13...16 m; not so comp M as to run together into a blaze or nipple.	478
		14.5	18 15	⊕; a fine L, R, cluster; 6' diam; all clearly resolved into st 11, 12, 13 m; does not come up to a nipple.	618
3799	.....	19 31 41.5	145 44 22	p B; p m E; g l b M; 40" 1, 30" br	469
3800	.....	19 33 23.7	118 56 47	e F; R; v l b M; 40"; a * 9 m north of it, at 6' distance has what may be easily taken for a nebula attached to it, but it is only a little group of v S st.	475
3801	.....	19 46 52.7	155 41 27	e F; R; v S; p s b M; has * 11 m 90° n p, and one 8 m 6' dist, s f.	602
3802	.....	19 47 3.4	122 16 9	p F; R; p s b M; 15"; on a highly stippled or dotted ground	495
3803	.....	19 48 38.9	137 32 12	e F; 1 E; g l b M; 30"	467
		.....	.....	v F; R; b M; 15"; found and viewed by the place of f 467	729
3804	.....	19 49 6.2	146 33 14	F; L; R; v g l b M; 90"; forms a triangle with 2 st 11 and 12 m, following it.	469
		9.4	32 54	p F; p L; R; v g l b M; 80"	710
3805	.....	19 49 45.7	130 40 12	p B; S; R; has a v S star n p	488
3806	.....	19 50 4.8	145 18 35	v F; R; b M; 25"	710
3807	.....	19 51 7.3	138 43 59	p F; S; R or v l E; p s b M; 15"	729
3808	.....	19 52 17.5	144 50 29	v F; S; R; g l b M; 12"	469
		20.8	50 46	F; S; R, or 1 E; b M	716
3809	.....	19 53 6.2	146 51 56	Not v F; S; R	470
3810	.....	19 54 4.8	151 34 28	F; R; g b M; 40"	726
3811	Δ. 425	19 54 50.7	138 50 40	B; S; 1 E; p g m b M; 20"	467
		55.4	51 26	B; S; E; g p m b M; 25". If a misprint of 42° 13' instead of 41° 13' be presumed in Mr. Dunlop's catalogue, this object is identified with his No. 425.	729

No.	Synon.	R. A. 1850.0. h. m. s. d.	N P D. 1850.0. o r s	Description, Remarks, &c.	Sweep.
3812	19 55 14.4	146 52 17	v F; l E; g l b M; 20"	469
3813	19 57 9.7	145 16 8	e e F; L; p m E.....	710
3814	19 57 27.4	138 51 31	v B; S; R; p g m b M; 20"	467
		30.5	51 28	v B; R; g v m b M; 30"	729
3815	19 57 45.0	138 46 16	F; p m E in parallel; g b M; 30" l.....	467
		47.4	46 34	p F; l E; 25"	729
3816	19 58 48.5	161 17 10	F; R; g l b M; 30"; has a v S * preceding; first of 4.....	604
		51.7	16 54	F; E; 40" l; has a * 9 m 10.5 preceding. The minute of R A altered from 59 to 58, as both the context of the MS. and the obs of f 604 agree in requiring.	614
3817	20 0 13.7	161 22 15	p F; R; 20"; a v S almost invisible * s f; 2nd of 4.....	614
		15.7	22 25	p B; S; R; r; 15"	604
3818	20 0 31.2	161 22 50	e F; e S; the 3d of a group of 4.....	604
		32.2	22 0	v F; v S; R.....	614
3819	20 1 6.7	136 39 33	F; v S; R; v g m b M; 10"; a * 7 m s f dist 5'	463
3820	20 1 24.9	161 22 25	p F; S; R; r; 15"; the last of 4.....	604
		31.1	22 16	e F; v S; has a v S * close to it.....	614
3821	20 1 56.5	135 1 45	v F; L; R; g l b M; 90"	472
3822	20 4 20.1	143 17 52	p F; L; p m E; g l b M; 2' l, 1' br.....	615
3823	20 5 46.2	144 28 23	v F; L; l E; 2' l, 90" br.....	710
3824	20 6 22.7	135 19 4	F; R; v g l b M; 15"	463
		24.2	19 25	p B; S; R; g b M; 25"	472
3825	20 8 31.7	138 46 21	p F; R; s v m b M to a * 12 m; 20"	467
		34.4	46 22	p F; R; g b M; 20"	729
3826	20 11 51.0	140 57 36	F; R; S; g l b M; 15" among stars.....	615
3827	20 12 48.4	134 11 29	F; R; p s b M; 25"	728
3828	20 15 35.6	137 34 41	p B; p L; g b M; near 2 st 10 m.....	463
3829	20 17 52.8	170 34 48	p B; R; p s m b M; 25"	611
3830	20 18 42.1	138 2 22	v F; attached to a * 12 m s f. [N.B.—By a diagram made at the time the star is s p.]	463
3831	20 19 55.8	134 46 48	e F; p L; R; v g v l b M; 40"	728
3832	20 21 8.1	121 23 22	p B; R; g b M; has 2 or 3 st very near it.....	619
		8.7	23 21	F; R; g b M; 25"; between 2 stars.....	620
		11.5	23 30	F; S; l E; b M; 15" l, 12" br.....	476
		12.7	24 0	p B; R; p g b M; 25"	618
3833	20 23 5.2	164 12 54	F; S; R; g l b M; follows a hook of 5 stars.....	606
3834	20 23 42.3	122 33 0	B; m E; p s l b M; 2 1/2 l, 40" br.....	476
		43.1	32 26	p B; p m E; p s b M; 80" l, 20" br.....	477
		43.7	33 23	B; L; m E, in position 6".0; p s m b M; 5' l.....	620
3835	20 25 43.4	142 40 51	p F; L; R; g l b M; 2'; the preceding of 2.....	468
		48.1	41 41	B; p L; R; g b M; r; 80"	615
3836	20 26 8.9	142 44 46	v F; R; 40"	468
		13.7	45 51	F; R; g l b M; 30"	615
3837	20 27 46.8	144 53 54	p B; R; p s l b M; 60"	710
3838	20 28 8.9	159 20 30	p F; L; m E; v g b M; 3 1/2 l; 1 1/2 br; has a barely perceptible point in the middle.	604
3839	20 30 38.1	123 5 10	v F; L; R; g b M; on a faintly stippled ground.....	495
3840	20 30 48.3	143 57 35	e F; p L; l E; 60" l; 50" br.....	710
		51.1	57 44	v F; E; l b M; 35" l.....	615
3841	20 37 42.7	128 36 55	B; R; p g m b M; 25"; follows 4 st; of which 1 is 9 m.....	483
3842	20 40 7.8	139 24 16	p B; S; l E; g m b M; 18" l.....	497
3843	20 44 56.7	142 30 46	e F; S; R; the preceding of 2.....	468
		58.1	31 25	v F; p m E.....	498

REDUCED OBSERVATIONS OF

No.	Synon.	R. A. 1830.0. h. m. s.d.	N P D. 1830.0. o. r. s.	Description, Remarks, &c.	Sweep.
3844	.....	20 45 17.6	134 37 14	e F; S; R; 45"	728
3845	.....	20 45 36.1	142 30 56	F; L; 1 E; g l b M; 90" l; the following of 2	468
		37.6	30 55	v F; p L; 1 E; v g b M.	498
		38.6	31 3	F; R; g l b M; 20"	615
3846	.....	20 46 12.0	139 17 15	F; S; R; g p m b M; has a v B * 1' prec	497
		17.3	16 45	p B; S; 1 E; g b M; among B stars	496
3847	.....	20 47 11.0	146 13 44	A * 10 m, to which is attached or almost so, by its extremity an e F, v s nebulous ray; v m E in merid 15" l; 4" br; night superb, and without this condition it were useless to look for this object.	469
		12.0	12 43	e e F; v S; R; S of a small * 13 m, 10" dist.	710
3848	.....	20 51 49.4	139 42 15	p F; p L; R; g l b M	497
		52.8	41 40	F; S; R; s m b M; 15"	496
3849	.....	20 52 7.8	139 47 25	e F; R; 1 b M; has a * 11 m 60" foll on parallel	497
3850	.....	20 53 11.1	143 13 5	p B; v S; R; p s l b M; 12"	468
		13.4	13 20	p B; S; R; p s m b M; 15"	615
		13.5	12 44	p B; S; R; p s b M; 15"; among stars	498
3851	.....	20 55 18.2	135 29 4	A nebulous looking but doubtful object following a * 10 m. My eye is too much fatigued to be able to decide on its nature.	463
		22.0	29 25	F; E; v g v l b M; 60" l; 30" br; near a *	490
3852	.....	20 56 15.1	137 51 49	p F; S; R; b M; has 2 st 12 m north.	497
3853	.....	20 57 4.4	154 42 53	p B; 1 E; p g b M; 30" l.	727
3854	.....	20 57 9.2	154 12 42	p F; R; p s b M; 25"; has a * 7.8 m 10' prec, exactly in the parallel. ..	602
3855	.....	20 57 39.8	139 59 18	e e F; S; R; on a delicately and uniformly stippled ground; a bright triple * 6' or 7' s f nearly points to it.	497
3856	.....	21 0 2.1	139 58 38	B; R; g p m b M; 35"	497
3857	.....	21 0 3.4	158 59 12	v F; R; g l b M; 25"	610
3858	.....	21 3 36.1	137 54 53	F; p L; R; g l b M; 90"	497
		37.6	55 15	B; L; p m E; g b M; 2' l; 90" br	496
3859	.....	21 4 51.5	139 4 8	B; S; E; has a * 10 m 3' n f.	497
		53.5	3 57	B; p m E; p s m b M; 40" l; has a * 11 m s f.	467
3860	Δ. 406	21 7 20.6	139 16 12	B; R; p g m b M; 60"	497
		25.8	16 25	v B; p S; p m E; p s v m b M; 25" l, 15" br	496
3861	.....	21 14 1.6	133 11 18	e F; v S; R; the preceding of 2	728
3862	.....	21 14 23.4	150 44 55	B; 1 E; g p m b M; 90" l, 40" br	613
3863	.....	21 14 57.1	133 8 4	v F; S; R; the following of 2	728
3864	.....	21 15 56.3	139 47 50	e e F; v S; R; 10"; the feeblest object imaginable	496
3865	.....	21 17 2.4	143 30 59	e F; v m E, in pos = 90° 3; v g b M; 80" l; has a * s.	468
3866	.....	21 19 29.4	133 49 46	F; L; v l E; v g l b M; 2' br; the preceding of 2	489
		30.7	49 26	F; p L; 1 E; g v l b M; 60"	728
3867	.....	21 19 40.7	133 54 0	v F; just seen; R A deduced roughly from that of the preceding nebula ..	728
		41.4	53 26	F; S; R; v g l b M; 30"; the following of 2	489
3868	.....	21 20 56.7	129 21 27	p F; S; R; p s b M; 15"	488
		.....	22 10	v F; v S; R; 15". Too late for R A.	718
3869	.....	21 21 35.0	134 48 44	B; R; p s b M; 30"	490
3870	Δ. 263	21 22 11.0	154 39 0	p B; p L; R; g b M; 60"	727
		13.9	39 7	F; L; R or 1 E; v g p m b M; 60"; r; with long attention it appears mottled. Perhaps Δ 263, with 3" correction in R A.	602
3871	.....	21 23 50.1	131 34 28	p F; S; R; g b M; 15"	488
		50.2	34 22	v F; R; 20"	718
3872	.....	21 24 28.8	145 18 40	p B; L; v m E in pos 127° 2; first g, then p s l b M to a v feeble nucleus; 4' l, 40" br; has a * 11 m preceding.	499

No.	Synon.	H. A. 1830.0. h. m. s. d.	N. P. D. 1830.0. o. ' "	Description, Remarks, &c.	Swamp.
3873	21 25 ..	127 32 ..	e F; p L; v g b M; 2'; place considerably uncertain, having been found when much past the meridian in searching in vain for Δ 561. This neb is much too faint to have been seen with 9 inches aperture [to say nothing of the difference of place, for mine cannot be so much in error as would reconcile them]. It precedes a * 6 m nearly in the parallel, about 40 seconds of time.	486
3874	21 27 57.4	154 40 3	v F; S; R; 12"; has a v S double * n f, near	727
3875	21 27 57.4 80.8	172 18 14 17 36	F; p L; R; v g v l b M; 50"	795
3876	21 28 54.1	165 52 29	F; p L; v g l b M; has a * 13 m on it	796
3877	21 29 27.4 31.6	133 17 56 18 46	p F; R; first v g, then p s b M; in a field with many large stars, and strongly stippled. B; S; R; p s m b M; 15"; (fog)	627
3878	M. 30 h. 2128	21 30 45.5	113 56 38	B; l E; g p m b M. [RA obtained by calculating from Δ P D and observed position, with a star near it, and therefore not to be considered as exact.] \oplus ; B; l E; b M; 4' l, 3' br; all resolved into st 16 m, besides a few 12 m. Two lines of rather larger stars run out n f.	489 728
3879	21 30 55.7	143 28 34	e F; l E; v g l b M; 30"; makes an obtuse angled triangle, with 2 st γ and 10 m to n.	474
3880	21 31 26.0	135 33 42	v F; p L; R; v g l b M; 2' diam	468
3881	21 31 42.8	125 13 1	v F; p L; R; v g l b M; 2' diam	490
3882	21 31 59.8	124 56 4	e F; v S; among stars	493
3883	21 34 33.2	139 12 28	v F; S; R; b M. p F; too late for transit	492
3884	21 34 57.2	139 7 58	v F; R; S; g l b M; the preceding of 2	493
3885	21 35 13.7	137 17 49	p F; R; g b M; 15"	497
3886	21 36 1.5	161 6 57	p F; S; R; g l b M; the following of 2	496
3887	21 36 42.0	151 29 32	v F; R; g b M; 15"	497
3888	21 36 42.6	141 21 14	Not v F; S; R; g b M; 20"	496
3889	21 36 45.0	151 23 27	p B; R; v g b M; 20"; a star 9 m follows, 8' dist	490
3890	21 38 3.4	125 13 58	e F; p L; R; 60"; the preceding of 2	616
3891	21 39 33.3	125 40 11	e F; l E; g l b M; 70' l, 60' br	613
3892	21 40 21.7	147 20 25	B; L; p m E; v g b M; 2' l, 80' br	468
3893	21 40 24.8	146 21 53	v F; p m E; v g l b M. (N.B.—Mirror begins to show signs of a want of light.) p B; p L; l E; g b M; 40' l, 35 br; the following of 2	498 730
3894	21 41 34.7	139 2 47	p B; R; g l b M; 20"	613
3895	21 42 16.0	138 40 47	p B; R; b M; 20"; a * 14 m precedes just out of neb	493
3896	21 43 43.5	141 28 24	p B; L; v g b M; has 5 st 8 m in field surrounding it	492
3897	21 44 5.2	120 5 0	p F; R; g b M; 35"	493
3898	21 44 45.4	119 49 54	F; L; R; first g, then p s l b M. [N.B.—It is not improbable that this and the nebula immediately preceding f 499 are identical, one or other being mistaken in P. D. Still, as both observations are clearly written in MS., and, as the difference of P. D. even then is rather considerable, (x 28") I have thought it necessary to enter them separately.] B; R; g m b M; 39"	499 500
3899	21 44 59.1	140 19 16	v B; p L; R; s m b m to nucleus; 45"	497
3900	21 45 9.5	125 37 12	B; R; p g b M; 20"; within a triangle of 3 st 13 m	496
	21 45 12.6	36 20	e F; m E; v g b M; rather wedge-formed; ? if not binuclear F; l E; v g l b M; 40"	497 468
			F; p L; l E; v g b M; r	730
			e F; v S; 10"; barely perceptible; sky perfectly clear	498
			e F; S; E; or has an e F * near	620
			p B; S; R; g b M; 15"	495
			p B; S; l E; p s m b M; 20"	497
			B; p L; g l b M; more nebulae hereabouts	496
			B; p L; irreg R; g l b M; r; 60"	492 493

No.	Synon.	R. A. 1850.0. h. m. s. d.	N. P. D. 1850.0. o. 1. 2.	Description, Remarks, &c.	Sweep.
3901	21 49 5.5	134 6 59	F; L; m E; v g b M; (Fog) Viewed; p F; p L; l E; g l b M; 50"; readily found in place by f 489, but place not re-taken.	489 728
3902	21 49 21.9 23.6 29.1	122 41 43 41 52 41 23	p F; l E; g l b M; 40" v F; p L; R; g b M; 40" v F; p L; l E; v g b M; 50" l. 40" br	494 620 619
3903	21 50 1.1	134 12 4	p B; S; R; p s m b M; 15" Viewed; readily found by place of f 489; B; l E; v s v m b M to nucleus	489
3904	21 50 53.8 54.4 56.7	142 34 1 33 7 33 42	p F; S; R; p s l b M; 15" p B; S; R; p s b M; 20" p B; R; p s b M; 20"	468 498 730
3905	21 50 55.2	115 26 51	F; R; v g l b M; 45"; has a * 10 m, 90" dist from centre, following in parallel.	474
3906	21 51 11.2	138 30 20	e F; S; R; difficult to distinguish from a * 15 m; has a * 8 m, dist 4" n p nearly in parallel, and another 11 m, 60" n f.	496
3907	21 52 2.9 8.3	154 51 47 51 52	F; R or l E; v g b M; 40" p F; l E; g b M; 25" long	602 727
3908	21 52 4.8 5.1 8.1 9.1	122 40 13 41 21 42 24 40 54	p B; p L; g b M. [The first of a group of 4.] See fig. 11, Pl. IV. ... p B; E p B; R; 40" F; p L; l E; g b M	494 493 492 619
3909	21 52 6.6 6.8 7.4 10.1	122 46 51 46 53 47 18 45 49	B; v S; R; s b M to a *. [The 2nd of 4.] B; S; R; s b M p F; R p B; S	493 494 620 619
3910	21 52 9.2	122 49 4	In f 493 this was taken for a v F star, but I now perceive it plainly to be a small faint round nebula. [Place deduced from that of the larger neb, to which it is attached (No. 4 of the group), by a careful measurement of the diagram made at the time, taking for the unit of measure the line joining the centres of the 2nd and 4th neb.]	495
3911	10.4 21 52 11.6 12.6 12.9 13.6 15.0 15.8	48 3 122 47 41 43 34 43 8 46 49 49 0 43 24	p F; S; attached to a larger, following it. [The 3rd of 4.] v B; p L; s b M to a star; has a very faint star s p. [The last of a group of 4.] B; R; m E, or rather distinctly binuclear, or a double nebula. Pos of the smaller about 250°. Much brighter and better seen than last night. Not a doubt about the nature of the appendage. B; p S; R; double B; R; g p m b M; 40" B; p L; R; s m b M; place roughly derived from that of the 2nd of the group as observed. B; R; p g b M; 40". [See fig. 11, Pl. IV. for this group.]	620 493 495 620 619 494 492
3912	21 52 18.8	126 37 20	e F; S; R; 2' n of a * 8 m; a double star 10 = 10 m follows nearly on the parallel of the neb, and pointing directly to it. A sure observation; but except in the finest nights this neb will not be seen.	485
3913	21 54 4.1	155 27 47	v F; S; l E; v g b M; 20"	602
3914	21 54 8.6 9.5	155 7 52 8 12	p B; S; R; g p m b M; 20" p B; S; R; p s b M; 20"	602 727
3915	21 54 51.9 52.9 55.9 57.5	140 56 37 56 43 56 32 56 33	B; R; g m b M; 20"; has a * 12 m 60" foll p B; R; p s l b M; 20"; position of a * 14 m from neb = 101° 7' p B; R; 25"; among small stars v B; S; R; s m b M; 15"; among many stars. The R Ascensions of this f uncertain to 4 or 5 seconds, owing to unexplained fluctuations of the zeros.	497 468 730 498
3916	21 55 47.5 49.3	155 31 27 31 53	v F; v S; R; p s l b M; follows a * 11 m, 3' v F; S; R; 2, but a good observation	602 727
3917	21 56 21.2	140 49 30	p F; S; R; s m b M; 15"	496

No.	Synon.	R. A. 1830.0. h. m. s. d.	N. P. D. 1830.0. ° ' "	Description, Remarks, &c.	Swamp.
3918	21 56 40.3 41.0 45.9	122 4 0 4 25 4 9	p F; R; g b M. P D roughly deduced from No. 15 of this f..... v F; a large star follows v F. [This is the first of a group of 3, No. 2 of which, however, is so faint as to have escaped obs in sweeps 494 and 620.]	494 620 619
3919	21 56 49.5	148 15 11	p B; l E; g l b M; 2 1/2' l, 1 1/2' br.....	470
3920	21 56 57.0	122 0 30	Found in place; p B; L; E; first g, then p s l b M; 3' l, 2' br..... e F; S; star like; the 2nd of a group of 3. [N.B.—It precedes the 3rd 2 beats of the chronom = 1.0. The R A here set down, it must be noticed, is comparable only with that single value of the R A of the others, which results from f 619.]	735 619
3921	21 56 54.3 54.5 58.0	121 58 23 59 16 57 30	p F; R; g b M. [The last of a group of 3.]..... p F; the following nebula; a large star follows F; R; g b M; the 3rd of 3; follows the 2nd 1.0	494 620 619
3922	21 57 3.3	121 52 13	p B; L; l E; g b M; 80". [As this nebula might be seen in the same field with all those of the group of 3 observed in sweeps 494, 619, 620, it properly belongs to that group of which it forms the 4th and last.]	494
3923	21 57 41.1	119 52 39	v F; v S; R; almost uniformly bright.....	495
3924	21 58 35.1	137 59 20	v B; R; g b M; 45".....	496
3925	21 59 7.0	159 29 32	p F; R; g b M; 25".....	616
3926	21 59 25.5	118 38 27	A v S cluster or resolvable nebula; irreg R; l b M; 2' diam; has 2 or 3 st larger than the rest.	475
3927	22 0 31.2	155 40 42	p B; R; p s b M; near 2 stars..... e F; S; 2 2	602 727
3928	22 1 27.6	121 22 53	F; R; g b M; has 2 st 14 m near, one almost involved..... v F; S; R; 2 v S st near F; R; g b M p F; l E; g b M; either r, or has loose stars	494 495 620 619
3929	22 3 33.6	116 59 27	p F; S; l E; b M; 15" l, 12" br.....	475
3930	22 4 19.1	120 12 59	F; p L; R; g b M; 80"..... p F; L; R; g l b M; r v F; l E; g l b M; 50 or 60" l..... e F; p L; R; v g l b M; 50".....	620 494 619 495
3931	22 5 5.5	136 41 23	p B; v S; p m E; p s b M; 15" l, 8" br. The preceding of 2	490
3932	22 5 16.0	136 41 8	F; v S; R; 10". The following of 2. A star 8 m follows nearly on the parallel, and another to the north.	490
3933	22 9 27.3	145 57 50	e e F; R; rather a doubtful object.....	499
3934	III. 458	22 11 17.0	115 31 43	Not v F; S; R; b M; 30".....	474
3935	22 13 24.6	119 12 27	v F; S; R or E, as if it had a feeble neb s p; g l b M; 15".....	475
3936	22 13 27.9	119 48 15	e F; p L; R; v g l b M; 40".....	495
3937	22 13 42.5	123 12 33	e F; S; R; l b M	494
3938	22 14 36.9	124 32 58	B; l E; g b M; 50"; has a bright triple * s p..... p B; R; p g b M; 40"; a large triple * s p..... v F; S; R. [The preceding of 2.]	493 492 492
3939	22 15 58.7 60.5 64.6	122 3 26 2 26 2 33	p F; S; l E..... v F; irreg R, or l E; 40 or 50"..... F; R; g l b M. Rough place	619 620 619
3940	22 16 30.9 31.9 32.0 36.3	122 0 13 0 36 0 .. 0 34	p F; p L; l E; g l b M. [The following of 2.] v F; S; R..... p F; S; R..... v F; l E; 30".....	494 495 620 619
3941	22 16 55.0	151 2 0	e e F; l E; v g v l b M; very difficult, but a certain observation. It is n p the first of 3 stars to 11 m.	726
3942	22 17 21.2 25.1	126 0 34 0 15	v F; p L; R; v g v l b M; 30"..... v F; S; R; g b M; 15".....	492 486

REDUCED OBSERVATIONS OF

No.	Synon.	R. A. 1830.0. h. m. s. d.	N. P. D. 1830.0. o. f. n.	Description, Remarks, &c.	Sweep.
3943	II. 469	22 19 10.5 10.7	115 43 27 43 29	p B; irr R; 25"; involves a double * (13 m + 14 m) F; E; b M; r; binuclear, pos 62° 3'. Rather an equivocal object, whether nebulous or a group, but I incline to regard it as a nebula.	621 474
3944	22 19 27.8	126 19 29	v F; R; g l b M; 20"	493
3945	22 21 14.3 25.3	128 42 10 38 52	e F; S; R. <i>The preceding of 2</i> e e F; perceived with the utmost difficulty, and taken at leaving the field. [Place very uncertain.]	486 637
3946	22 21 38.8 46±	128 41 20 37 ±	e F; S; R. <i>The following of 2</i> Required very long attention to see (mirror growing dim). [Place very rude, by estimations from the preceding nebula, which is itself ill deter- mined in this.]	486 637
3947	22 23 46.4	131 49 6	F; p L; p m E; about pos of 75° with parallel; 2½' long.....	737
3948	22 23 47.9	118 7 17	v F; S; l E; follows a * 11 m in the parallel	475
3949	22 26 22.4 22.4	116 55 10 54 47 55 32	p B; L; m E in merid; v l b M; 4' l, 2' br; 3 B; v L; m E in merid; g v l b M; 4' l, 1½ br B; L; m E in merid; 3' l, 1' br; cloud prevented transit being observed..	474 475 621
3950	22 28 0.2 4.2 6.5	128 6 0 7 0 5 7	p F; R; g b M; 20" e F; S; v l E e e F; barely, but certainly seen. [N.B.— <i>The obs makes the R A</i> <i>29° 6.5, and as the P D fails of a perfect agreement, it is not impos-</i> <i>sible that this may be a different nebula.</i>]	484 486 637
3951	22 28 29.5	157 21 34	p B; m E in parallel; g b M; 50" l, 20" br	610
3952	22 33 42.8	128 45 50	e e F; v S; R; a double star follows about 40° on the parallel	486
3953	Δ. 253?	22 34 6.1	156 0 43	F; S; R; b M; 15"	610
3954	22 34 50.3	120 56 27	F; p L; v m E in merid; v g v l b M.	495
3955	22 35 46.2	130 14 0	p L; E; g l b M; 30" l	737
3956	22 40 40.8	127 44 45	e F; v S; R; appended (s f 45°, dist 30") to a * 12 m; place taken that of the star.	486
3957	22 43 57.0	136 15 8	p F; l E; g l b M. Query if it have not a v S * involved	490
3958	22 44 41.3	130 13 2	v F; S; R; 15". [The minute altered from 45 to 44 of R A, as required by the context of the observations.]	737
3959	22 44 52.0	154 36 2	p B; R; v g l b M; 40"	507
3960	Δ. 518	22 45 19.3 21.1	130 34 17 33 59	A long p B ray, 4' long, p s v m b M; elongated in pos 44° 7 B; p L; v m E in pos 41° 9; p g m b M; 3' l, 20" br; has a * 11 m, 2' dist, pos from nucleus 12° 9.	737 488
3961	22 46 2.0	133 33 22	e F; v L; 3' diam at least; it is s p a * 7 m, 8' dist.	728
3962	22 46 38.8 44.0	155 55 57 56 0	p F; R; g p m b M; 20" B; R; g p m b M; r; 40"	731 610
3963	22 46 57.3 62.2 63.3	127 56 10 56 40 55 2	p B; v L; R; or v l E; v g b M; 4' diam; with left eye r, hardly re- solved P D bad. A fine object. B; v L; R; or v l E; v g l b M; 5' v F; v L; R; v g l b M; 3'	484 486 637
3964	22 47 17.9 19.2 23.9	123 16 15 15 10 13 55 15 2	B; L; R; g p m b M; 2'; r with right eye; with left, barely resolved in the centre. B; L; R; g b M; 2½' or 3' p F; p L; v l E; v g l b M; 50" l v F; (mirror dim)	484 486 636 637
3965	22 47 38.1 39.1	131 58 53 58 26	v F; l E; 45" F; v L; R; v g m b M; 3' diam	728 489
3966	22 52 32.0	130 28 57	F; L; m E; v g l b M; pos of elongation 33° 3; 4' l; 1' br; loses itself imperceptibly.	488
3967	22 52 35.0	130 29 23	e F; v L; v l b M; 6' l; 3' br	737
3968	22 53 12.9 14.8	131 44 19 44 53	v F; v m E, in pos 5° ±; 100" l p B; S; v m E; has a * 11 m preceding its extremity	728 489
3969	22 54 27.9	141 1 50	e F; R; g l b M; 60"; has a * 11 m n p 5' dist	496

No.	Synon.	R. A. 1850.0. h. m. s. d.	N. P. D. 1850.0. ° ' " "	Description, Remarks, &c.	Sweep.
3970	.....	22 55 36.3	134 0 59	p F; S; R; 12"; makes an obtuse-angled triangle, with a st 7 m at some distance.	489
		38.4	1 44	e F; R; 20"; makes a triangle with a st 7 m	728
3971	.....	22 56 35.4	127 11 44	p B; S; R; g b M; attached to, or not much separated from, a * 8 m just S of neb, 60" dist. [N.B.—The description of this neb and the next agree so well that it seems highly probable they are the same, this being 1" too early in R. A. Nevertheless, on that supposition, there is still a rather unusual discordance of places, and as the minute is quite distinctly written in the original observations, I have preferred leaving the question of identity open.]	484
3972	.....	22 57 41.2	127 11 50	Not v F; S; R; appended to, and very nearly n of, a * 9 m, the preceding of a st, neb 90" from *.	486
		44.1	10 7	F; R; g l b M; pos 2°.1 from a * 10 m 30" dist	637
		44.6	11 35	F; S; R; just n of a * 9 m	636
3973	.....	23 0 14.6	134 19 53	F; p L; l E; g l b M; near a st	728
		15.2	20 40	B; L; l E; v g m b M, to a * 13 m	489
3974	II. 2? h. 2211	23 2 56.2	118 27 8	B; R; p s v m b M; 60". [The degree (118) of P D is distinctly written and rightly reduced. Still, supposing 119 to be the correct reading, the place agrees so well with II. 2, that it is very likely that nebula with a mistaken degree.]	742
3975	.....	23 5 19.9	134 31 36	p B; S; l E; p g m b M.	728
3976	.....	23 6 9.7	129 27 22	e F; S; R; or l E; v g v l b M; attached to a * 10 m in parallel.	488
		....	28 ±	e F; close to a *	737
3977	Δ. 475	23 6 44.8	133 31 17	B; S; m E, nearly in the parallel; v s b M to a * 13 m	728
3978	Δ. 476?	23 8 59.8	133 2 47	p B; L; p m E; g b M	728
3979	II. 236 h. 2226	23 9 14.1	95 34 56	p B; R; g b M; 20"	739
3980	Δ. 477	23 9 29.5	133 9 42	p B; p m E; g b M; 90"; the preceding of a	728
3981	.....	23 9 57.0	133 10 57	F; p m E; g b M; 3'; [the following of a]	728
3982	I. 104 h. 2228	23 10 16.2	99 25 24	F; p L; p m E; 2' 1; 1 1/2' br	740
3983	.....	23 11 33.6	153 3 22	e F; e S; rather a doubtful object; situated among 5 small stars	507
3984	.....	23 12 36.4	172 50 10	v F; p L; R; v l b M; 90"; 2 or 3 st near it.	633
3985	.....	23 12 39.7	133 24 34	p B; S; R; p s b M; 20"	489
		44.5	24 53	v F; R; g l b M; 20"	728
3986	.....	23 12 38.2	158 36 2	p F; v S; p m E in parallel; p s b M	508
		39.9	35 18	v F; R; or l E; g b M; 15"	731
3987	.....	23 13 27.0	120 12 32	e F; S; R; s b M; rather a doubtful object	495
3988	.....	23 14 31.0	120 18 43	v F; S; R; g l b M; 15"	494
3989	.....	23 15 33.3	148 43 30	F; R; g b M; 35"	735
		34.4	43 51	p B; R; g l b M; 40"; the preceding of a	504
3990	.....	23 15 54.0	148 49 51	e F; S; R; the following and fainter of a	504
3991	.....	23 16 24.4	158 57 32	e F, and feeble, if a neb; p s l b M; v S; R; 10". It follows a large *. Re-examined—it is a nebula.	616
		32.5	58 0	e F; R; S; 15" follows a star 10 m on parallel 22'.5	731
3992	.....	23 16 57.0	148 44 50	e F; R	735
3993	.....	23 17 8.7	156 12 42	e F; L; R; v g v l b M; 100"; a difficult object	507
3994	.....	23 17 10.0	150 9 36	Double nebula; individuals equal; e F; R; b M; 20"; follows a line of 4 st 11 and 12 m somewhat oblique to meridian.	488
		....	10 ±	A double neb; both e F; S; R; follows an oblique line of 4 stars 10 and 11 m.	737
3995	.....	23 19 18.9	150 38 56	B; S; l E; v s v m b M to a * 11 m	504
3996	Δ. 347?	23 23 7.8	145 2 17	p F; L; R; v g l b M; 2'	629
3997	.....	23 23 39.9	142 37 47	p B; S; R; 20"; precedes a * 8 m 37"	730
		40.5	38 28	B; S; E; p s b M	498
3998	.....	23 25 3.7	156 20 34	e e F; p L; 40"; very difficult, but certain	731

No.	Synon.	R. A. 1830.0. h. m. s. d.	N. P. D. 1830.0. ° ' "	Description, Remarks, &c.	Sweep.
3999	23 26 0.6 6.3	146 56 56 57 2	v B; p m E; s m b M; 30" l; has a * 9 m 23.5 p, 10" n p B; l E; first g, then p s l b M follows a * 8 m nearly in parallel.....	504 735
4000	23 27 20.4	128 52 59	p B; oval; or p m E; v g b M; 5'	737
4001	23 32 59.5	156 55 0	e F; S; R; the p of 2; pos from the other = 210°	508
4002	23 33 7.5	156 54 20	e F; S; R; 25"; the following and largest of 2	508
4003	23 35 59.1 60.0 60.2	133 52 0 51 26 50 55	p B; S; R; p g m b M; 25" p B; R; v s m b M to a * 14 m; 50" B; S; l E; v s m b M to a small round almost stellar nucleus	639 728 489
4004	23 36 54.5 56.1	120 27 23 26 46	F; S; R; g l b M; has a * 12 m 1' dist following e F; S; R; has a very small * following it	494 495
4005	23 39 1.1 2.3	121 27 7 28 23	B; L; R; p s b M; 2' diam B; L; R; p s m b M; 90" diam	495 494
4006	23 41 59.6	131 41 3	B; R; g b M; 90"	737
4007	23 49 5.9	134 45 43	e F; v S; R; l b M	489
4008	23 49 12.8	134 39 48	v F; v S; R; l b M; follows 3 at 12, 13, and 14 m	489
4009	23 50 11.1	146 24 18	p B; S; R; g m b M; 25"	732
4010	23 54 10.5	125 11 40	v F; S; R; among S stars	493
4011	23 55 56.7 68.5	153 0 48 0 40	v F; v S; R; g b M; 12" F; S; R; g b M; 15"	736 726
4012	23 56 35.2	134 11 32	e F; v S; n f a star 7.8 m distant 3'	489
4013	III. 190	23 57 45.2	94 39 50	F; R; first v g, then p s b M; has 2 st 9 m s f	739
4014	23 59 41.7 41.8 41.9	120 51 33 50 53 51 13	e F; L; m E; requires the utmost attention to perceive though the sky is perfectly pure. v F; m E; v g v l b M v F; p L; v m E; g v l b M; 2' long	620 495 494
4015	23 59 55.8 57.1	124 49 17 48 56	F; p L; R; b M; 40" Not v F; L; l E; g l b M; 60"	635 493

See omitted observations. Numbers indicated above in R. A. order.

(Errata, etc. last page 1270.)

APPENDIX.

PLACES and DESCRIPTIONS of EIGHT NEBULÆ discovered by the late SIR WILLIAM HERSCHEL,
but not published in his Catalogues.

The Places are brought up to 1830 by the precessions of the determining Stars.

No.	Synon.	R. A. 1830.0. h. m. s. d.	N. P. D. 1830.0. ° ' "	Description, Remarks, &c.
1	III. 982	8 28 16.2	16 29 31	Stellar } Two. The preceding is within 1' of a small star which follows it, and which is free from the burr which affects the Stellar. III. 983 follows v F; S } 24 Bode Ursæ (Groomb 1457) 3" 19', and is 2° 36' north of that *. III. 982 is 6' n of the other. Discovered Sept. 30, 1802.
2	III. 983	8 29 18.2	16 35 31	
3	II. 928	8 38 58.2	19 5 31	p B; p L; easily resolvable. I believe I see some of the stars; figure irreg; follows 24 Bo. Ursæ (G. 1457) 6" 59', and is 0° 9' north of it. Discovered Sept. 30, 1802.
4	IV. 79	9 41 18.0	19 25 55	A v B. beautiful, ray of light, about 8' long, 2' or 3' broad; brightest in the middle of all its lengths. Follows 27 Ursæ (G. 1563) 14" 12', and is 2° 27' south of that star. Discovered Sept. 30, 1802. = M52.
5	II. 929	9 47 9.0	17 3 55	F, p L, R; the last of 3, the others are II. 333 and 334. Follows 27 Ursæ (G. 1563) 20" 3', and is 0° 5' south of it. Discovered Sept. 30, 1802.
6	III. 979	.....	.....	Stellar } Three in a line, 1' distant from each other. The place is that of the last, v F; S } which precedes 191 Bode Camelopardali (G. 1643) 7" 44', and is 0° 38' v F; S } south of it. Discovered Sept. 26, 1802.
7	III. 980	.....	.....
8	III. 981	10 10 17.3	9 16 5	

SYNOPTIC TABLE OF THE DATES OF THE SWEEPS REFERRED TO IN MY CATALOGUES OF NEBULÆ, DOUBLE STARS, &c.

Sweep.	Date.	Sweep.	Date.	Sweep.	Date.	Sweep.	Date.	Sweep.	Date.	Sweep.	Date.
1	1823 Nov. 2		1827 Jan. 2		July 7		Feb. 18		Sept. 15		Nov. 19 bis
2	1825 April 10	40 41 42	2 4 5	77 78 79	15 16 17	125 126	19 March 5	177 178 179	15 16 17	227 228 229	Dec. 16
3	11 May		1823* May 8	81 82 83	21 22 23	127 128 129	6 9	180 181 182	18 18 bis 18 ter		1830 Jan.
4	9	43	29	84	28	131	11 bis	183	1	230	..
5	21	44	5	85	29	132	12	184	2	231	Feb.
6	Aug. 20	45	1	86	30	133	12 bis	185	3	232	9
7	Sept.	46	2	87	20	134	12 ter	186	4	233	10
8	7	47	Aug.	88	21	135	13	187	5	234	11
9	9	48	6	89	22	136	14	188	6	235	12
10	Oct.		Sept.	90	23	137	15	189	7		March
11	4	49	10	91	24	138	16	190	8	236	4
12	7			92	25	139	17		9	237	..
13	11		1827 Jan.	93	26	140	18	April	1829 May	238	15
14	12		94	94	13	141	19	191	2	239	16
15	13	50	21	95	16	142	20	192	3	240	..
	14	51	22	96	..	143	21	193	4	241	20
	15	52	23	97	18	144	22	194	5	242	23
16	1826 Feb. 13		1821 May 30	98	22	145	23	195	6	243	24
17	March	53	29	99	..	146	24	196	7	244	25
18	4	54	30	100	Nov.	147	16 bis	197	8	245	25 bis
19	10			101	11	148	17	198	9	246	29
20	11			102	12	149	18	199	10	247	April
21	12			103	13	150	19	200	11	248	12
22	13	55		104	17 bis	151	20	201	12	249	13
23	1	56	1827 Jan. 26	105	..	152	21	202	13	250	17
24	3		105 1/2	106	22	153	22	203	14	251	19
25	5		Feb. 107	107	23 bis	154	23	204	15	252	20
26	6	57	108	108	24	155	24	205	16	253	24
27	8	58	109	109	24 bis	156	25	206	17	254	25
28	9	59	Dec.	110	25	157	26	207	18	255	26
29	30	60	111	111	16 bis	158	27	208	19	256	27
30	July	61	23	112	17	159	28	209	20	257	May
31	1	62	24	113	20	160	29	210	21	258	15
32	7	63	25	114	23	161	30	211	22	259	16
33	24	64	26	115	24	162	31	212	23	260	18
34	31	65	30	116	25	163	19 bis	213	24	261	22
35	Aug.	66	31	117	27	164	20	214	25	262	24
36	1	67	April			165	21	215	26	263	25
37	2	68	2			166	22	216	27	264	June
38	5	69	19 bis	1828 Jan.	8	167	23	217	28	265	July
39	28	70	27	118	13	168	24	218	29	266	11
	30	71	28	119	14	169	25	219	30	267	12
		72	29	120	15	170	26	220	31	268	14
		73	30	121	16	171	27	221	1	269	15
		74	31	122	17	172	28	222	2	270	16
		75	July	123	18	173	29	223	3	271	17
		76	6	124	19	174	30	224	4	272	18
					20	175	31	225	5	273	19
					21	176	12 bis	226	6	274	20

* Nos. 43 . . . 49 are Sweeps made in 1823 which had been mislaid, having been written on loose paper, and not found until after No. 42. As a renumbering of the intermediate Sweeps would have created confusion, it was thought better to carry on the numbers in regular succession.

SYNOPTIC TABLE OF THE DATES OF THE SWEEPS

Sweep.	Date.	Sweep.	Date.	Sweep.	Date.	Sweep.	Date.	Sweep.	Date.	Sweep.	Date.
275	July 28	337	April 3	399	Feb. 3	462	June 29	528	1835 Jan. 1	594	June 1
276	29	338	4	400	no such	463	July 1	529	2	595	2
277	Aug. 10	339	5	401	7	464	2	530	20	596	16
278	13	340	6	402	26	465	5	531	23	597	17
279	15	341	9	403	..	466	2	532	23	598	18
280	16	342	10	404	March 8	467	6	533	23	599	19
281	16	343	13	405	8	468	7	534	24	600	20
282	19	344	14	406	21	469	8	535	27	601	21
283	23	345	May 1	407	25	470	9	536	28	602	22
284	Sept. 7	346	2	408	29	471	10	537	29	603	23
285	8	347	4	409	do.	472	12	538	do.	604	27
286	10	348	5	410	30	473	28	539	30	605	28
287	11	349	6	411	April 2	474	29	540	Feb. 1	606	29
288	12	350	do.	412	3	475	30	541	2	607	30
289	13	351	8	413	2	476	31	542	1	608	July 15
290	do.	352	9	414	4	477	Aug. 1	543	3	609	16
291	14	353	do.	415	5	478	1	544	4	610	20
292	14	354	11	416	17	479	3	545	17	611	21
293	do.	355	12	417	19	480	4	546	20	612	22
294	16	356	14	418	20	481	7	547	21	613	do.
295	17	357	16	419	21	482	8	548	22	614	23
296	18	358	July 30	420	23	483	12	549	23	615	24
297	20	359	31	421	25	484	24	550	24	616	do.
298	21	360	Aug. 1	422	26	485	30	551	25	617	28
299	22	361	2	423	28	486	31	552	26	618	Aug. 14
300	23	362	3	424	29	487	Sept. 1	553	27	619	15
301	24	363	4	425	May 1	488	1	554	March 1	620	18
302	25	364	5	426	18	489	4	555	2	621	Sept. 14
303	do.	365	6	427	19	490	5	556	3	622	18
304	Oct. 5	366	8	428	22	491	6	557	4	623	19
305	9	367	11	429	23	492	21	558	..	624	do.
306	10	368	12	430	23	493	23	559	20	625	no such
307	14	369	Sept. 3	431	March 5	494	25	560	21	626	21
308	16	370	do.	432	8	495	27	561	22	627	22
309	13	371	6	433	13	496	28	562	23	628	do.
310	14	372	9	434	14	497	30	563	24	629	24
311	16	373	10	435	16	498	Oct. 3	564	26	630	do.
312	18	374	Oct. 31	436	16	499	3	565	30	631	27
313	do.	375	4	437	April 31	500	4	566	no such	632	no such
314	20	376	5	438	April 1	501	5	567	April 1	633	Oct. 17
315	1831 Jan. 6 bis	377	..	439	3	502	6	568	1	634	18
316	7	378	28	440	4	503	23	569	3	635	19
317	8	379	29	441	6	504	27	570	7	636	22
318	7	380	Nov. 31	442	10	505	28	571	18	637	23
319	8	381	1	443	11	506	30	572	20	638	do.
320	11	382	2	444	do.	507	Nov. 1	573	21	639	24
321	Feb. 2	383	3	445	13	508	2	574	22	640	Nov. 10
322	..	384	7	446	28	509	2	575	do.	641	11
323	5	385	4	447	29	510	3	576	23	642	13
324	9	386	8	448	May 30	511	4	577	do.	643	14
325	10	387	9	449	May 1	512	6	578	24	644	18
326	12	388	Dec. 2	450	2	513	23	579	25	645	19
327	15	389	9	451	3	514	24	580	1	646	20
328	16	390	10	452	5	515	26	581	2	647	21
329	March 7	391	23	453	8	516	30	582	3	648	22
330	8	392	31	454	10	517	1	583	16	649	Dec. 8
331	11	393	4	455	13	518	2	584	17	650	9
332	13	394	3	456	June 13	519	3	585	18	651	10
333	14	395	24	457	1	520	4	586	19	652	11
334	17	396	25	458	3	521	5	587	23	653	13
335	18	397	27	459	5	522	6	588	24	654	14
336	April 1	398	do.	460	..	523	23	589	25	655	15
			29	461	8	524	26	590	26	656	do.
					24	525	27	591	27	657	16
					26	526	28	592	29	658	20
					28	527	29	593	31	659	24

Sweep.	Date.	Sweep.	Date.	Sweep.	Date.	Sweep.	Date.	Sweep.	Date.	Sweep.	Date.
	Dec.		March		July		Oct.		Jan.		June
660	25	685	14	711	3	738	4	762	5	789	6
661	26	686	15	712	5	739	5	763	9	790	7
		687	16	713	6	740	9	764	do.	791	do.
	1836	688	18	714	do.	741	12	765	25	792	8
	Jan.	689	22	715	7	742	13	766	27	793	27
662	8	690	25	716	do.		Nov.	767	28	794	..
663	9		April	717	9	743	1	768	31		Sept.
664	10	691	5	718	10	744	4		Feb.	795	21
665	11	692	7	719	12	745	5	769	1	796	23
666	17	693	15	720	13	746	8	770	do.	797	24
667	18	694	..	721	do.	747	11	771	5	798	do.
668	19	695	20	722	14	748	do.	772	7	799	25
669	20		May	723	15	749	12	773	9	800	26
670	22	696	11	724	do.	750	do.	774	28		Nov.
671	23	697	12	725	16	751	do.		March	801	28
	Feb.	698	18		Aug.		Dec.	775	2	802	29
672	8	699	do.	726	11	752	4	776	3	803	30
673	9	700	19	727	31	753	5	777	7		Dec.
674	11		June		Sept.	754	do.	778	8	804	1
675	12	701	3	728	2	755	8	779	13	805	3
676	14	702	5	729	5	756	9	780	28	806	23
677	15	703	6	730	do.	757	11	781	29	807	24
678	16	704	7	731	6	758	26	782	31	808	25
679	17	705	do.	732	11				April		
680	18	706	do.	733	12	759	30				
	March	707	do.	734	15		1837	783	1		1838
681	7	708	8		Oct.		Jan.	784	5		Jan.
682	8	709	9	735	2	760	2	785	do.	809	22
683	10	710	do.	736	3	761	3	787	7	810	..
684	..			737	4	761½	4	788	do.		

LIST OF FIGURED NEBULÆ REFERRED TO IN THE CATALOGUE.

R.A. 1830.	NPD. 1830.	No. in Catal.	Plate.	Fig.	Synonyms, &c.	R.A. 1830.	NPD. 1830.	No. in Catal.	Plate.	Fig.	Synonyms, &c.
h. m. s.	° ' "					h. m. s.	° ' "				
0 6 30	150 10	2315	IV.	8	Δ. 507.	5 41 ..	159 50	2950	III.	4	Group in the Nubecula Major.
0 16 26	161 2	2322	III.		1 47 Toucani (Bo.).			2951			
0 21 58	124 12	2327	VI.	19	Δ. 590?			2952			
0 46 52	128 37	2359	V.	10	Δ. 530.			2953			
0 53 19	165 6	2370	IV.	6	Δ. 25.			2955			
2 26 48	129 47	2487	VI.	14	Δ. 519??	7 9 40	102 55	3075	IV.	4	V. 21.
3 16 58	112 8	2534	VI.	17	IV. 77.	8 29 22	130 5	3131	VI.	12	
3 27 9	126 43	2552	VI.	1	1 Nova.	8 54 28	135 14	3145	V.	12	
4 5 31	123 19	2621	V.	11	Δ. 600.	9 9 9	125 54	3154	V.	8	Δ. 564.
4 56 52	156 43	2709	III.	3	Group in Nubecula Major.	9 55 17	115 21	3221	V.	9	
		2710				9 59 52	129 36	3228	VI.	9	
		2711				10 10 42	147 8	3239	VI.	3	
		2716				10 11 7	170 1	3241	IV.	2	
5 8 6	159 11	2775	VI.	11	Nova.	10 16 36	107 47	3248	VI.	5	IV. 27.
5 14 29	159 33	2802	III.	6	Group in Nubecula Major.	10 38 27	148 47	3295	IX.	5	η Argus.
		2803				11 4 54	150 22	3324	IV.	10	
		2804						3325			
		2805						3326			
		2808						3327			
		2810						3329			
5 22 36	158 4	2840	III.	2	Group in Nubecula Major.			3330			
		2842				12 43 36	149 26	3435	I.	2	κ Crucis.
		2843				13 15 31	132 8	3501	IV.	2	Δ. 432.
		2844				13 16 37	136 35	3504	V.	7	α Centauri.
		2845				13 21 37	155 6	3574	VI.	1	Δ. 52.
5 26 56	95 30	2859	VIII.		θ Orionis.	13 27 28	119 0	3579	IV.	5	185 Centauri (Bode).
5 27 0	94 57	2859	II.	3	ε Orionis.	13 40 18	140 22	3541	VI.	15	
5 27 9	160 1	2864	IV.	7	Group in the Nubecula Major.	13 47 34	129 9	3548	VI.	10	
		2865				15 5 18	135 1	3594	VI.	8	
		2872				15 33 23	150 41	3610	VI.	7	
		2875				16 28 22	133 2	3641	V.	4	
		2876				16 33 54	136 42	3644	V.	6	
5 27 45	158 58	2876	VI.	20	Group in the Nubecula Major.	16 50 24	119 51	3661	VI.	13	M. 62.
		2867				17 7 19	141 33	3675	VI.	6	
		2868				17 10 37	128 18	3680	VI.	3	
		2869				17 14 35	132 40	3684	V.	3	Milky Way.
5 35 55	157 41	2913	III.	5	Δ 220 and group in the Nubecula Major.	17 19 2	113 37	3686	VI.	4	IV. 11.
		2918				17 22 43	128 57	3688	VI.	18	
		2923				17 34 31	123 37	3702	V.	1	Milky Way.
		2925				17 39 45	120 9	3707	V.	5	VI. 13.
5 39 7	160 17	2933	IV.	9	Group in the Nubecula Major.	17 41 41	120 23	3713	V.	2	Milky Way.
		2935				17 52 6	113 1	3718	II.	2	IV. 41

OF THE
LAW OF DISTRIBUTION
OF
NEBULÆ AND CLUSTERS OF STARS
OVER
THE SURFACE OF THE HEAVENS.

(91) The distribution of nebulae and clusters over that portion of the heavens visible in our latitudes is extremely unequal. A mere inspection of my Northern Catalogue will suffice to show, that an immense and evidently systematic inequality exists among the numbers of them which occur in each successive hour of right ascension. This is an induction "*per enumeration simplicem*"—a mere matter of statistics; and its results are not a little remarkable. The following table exhibits a synoptic view of the numbers in question:—

NUMBERS OF NEBULÆ, &c., IN EACH HOUR OF R A IN MY NORTHERN CATALOGUE.

Hour of R A.	No. of Neb.	Hour of R A.	No. of Neb.	Hour of R A.	No. of Neb.	Hour of R A.	No. of Neb.	Hour of R A.	No. of Neb.	Hour of R A.	No. of Neb.
h h		h h		h h		h h		h h		h h	
0 to 1	89	4 to 5	56	8 to 9	72	12 to 13	44	16 to 17	32	20 to 21	56
1 " 2	109	5 " 6	32	9 " 10	109	13 " 14	214	17 " 18	18	21 " 22	45
2 " 3	89	6 " 7	56	10 " 11	154	14 " 15	153	18 " 19	54	22 " 23	60
3 " 4	24	7 " 8	55	11 " 12	271	15 " 16	42	19 " 20	37	23 " 0	98

(92) It is evident from this that the great mass of the nebulae in that part of the heavens visible in our latitudes, is accumulated upon the six hours of R A between 9^h and 15^h; on both sides of which the falling off is rapid, and after 15^h very sudden; while within the 6 hours in question the condensation increases to a very marked maximum between the hours 12 and 13. Another maximum, but very much less marked, occurs between the hours 1 and 2, and is also gradually shaded off on the preceding side, and more suddenly on the following.

(93) The true import of this rough and simply statistical view of the subject is not seen, however, till we come to project the places of the individual objects on a chart or globe, so as to obtain a distinct view of their mode of grouping, and a measure of their actual degree of condensation at each point. For this purpose the usual projections of the sphere are ill

adapted. In the orthographic projection, the projected representations of the equatorial zones are contracted into infinitely narrow annuli, while those of the polar ones preserve their natural magnitude. In the stereographic projection, on the contrary, the equatorial areas are unduly dilated as compared with the polar. For our purpose a projection is required which shall represent equal areas on the sphere by equal ones on the projection. The following construction will satisfy this condition.

(94) Supposing r to be the radius of the sphere, take

$$R = r \cdot \sqrt{2},$$

and with R for a radius describe a circle. This will be the projection of one hemisphere, and its area will be equal to the surface of the hemisphere. Now, to divide this circle into annuli corresponding to zones of equal polar distance on the sphere, so that the area of each annulus shall be equal to that of the spherical zone of which it is the projection, we have only to calculate a series of radii according to the formula

$$\rho = R \cdot \frac{\sin \frac{1}{2} \theta}{\sin 45^\circ}; \text{ or } \rho = 2r \cdot \sin \frac{1}{2} \theta;$$

and with these radii describe circles about the common centre, then will each circle be the projection of a parallel of θ° polar distance. To execute this projection in fact, however, no calculation at all is needed, for since the radius of the sphere is of no consequence, we have only to take out, upon any scale we please, the successive values of $\sin 30'$, $\sin 1^\circ$, $\sin 1^\circ 30'$, and so on to $\sin 45^\circ$ from a table of natural sines and these will be the radii of circles corresponding in our projection to the successive polar distances $1^\circ, 2^\circ, 3^\circ, \dots 90^\circ$.

(95) On this principle, having constructed charts representing the northern and southern hemispheres, divided into zones of 3° in breadth in polar distance, and into hours of R A (subdividing each of the latter into quarters), I laid down the nebulae in each from the joint contents of both catalogues, so as to obtain a *coup d'oeil* of their distribution over the whole heavens. This, and not the construction of regular charts for publication, being the object in view, it was not considered necessary to project each individual nebula in its precise place—but only to lay down, in each rectangular space of 3° of P D, and 15^m of R A, the true number of nebulae which had been found to exist in that area, distributing them therein uniformly, and denoting each by a round and sufficiently conspicuous dot. The numbers of such dots found to occur in the several hours of R A (which will suffice for our immediate purpose) are expressed in Pl. X, figs. 1, 2, which may be taken as a synoptic view of the distribution of the nebulae in both hemispheres as it results from my own observations.* The following are the principal conclusions which may be drawn from this operation.

(96) 1st, The distribution of the nebulae is not, like that of the milky way, in a zone or band encircling the heavens, or if such a zone can be at all traced out, it is with so many interruptions, and so faintly marked out through by far the greater part of its circumference, that its existence as such can be hardly more than suspected.

(97) 2dly, One-third of the whole nebulous contents of the heavens are congregated in a

* There are between 300 and 400 nebulae of my Father's Catalogue still unobserved by me, and which are not included in this induction. However, they are for the most part very faint objects, and I have satisfied myself that they would have little or no effect in modifying its conclusions had they been admitted.

broad irregular patch occupying about one-eighth of the whole surface of the sphere; chiefly (indeed almost entirely) situated in the northern hemisphere, and occupying the constellations Leo, Leo minor, the body, tail, and hind legs of Ursa major, the nose of the Camelopard, and the point of the tail of Draco, Canis venatici, Coma, the preceding leg of Bootis, and the head, wings, and shoulder of Virgo. This, for distinction, I shall call the nebulous region of Virgo.

(98) 3dly, Within this area there are several local centres of accumulation, where the nebulae are exceedingly crowded, viz. 1st, from 59° to 62° of N P D in the 13th hour of R A between the northern part of Coma and the fore legs of Chara, as also (in the same hour) from 72° to 78° N P D, between the palm branch and the northern wing of Virgo, and again, in the same hour, from 80° to 87° N P D in the northern wing and breast of Virgo. Northward the nebulous area terminates almost abruptly with a very rich patch between the nose of the Camelopard and the tail of Draco. The line of greatest condensation connecting these most condensed patches is irregular and wavy, without appearance of reference to any one particular centre, and the shading off, though patchy, is on the whole gradual.

(99) The southern portion of this great nebulous region extends but little (at least with any marked intensity) beyond the equator, though it may perhaps be considered as prolonged by one or two pretty rich patches in the 13th and 14th hours of R A, as far as the 141st degree of N P D, where, at all events, it is abruptly terminated. These patches occupy the point of the southern wing of Virgo, and the region about the tail of Hydra and head of Centaurus.

(100) The lesser nebulous region in the northern hemisphere extending in R A from about 22° to 2° , and in P D from 50° or 60° N P D to the equator (beyond which it also projects considerably into the southern hemisphere), is much less concentrated, and has none of those densely congregating groups or centres of accumulation which form so distinct a feature in the other. Confining ourselves at present to its development in the northern hemisphere, it occupies the chest and wing of Pegasus and the southern Fish, the area included by the connecting band of the Fishes, the northern Fish, and nearly the whole of Andromeda. This I shall call the nebulous region of Pisces.

(101) Between these principal masses an almost total disconnection exists throughout all the region from 16^{h} to 19^{h} on the one hand, and from 3^{h} to 6^{h} on the other, from the pole down to the equator, for the few nebulae sporadically scattered over this great area are quite insufficient to convey any idea of junction, though perhaps a thread of connection may be traced across the head and sword of Perseus through Camelopardalus, with the dense mass of nebulae which forms the northern limit of the nebulous region of Virgo. This barren region includes the constellations Aries, Taurus, the head and upper part of the body of Orion, Auriga, Perseus, Camelopardalus, Draco, Hercules, the northern parts of Serpentarius, the tail of Serpens, that of Aquila, and the whole of Lyra.

(102) Sporadic nebulae, increasing in frequency with the increase of R A from the 6th hour, over Canis minor, Gemini, Lynx, and Cancer, lead gradually, but without any other prevalent feature in their distribution, to the region of Virgo, and complete our survey of the northern hemisphere.

(103) In the southern a much greater uniformity of distribution prevails. If we except the two Nubeculae (which are full of nebulae, and the greater of which is even richer in objects of that class than the densest portion of the northern group), the general character of this

hemisphere is that of alternating patches of nebulae, and vacuities of greater or less extent, some of the latter, however, being very extensive. In one of these vacuities in which comparatively few nebulae occur the south pole is situated, having one nebula, however, within half a degree of it (as the north pole has also one within five or six minutes). This barren region extends nearly 15° on all sides of the pole, and immediately on its borders occurs the smaller nubecula.

(104) This nubecula is insulated from communication with other nebulous patches. The case is otherwise with the larger nubecula which stands in connexion with, and in termination of, something approaching to a zone or band of connected patches of nebulae which extends along the back of Dorado, through the following portion of Horologium across Eridanus and the following portion of Fornax, over the paws and body of Cetus to the equator, where it unites with the nebulous region of Pisces, the nebulae growing decidedly more frequent as we approach that constellation.

(105) One of the most remarkable features in the southern nebulous system is the extraordinary display of fine resolved and resolvable globular clusters which occurs between $16^\circ 45'$ and 19° in R A in the region occupied by Corona Australis, the body and head of Sagittarius, the tail of Scorpio, with part of Telescopium and Ara. Here, in a circular space of 18° in radius, we find collected no less than thirty of these beautiful and exquisite objects (Nos. 3658, 3661, 3663, 3665, 3666, 3667, 3670, 3671, 3677, 3683, 3690, 3692, 3698, 3705, 3720, 3723, 3726, 3730, 3731, 3736, 3737, 3742, 3743, 3747, 3748, 3749, 3753, 3756, 3763, 3770). This is certainly something beyond a mere accidental coincidence. Are we to suppose that in this direction the visual ray encounters some branch of the general nebulous system nearer to us than the rest. Or are we to connect it with the very peculiar structure of the Milky Way in this particular part of its course, which is here unlike in its constitution to any other portion of that zone, and which passes diametrically across the circular area in question. It can scarcely be doubted on reading the descriptions of Nos. 3690, 3720, 3723, that some at least of these objects belong to and form a part of the Milky Way.

(106) The general conclusion which may be drawn from this survey, however, is, that the nebulous system is distinct from the sidereal, though involving, and perhaps, to a certain extent, intermixed with the latter. The great nebulous constellation in the northern hemisphere which I have called the region of Virgo, being regarded as the main body of this system, and subtending at our point of view an angle of 80° or 90° , it is evident that, supposing its form to approach to the spherical, our distance from its centre must be considerably less than its own diameter, so that our system may very well be regarded as placed somewhat beyond the borders of its denser portion, yet involved among its outlying members, or forming an element of some one of its protuberances or branches of which the individuals are the sporadic nebulae confusedly scattered over the general surface of the heavens, and of which the prolongation in a direction tending towards the constellation Pisces may give rise to the apparently denser grouping of the nebulae in that region.

(107) It must not be left out of consideration, and has been distinctly remarked by Sir Wm. Herschel as an element of whatever speculation a closer attention to this subject and a more perfect classification of nebulous objects may lead us to indulge in, that the most condensed portion, and what may fairly be regarded as the principal nucleus, of the region of

Virgo is situated almost precisely in one pole of the Milky Way. Taking that great circle as a horizon, the whole of that stratum forms, as it were, a canopy occupying the zenith, and descending thence to a considerable distance on all sides, but chiefly on that towards which the North Pole lies. The phenomena on the other side of the Milky Way, though much less characteristic, are not altogether dissimilar, the nebulous region of Pisces and Cetus standing, on the whole, in pretty nearly the same relation to that circle, the most condensed part of that stratum being elevated at an altitude of between 60° and 70° above its plane. If we leave out of view in this estimate the band of clusters of the VII. and VIII. classes which accompany the Milky Way, and a great many (probably the whole) of which are to be looked upon rather as part and parcel of that sidereal zone, than as properly belonging to the nebulous system; this division of the nebulae into two chief strata, separated (apparently) from each other by the Galaxy, will become much more distinct and striking. Indeed, there are few features more remarkable in the constitution of the Milky Way itself than the comparative rarity of nebulae of the 1st, 2nd, and 3rd classes within its limits. I do not mean simply comparatively with the immense number of stars, but with the area. The only parts which are exceptions to this rule are the portion of its course where it traverses the mass of globular clusters already mentioned, Art. (105), and that where it passes through the Cross and Centaur, where it encounters a faint prolongation of the nebulous region of Virgo. In any point of view which has hitherto occurred to me, the nubeculae must be considered as exceptional. Their constitution is quite peculiar, and will be separately considered.

OF THE CLASSIFICATION OF NEBULÆ.

(108) The distinction between nebulae and clusters of stars, must depend on two very different considerations; viz., 1st, on the power of our instrument to distinguish the very minute individuals of which a resolvable cluster, or one entirely composed of stars, may consist; and, 2ndly, on the idea we attach to the word "nebulous," that is to say, on the distinction which we conceive to exist between objects physically nebulous, and objects only optically so. An object really composed of discrete stars, will appear nebulous, or be optically nebulous when it consists of stars so small, or so close, or both, as either to be separately indiscernible by the light of the telescope, or incapable of being duly separated from each other by its defining and magnifying powers. Under different degrees of instrumental imperfection in these two respects, such an object may offer any variety of appearance, from a mere vaporous and barely discernible patch of light to a brilliant surface of mottled, or even of sensibly uniform illumination. The great nebula in Andromeda, for example, may be, and not improbably is, optically nebulous, owing to the *smallness* of its constituent stars, while the interior portion of those resolved clusters in which the stars are described as "running together into a blaze," or to "have a nucleus of a higher degree of condensation" in the centre, are so, owing to their *closeness*.

(109) As respects the idea conveyed by the word nebula, it seems not easy to draw any distinct and serviceable line of demarkation between objects optically and physically (*i. e.*, apparently and really) nebulous. We have no knowledge of any natural limit, in either direction, to

the real size and lustre of those self-luminous bodies we call stars. Masses of luminous matter, as large as mountains or planets, if congregated by millions at the vast distance of a nebula, would affect our sight armed with any conceivable amount of telescopic power we can hope to attain, individually, no more than the undistinguishable particles of a cloud of dust on a sunny day, or than the constituent aqueous spherules of an actual cloud or fog, from which the term in question derives its origin. It is between discrete and concrete *forms of matter* only than any true physical line can be drawn between a multitude of distinctly separated bodies, whether greater or less, constituting a *system*, and continuous, solid, liquid, or gaseous matter constituting a *whole*, or *individual*. No one has yet considered, or is likely, I presume, to consider, a nebula as a solid or liquid body (in our sense of the words) variously luminous in its different parts. The gaseous, or (to speak more properly) the *cloudy* form of matter has rather suggested itself to the imagination of those who have speculated on this subject (for we must bear in mind that a cloud is not a gas, but a mixture of gasiform with solid or fluid matter, or both, in a state of extreme subdivision). It is certainly conceivable that a continuous transparent liquid or gaseous medium may be luminous throughout its whole substance; but it will be found, I apprehend, on a careful examination of every case apparently in point, that nature furnishes no example of such a thing within the limit of direct experience. Ignited liquids (as glass, for example, or melted nitre, &c.) are demonstrably only superficially luminous. Were it otherwise, their apparent intensity of illumination would be proportional to the depth of melted matter, which is not the case. Air, however intensely heated (if perfectly free from dust), gives out no light. Even flames are more than surmised to owe their light to solid or fluid molecules existing in them *as such*, and in a state of ignition. The flame of mixed oxygen and hydrogen can hardly be doubted to owe what little light it possesses to intermixed impurities, and in the flames of carbonaceous matters, and others where metals or phosphorus are burned and fixed oxides generated, the intensity of the light bears an evident proportion to the *fixity* of the ignited molecules, on whose surfaces it may be presumed to originate by some unknown electric or other process.

(110) Waving, however, the question as to the constitution of *flame* (which I suppose no one will be disposed to contend for as the *material* of a nebula), there is no want of examples of luminous bodies floating in, or intermingled with, non-luminous transparent media. The luminous appearance of the sea, which is due to organized beings, sometimes of large dimensions, is a familiar instance. On the solar envelope, too, of whose fluid nature there can be no doubt, we clearly perceive by our telescopes an intermixture (without blending or mutual dilution) of two distinct substances or states of matter; the one luminous, the other not so, and the phenomena of the spots and pores tend directly to the conclusion that the non-luminous portions are gaseous, however they may leave the nature of the luminous doubtful, and suggest the idea of radiant matter floating in a non-radiant medium, and having a tendency to segregate itself by subsidence, after the manner of snow in air, or precipitates in a liquid of slightly inferior density.

(111) Between a cloud or mist, and a shower, there is no real distinction, but that in the latter the globules are large enough to overcome the resistance of the medium in which they exist, and acquire a greater or less velocity of descent.* If water were nearly of the same

* Waving the question as to the supposed vesicular state of water in clouds and mists.

specific gravity as air, it might be scattered through our atmosphere in large globes, with no more tendency to fall in rain than at present in a cloud, as we see in immiscible liquids of nearly the same specific gravity shaken together. Now there is nothing to prevent our generalizing the notion of a luminous cloud, and suppose the possibility of masses of luminous matter—of whatever density or variety, of whatever bulk or minuteness—forming a connected system, and prevented from collapse or from mutual interference, by the resistance of a transparent and non-luminous medium, which shall serve them as a common vehicle, and perform other useful cosinical offices to them. Such an idea, as a matter of pure speculation, has even something inviting in it, as rendering in some degree conceivable the solution of a problem otherwise almost inapproachable,—I mean that of the stability of a cluster of stars in the state of apparent condensation in which we see so many of those wonderful systems. The *dynamical* equilibrium (if I may use such a phrase to express internal mobility of parts, accompanied with a conservation of outward form and regular condensation towards a centre) of a globular, elliptic, or other cluster of *totally disconnected* stars, acted on only by central forces, cannot certainly be denied as an abstract possibility; nay, under one very peculiar condition (that of a *uniform* distribution of stars in a sphere) we perceive it to be so, and that such equilibrium must subsist. But beyond this case we cannot reason distinctly; and it certainly becomes exceedingly difficult to conceive the conditions of conservation of such a system as that of ω Centauri, or 47 Toucani, &c., without admitting repulsive forces on the one hand, or an interposed medium on the other, to keep the stars asunder.

(112) Such a mixed system might admit of a statical instead of a dynamical equilibrium, the interposed medium serving to propagate pressure and give unity to rotation, so as to bring its movements and figure under the Newtonian laws of rotatory equilibrium. Nay, if we choose to give the reins awhile to speculation, and admit the gradual absorption of such a fluid, it is far from inconceivable that a system of orbital movements might become established among its members; at first entirely, but gradually less and less under the conservative control of its resistance and impulse, as they approached in their forms, magnitudes, and other elements, to a final state, in which the absorption of the medium should be total, and the system dynamically stable, under conditions of adjustment, such as, in an infinitely simpler form of enunciation, preserve the stability of our planetary system.

(113) But such a medium is purely hypothetical. We see, after all, only the luminous portions of a nebula, and can have no other knowledge of their aggregation or segregation than what our telescopes afford us. The distinction between nebulae properly so called, and those which we are to consider as certainly or very probably clusters of stars, resting, as it must do, on the merely temporary and conventional ground of the capacity or incapacity of our telescopes, wholly or partially to resolve them, can never become a permanent ground of classification, since every new improvement in the powers of the telescope will cause more and more nebulae to pass into the class of clusters.

(114) Nevertheless, granting it to be impracticable to draw any clear line of separation between nebulae and clusters, yet their degree of resolvability, connected as it is with the absolute brightness of their constituent stars, and their distance from us, must always form an important character in their description, and is fully as much entitled to be received as an element in their classification as their total brightness, or degree of condensation about a centre, &c. It has already been remarked, Art. (44), as the result of a very extensive

induction, that the normal form of what may be called Regular Nebulæ is the Elliptic, admitting every degree of ellipticity, from the spherical to the linear form; every law of condensation, from the circumference to the centre of the apparent outline, from a uniform disc to a star-like centre, surrounded with faint and gradually fading nebulosity; every grade of brightness, from an object like ω Centauri distinctly visible to the naked eye, to the feeblest third-class nebula, barely discernible with the best telescopes; and every shade of resolvability, from stars distinctly numerable even in the middle, to a total absence of any suspicion of stars indicated by the slightest mottling of surface. Another feature, common to all nebulae of this class, is the diminution observable in the ellipticity of their strata from without inwards, so as to approach to a spherical nucleus, however elongated their extreme elliptic outline.

(115) When sensible objects possess no qualities but such as are common to them all, and differ only in the greater or less degree in which those qualities are present in them, the only classification they admit is evidently a *classificatio per gradus*—one grounded on the measured or estimated intensities with which those several qualities co-exist in the same individual. Classes (or rather subclasses) founded on such gradations are purely arbitrary, and admit of no natural lines of demarcation. If minerals, for example, differed from each other only in respect of hardness, transparency, and specific gravity, it would be a question of pure convenience, how many degrees of these qualities we might choose to regard as distinct from each other, and consequently how many classes we could form by their combination, in the absence of exact numerical statement, which, when attainable in each particular, goes to abolish the idea of sub-classes altogether, by assigning to each individual its precise place in the more general class. As regards the division of our great class of Regular nebulae into sub-classes, it will amply suffice to recognize in each character five degrees—two extreme, and three medial. Pursuant to this idea I would, therefore, propose the following system of numerical sub-classification and nomenclature:—

SUB-CLASSIFICATION OF REGULAR NEBULÆ. CLASS I.

Sub-class in respect of	Magnitude.	Brightness.	Roundness.	Condensation.	Resolvability.
1	Great.	Lucid.	Circular.	Stellate.	Discrete.
2	Large.	Bright.	Round.	Nuclear.	Resolvable.
3	Middle-sized.	Faint.	Oval.	Concentrate.	Granulate.
4	Small.	Dim.	Elongate.	Graduating.	Mottled.
5	Minute.	Obscure.	Linear.	Discoid.	Milky.

(116) As regards concentration, a nebula may have a double class, since the law of condensation may be infinitely varied, so as to render, for example, such combinations as *Discoid-nuclear*, *mottled-stellate*, &c., not incompatible. In fact, the heavens furnish many such instances. Comparatively speaking, however, they are rare, and, for the purposes of general classification, to serve for the formation of a catalogue of nebulae, such as I hope to see one day constructed, the distinctive character in respect of concentration may always be satisfactorily indicated by a single epithet or number, leaving the few remarkable cases to be specially noticed.

(117) The utility of the system thus proposed, in affording in very small compass a good

deal of information respecting the physical (or optical) characters of a nebula, ^{and} in thus rendering possible a general descriptive catalogue of convenient magnitude for reference, will, I am disposed to think, be found considerable. It is not necessary, to this end, to write or print the words at length, or even to arrange the numbers separately into columns. Such a combination as I. 22435, when once the system is familiar, is quite as *distinct* as if each figure were placed in a separate column with appropriate heading, and, after a little practice, quite as intelligible as if for each number its appropriate *word* were written. Thus the above-mentioned combination reads as follows:—A nebula of the 1st class (*i.e.* regular), large, bright, elongate, concentrate, milky, a description which readily recalls to the imagination such an object as is represented in our figure 19, Pl. VI., while (to express our meaning by a few more instances) the combinations—

I. 32155—or Middle-sized, Bright, Round, Discoid, Milky.

I. 11242—Great, Lucid, Round, Graduating, Resolvable.

I. 11325—Great, Lucid, Oval, Nuclear, Milky—

will satisfactorily express such objects as are represented respectively in Pl. V. fig. 8, of this volume, fig. 88 of my northern catalogue, and Pl. IV. fig. 5 of this, or 185 Centauri. In such a system of abbreviation, o, or zero, in any place, might indicate the absence of information as to the appropriate particular.

(118) In this sub-classification, which is founded solely on the optical aspect of the nebulae, without reference to any notions we may entertain of their intimate nature, both globular clusters and planetary nebulae are included, the essential characters of the former being roundness and resolvability in their higher or highest degrees, and that of the latter a simply discoid round or slightly oval appearance, with or without a stellar nucleus. Nevertheless, these bodies, in their best characterized state, are so remarkable, that, without prejudice to their being duly included in the general classification, it will be well to retain for them these distinctive names, and to mark them for attention by special characters, such as \oplus and \circ , which in a catalogued arrangement may be appended to, or substituted for, the Roman numeral I. expressive of their class. Thus, \oplus 22232 and \circ 33355 would be read, respectively—

A globular cluster, Large, Bright, Round, Concentrate, Resolvable, and

A planetary nebula, Middle-sized, Faint, Oval, Discoid, Mottled.

I should observe that in this nomenclature the term *resolvable* is to be understood in a somewhat stronger sense than it was originally used by Sir W. Herschel, and hitherto by myself—that is to say, not as implying merely a suspicion of consisting of stars, but that sort of partial resolution which leaves no room for doubt as to the object consisting of stars, though they are not seen so well insulated from each other as is implied in the term *Discrete*.

(119) ANNULAR nebulae belong, no doubt, to the general class of regular or symmetrical nebulae, and in the full generality of the expression of the law of condensation, which of course admits of an internal vacuity, it would suffice to add a sixth number and word (6, Annular) to our column headed Condensation; and the occurrence of the number 6, or, for distinction's sake, a capital A in the numerical exponent of the sub-class, would sufficiently mark the character of such an object. As there are so few objects of this kind known, it is hardly worth while to make a class apart for them, but in such an arrangement as I am now proposing, the word

Annular at full length might conveniently, on that very account, be substituted for the whole numerical combination in question—(thus, I. Annular). In this view they would be considered as a sub-class apart, and this distinction at least they merit, if, as is most probable, their physical structure be that of hollow, elliptic, or spherical shells of stars, as I have already before suggested, Art. (53).

(120) *Double Nebulæ*, like double stars, may be either optically or physically double; but as we are here deprived, at least at present, of the criterion of orbital motion, I should feel disposed to include under this head those cases only in which two nebulae of the regular kind are so near each other as to mix their nebulosities, or to be, as it were, included one in another, or if disjoined, yet so close, or otherwise so related in appearance, as very strongly to suggest the notion of a real vicinity in space, and therefore of probable physical connection. In the very remarkable case of M. 62, which is a double globular cluster, or one such cluster with another *included within it* (Fig. 13, Pl. VI. of this volume), and in the cases of the nebulae represented in figs. 68, 69, 70, and 71 of my northern catalogue, it seems impossible to doubt such physical connection. As, however, no instance has yet occurred in which the individuals of such a pair do not each belong to the regular (*i.e.* elliptic or spherical) class, it does not appear necessary to erect a separate class for them, but rather to regard them, as we have done with the annular nebulae, as a peculiar (though very interesting) sub-class of regular nebulae, to be specially designated in the few cases where their closeness is such as to prevent their being separately entered in a catalogue, which may be done by the letter D affixed to the numeral expression of the sub-class of the principal individual, or by special description in a note.

(121) We come now to consider the next great division of our nebulous system II. *Irregular Nebulae*, in which class may be comprehended all which, to a want of complete and in most instances even of partial resolvability by the power of the 20-feet reflector, unite such a deviation from the circular or elliptic form, or such a want of symmetry (with that form) as precludes their being placed in class I., or that of Regular Nebulae. This second class comprises many of the most remarkable and interesting objects in the heavens, as well as the most extensive in respect of the area they occupy. Such, for instance, as the great nebulae about θ Orionis, η Argus, ϵ Orionis, and κ Cygni, as well as those smaller but still very extensive and most singular objects, IV. 41, 8 Messier, 17 Messier, 30 Doradus, &c.; the partially symmetrical forms M. 51, M. 27, and M. 64, &c.; and a variety of others.

(122) To subdivide this class would almost be to create as many sub-classes as individuals, such is the capricious variety of their forms and general aspect. In consequence I shall not attempt it, but content myself with specifying as matter of nomenclature, a few terms which express characteristic features in their appearance, accompanying each with one or more examples.

1. Sub-regular nebulae, or those which possess a certain degree of symmetry, and an evidently systematic structure. Such are M. 51, M. 27, M. 64, figured in figs. 25, 26, 27, of my Northern Catalogue, and Pl. IV. fig. 1, Pl. VI. figs. 1 and 2, of this volume.

2. Compact; such as V. 21, (Pl. 4, fig. 4) M. 78 = h. 368 (fig. 36, Northern Catalogue) &c.

3. Branching; as θ Orionis; V. 14, and 15; (figs. 33 and 34 of Northern Catalogue); ϵ Orionis (Pl. II. fig. 3, of this volume).

4. Convolved; as M. 17, Plate II. fig. 1.

5. Cellular; 30 Doradus; M. 8; h. 2093 (fig. 82, N. Cat.) shown by Mason to be connected with and to form a part of V. 14. As the annular form may be conceived to originate in a spherical or ellipsoidal envelope, enclosing a hollow space of similar form within it, so may also this kind of appearance in a nebula be conceived to originate in an actual cellular structure of the nebulous mass, or in convoluted and mutually intersecting sheets or folds of a nebulous stratum variously penetrated by the visual ray.

6. Fissured; IV. 41, Pl. II. fig. 2, h. 3501 (Pl. IV. fig. 2).

7. Cometic; Pl. VI. figs. 17, 18, &c.

(123) In a synoptic catalogue of nebulae it would hardly be necessary to indicate in addition to the class II. to which they belong, any other particulars than those which refer to magnitude and brightness, for which the two first columns of the synoptic view of the sub-classes of class I. furnish sufficient means. Thus II. 1.1, will indicate a great and brilliant irregular nebula—II. 3.3, a middle-sized (common-sized) and faint one. As nebulae of this class will necessarily be objects of especial interest to every observer, it will answer every purpose in the synoptic catalogue which indicates their places, to give him some notice of this kind that he may be enabled to judge how far the magnifying power and light of his telescope may be expected to show him its peculiarities—or whether he may expect to see it at all.

(124) The third principal class or subdivision of these objects is that of Irregular Clusters. This class will comprehend all the clusters designated by Sir W. Herschel as of the VII. and VIII. classes, and such of those of his VI. class as are irregular in their form, and cannot be referred to the class of Globular Clusters. It will suffice to divide them into three sub-classes III. 1, III. 2, and III. 3, according to their general impression on the eye, without descending into minutiae of detail which admit of infinite variety, according as we regard their richness in stars, the magnitudes of their constituent stars, their size, general form, or degree of concentration towards one or more centres. III. 1, in this view will indicate a rich, brilliant, and conspicuous cluster; III. 3, a poor and inconsiderable one; and III. 2, such a one as cannot properly be characterized in either of these forms of expression. This is quite sub-division enough for every useful purpose.

OF THE TWO NEBULÆ OR MAGELLANIC CLOUDS.

(125) The general appearance of these objects to the naked eye in a clear night and in the absence of the moon (whose light completely effaces the lesser and almost also the larger of them), is that of pretty conspicuous nebulous patches of about the same intensity with some of the brighter portions of the milky way. That such is their aspect as regards their impression on the unassisted eye of others as well as my own, is evident from what is said of them by Lacaille (Acad. Sci. 1775, p. 195) and by M. Rümker (Preliminary Catalogue, &c. Hamburg, 1832, p. 17). Whether their figures in Phil. Trans. 1828, i., which are stated to have been engraved from "very correct drawings," are eye-drafts or telescopic representations, their author has not informed us. If the latter, I am unable to reconcile them with my own

observations as regards the greater part of their details. If the former, they certainly tend to convey such a conception of their appearance as must inevitably create a sentiment of disappointment in the mind of any one (as I confess it did in mine) who, having his imagination excited by representations so striking and extraordinary, is presented for the first time with a view of the real objects. I consider, therefore, that it will not be irrelevant to lay before the reader such representations as I have been able to make of them, *entirely without telescopic aid*, when seated at a table in the open air, in the absence of the moon, and with no more light than absolutely necessary for executing a drawing at all. See Plate IX. figs. 1 and 2. They are copied from one of my working charts (pricked off, as to the positions of the more conspicuous stars from Bode's Atlas,) and on the same scale as the originals. It will not fail to be noticed that the situations occupied by both nubeculæ with respect to the surrounding stars, especially by the nubecula minor, is very different from what is represented in Bode's, and in many other charts and globes in common use. I ought to add that all my own attempts to delineate other than very small portions of the nubecula major from the telescope, have been completely baffled by the overwhelming complexity of its details. The lesser cloud is less complex—but for that very reason less interesting.

Of the Nubecula Minor.

(126) The Nubecula Minor is situated between the parallels of 162° and 165° N P D, and between the meridians of $0^{\text{h}} 28^{\text{m}}$ and $1^{\text{h}} 15^{\text{m}}$ R A. It is of a generally round form to the unaided eye, nor can any very material deviation of its centre of brightness from its centre of figure be noticed. As seen in the telescope, however, the most conspicuous and resolvable region appears to lie somewhere about $0^{\text{h}} 45^{\text{m}} 30^{\text{s}}$ R A, and $164^{\circ} 16'$ N P D, which is somewhat to the south of its middle. It is preceded at a few minutes distance in R A, by the magnificent globular cluster 47 Toucani (Bode), but is completely cut off from all connection with it; and with this exception, its situation is in one of the most barren regions of the heavens. I cannot better describe its general insulation than in the words of a memorandum in the Gage-book sweep 745. "The access to the Nubecula Minor on all sides is through a desert." Neither with the naked eye nor with a telescope is any connexion to be traced either with the greater nubecula or with the milky way. In order to convey a better idea as well of this kind of insulation as of the general character of the nubecula itself, I shall here bring into one view such incidental notes respecting these points as I find scattered up and down in the journals of my sweeps, and of the accompanying gages, noted in the intervals of actual observation.

(127) *Zones including or passing through the Nubecula.*

Sweep 441.—(Sub Polo)—Zone 162° 165° .

" 0h. 30m. R A $164^{\circ} 27'$ P D. The edge of the smaller cloud comes on as a mere nebula.

" 0h. 40m. 53.6s.— $164^{\circ} 24' 7''$ (a nebula). In the edge of the cloud, vision bad, objects faint and much light cut off by tree tops, but the cloud is not resolved, and seems a very mysterious object."

Sweep 482.—Zone 162° 165° . August 12, 1834.

" 23h. 19m. Began. The ground of the sky very decidedly but not very richly dotted rather than 'stippled' with faint stars *. Stars of 9, 10, 11, 12 magnitudes are sparingly scattered over it."

* For this phenomenon see more hereafter.

"0h. 2m. The lesser nubecula is now approaching, but I discern no indications in the field throughout the zone which should lead to expect any remarkable object. On the contrary, the stippled or dotted appearance mentioned at 23h. 19m. is gone and the ground is black."

"0h. 13m. 6.5s. $163^{\circ} 5' 55''$. There is now a great increase of st. 13m. in the field. On further examination they appear to be the outliers of the great globular cluster" (47 Touc.) This cluster "is completely insulated. After it has passed, the ground of the sky is completely black throughout the whole breadth of the sweep."

"0h. 29m. 7.3s. The field begins to show more stars and to be *alive*."

"0h. 37m. 5.1s. We are now in the cloud. The field begins to be full of a faint light, perfectly irresolvable."

"0h. 46m. 3.7s. $164^{\circ} 19' 23''$. I should consider about this place to be the body of the cloud which is here fairly resolved into excessively minute stars, which, however, are certainly seen with the left eye."

"1h. 9m. 50.2s. Re-examined by the side motion the whole cloud in detail and in general. The main body is resolved, but barely. I see the stars with the left eye. It is not like the stippled ground of the sky. The borders fade away quite insensibly and are less or not at all resolved. The body of the cloud does not congregate much into knots, and altogether it is no way a striking object, apart from the nebula and clusters." "N.B. Mirror a good deal tarnished—at least a fourth of its light."

Sweep 625.—Zone 162 165. September 21, 1835.

"0h. 39m. 11.1s. $164^{\circ} 0' 52''$. Here commences a very starry region."

"0h. 44m. 55.0s. $164^{\circ} 13' 22''$. This seems to be the body of the cloud. It is a fine rich large cluster of very small stars 12 18 mag. which fills more than many fields, and is broken into many knots, groups and straggling branches, but the whole (i. e. the whole of this clustering part) is clearly resolved."

"1h. 2m. 42.3s. $163^{\circ} 15' 56''$. Neb., &c. The field rich with st. 11 15 m."

"1h. 15m. The cloud is past, and the zone is as free of stars as before it came on."

Sweep 738.—Zone 162 165. October 4, 1836.

"0h. 37m. 8.9s. $164^{\circ} 22' 18''$ (a neb. taken). This is in the light part of the cloud."

"0h. 40m. 13.0s. $164^{\circ} 2' 8''$. The field here has light in it and many stars."

"0h. 41m. 43.9s. $164^{\circ} 12' 28''$ (a cluster taken). It is the preceding knot of the resolvable portion of the body of the Nubec. Min., which fills the subsequent field and consists of irregularly clustered stars 12 16 20 m."

"0h. 49m. $162^{\circ} 4' 18''$. A field almost black. This is decidedly above (north of) the cloud."

Sweep 745.—Zone 162 165. November 5, 1836.

"0h. 33m. 51.1s. $164^{\circ} 20' 54''$ (a nebula taken). The field is full of the nebulous light of the Nubecula."

"0h. 43m. 19s. $164^{\circ} 31' 47''$. Lower limit of the light of the Nubecula."

"0h. 47m. 21s. $163^{\circ} 7' 16''$. Upper limit, but here it is starry, at the other limit nebulous."

"1h. 13m. $164^{\circ} 15'$. This seems to be about the end of the small cloud. The field has 15 or 20 stars in it 11 15 m. Above and below, it is almost vacant."

"2h. 0m. Here, after a region of utter barrenness, commences a somewhat brighter region. N.B.—The access to the Nub. Minor, on all sides, is through a desert (Gage Bk. f. 745)."

"2h. 42m. A miserably poor and barren region."

"3h. 30m. Most dreary since the small nubecula (Gage Bk.)."

"3h. 40. Swept assiduously since 2h. 30m., but it is a barren and utterly uninteresting region, having few stars and neither nebula nor double stars."

(128) *Sweeps above and below the Nubecula Minor.*

Sweep 616.—Zone 159 162. July 24, 1835.

"22h. 50m. $23^{\circ} 30'$. The latter part of this zone most oppressively desolate. N.B.—Admirably well

swept." (Gage Bk.) The average of the gages during this interval was 8 stars per field of all magnitudes.

Sweep 509.—Same zone. November 3, 1834.

"1h. 9m. 59^s 9". The lower part of the sweep (*i. e.* at 162° N P D) contains a good deal of loose light, and is evidently the border of the Nubecula Minor, but there are not many stars, and the light is perfectly irresolvable and not congregated into knots or distinct nebulae."

"1h. 28m. All this part of the sweep is singularly barren of stars, scarcely any" exist, "say on an average 2 or 3 in a field of all magnitudes from 10 to 16."

It is perhaps worthy of notice that the fine Globular Cluster Δ 62, which occurs in this zone at Oh. 57m. 161^s 46" is situated beyond the limits of the Nubecula, like 47 Touc., to which, though much inferior in brilliancy, it is yet a not unworthy fellow.

Sweep 622.—Zone 165 168° N P D. September 18, 1833.

"23h. 0m. 0^s 22". Gages averaging 13 stars in the field of all magnitudes from 8.9 downwards," (Gage Bk.)

"0h. 22m. No sign of the cloud." (Gage Bk.)

"0h. 25m. 22^s. Looking well out for symptoms of the lesser cloud but I perceive none."

"1h. 0m. No symptoms of the cloud unless perhaps a very feeble light in the field at the upper edge of the zone." (164^s 56") (Gage Bk.) Average of Gages since 0 22 = 13 stars per field.

"1h. 10m. A most dull and uninteresting sweep." (Gage Bk.)

"1h. 32m. 12^s 7s. Swept steadily from 0.50—sky 10, but nothing of the slightest interest. Very few stars above 10 m., and all single." Average of Gages, per Gage Book, from 1h. 0m. to 4h. 0m., 12 stars per field.

(129) There are 37 objects entitled to entry in the Catalogue, as nebulae, or clusters, within the area of the Nubecula Minor.

Of the Nubecula Major.

(130) The Nubecula Major is situated between the parallels of 156° and 162° N P D, and the meridians of 4^h 40^m and 6^h 0^m in R A. Its brightest, and for the most part, unresolved portion (which has been pitched on several times in sweeping as "the main body of the cloud") is situated in 5^h 20^m R A and 159° 40' N P D, but the whole region between 5^h 10^m and 5^h 30^m in R A, and from 158° 50' to 160° 10' in N P D, is almost equally entitled to be so called. The brightest and richest region of resolved and clustering stars is situated about 5^h 30^m R A, 157° 0' N P D.

(131) The Nubecula Major, like the Minor, consists partly of large tracts and ill-defined patches of irresolvable nebula, and of nebosity in every stage of resolution, up to perfectly resolved stars like the Milky Way, as also of regular and irregular nebulae properly so called, of globular clusters in every stage of resolvability, and of clustering groups sufficiently insulated and condensed to come under the designation of "clusters of stars," in the sense in which that expression is always to be understood in reading my Father's and my own catalogues. In the number and variety of these objects, and in general complexity of structure, it far surpasses the Lesser Nubecula; some idea of which may be formed by comparing the numbers of registered nebulae and clusters in each. For while, within the limits assigned above to the latter, the number of such nebulae and clusters amounts only to 37, and taking in six outliers, which may be regarded as forming part of its system, at most to 43, (a very remarkable concentration of such objects already, within an area not much exceeding ten square degrees),—the

former within an area of about 42 square degrees, allows us to enumerate no fewer than 278 (without reckoning between 50 and 60 outliers, immediately adjacent, and which may very fairly be regarded as appendages of the nebulous system of the Nubecula Major) making an average of about $6\frac{1}{2}$ to the square degree, which very far exceeds anything that is to be met with in any other region of the heavens. Even the most crowded parts of the stratum of Virgo, in the wing of that constellation, or in Coma Berenices, offer nothing approaching to it. It is evident from this, and from the intermixture of stars and unresolved nebosity which probably might be resolved with a higher optical power, that the nubeculæ are to be regarded as systems *sui generis*, and which have no analogues in our hemisphere.

(132) To the naked eye, as shown in Fig. 2. Pl. VII., the greater nubecula exhibits the appearance of an axis of light (very ill-defined indeed, and by no means strongly distinguished from the general mass) which seems to open out at its extremities into somewhat oval sweeps, recalling, in some faint degree, the appearance of that extraordinary object Mess. 27. It would be strange, indeed, but not beyond the analogies of other wonderful disclosures effected by optical improvements, if instruments yet to be created, or even possibly those already in progress, should one day analyse this last mentioned object into subordinate groups and systems of, perhaps, equal complexity. In the nubecula itself, there is a nebula (h. 2878) which, as will be seen in the description and remarks annexed to its observation in the Catalogue, has given rise to a similar train of speculation.

(133) The only object which stands at all conspicuously distinguished from the general misty illumination of the greater nubecula (at least to my eye), is the great looped Nebula 30 Doradus of Bode, which, however, is merely to be perceived as a small indistinct patch, evidently not a star, and that only in fine nights. Of this object, an ample description has been already given, to which I shall here only add, that it is unique even in the system to which it belongs, there being no other object in either nubecula to which it bears the least resemblance. Of the very peculiar character of several other of the nebulous constituents of the nubecula when viewed in the 20 feet reflector, sufficient specimens have been given in figures 2—6, Pl. III., figs. 7, 9, Plate IV., and figs. 11, 20, Plate VI.

(134) The immediate neighbourhood of the Nubecula Major, is somewhat less barren of stars than that of the Minor, but it is by no means rich, nor does any branch of the Milky Way whatever form any certain and conspicuous junction with, or include it; though on very clear nights I have sometimes fancied a feeble extension of the nearer portion of the Milky Way in Argo (where it is not above 15° or 20° distant) in the direction of the nubecula. On the whole, however, I do not consider this appearance as more than would be accounted for by the general increase of the number of small stars which, in almost every part of the course of the Milky Way, accompany its borders, and, in a telescope, announce its approach. I have encountered nothing that I could set down as *diffused nebosity* anywhere in the neighbourhood of either nubecula.

(135) I have already stated that the excessive complexity of detail in this object baffled every attempt to delineate the whole or any large portions of it by the aid of the telescope. It was my wish to have done this, so as to present a correct and magnified drawing of it, and to this end I took roughly, with the equatorial, the place of every star visible in that instrument down to the 10th magnitude, in both Nubeculæ, with a view to the formation of charts precise

enough, and sufficiently detailed to serve as the groundwork of such drawings of both objects. This, in itself, was no trifling operation, when conducted, as it was, in such a manner as I shall describe, so as to secure the observation of *every* visible object, without the possible escape of any (except by the intervention of unperceived cloud). It was, however, executed in a series of 34 zones, observed (as regards the Nubecula Major) between Nov. 2, 1836, and March 26, 1837. The series for the Nubecula Minor (as less interesting) were deferred, and were not completed till December, 1837. The results of these observations, reduced by clock and index errors obtained from stars occurring in the zones, are contained in two Catalogues, hereto subjoined; and in order to render them as complete as I have the means of doing, all the objects observed in the 20 feet have been also inserted which fall within the limits prescribed for each. By far the greater part of the nebulae and clusters are in this predicament, the power of a 5-inch achromatic object-glass being inadequate to render visible more than a few of the brighter and more conspicuous among them. But the drawings proved beyond my unassisted power to execute, and I was obliged, though with regret, to rest content with having, at least so far, roughed out the groundwork of them, and prepared the way for the more successful operations of some other astronomer, to whom I earnestly recommend the completion of a work at once so interesting in its performance, and instructive in its result.

(136) The process of zone observation, followed with the equatorial, is applicable to the *complete* mapping down of any given region of the heavens, and is as follows:—The index error of the declination circle being ascertained, clamps are screwed on the limb of that circle, so as to allow the telescope a motion of only a single degree on the meridian, viz., from one whole degree in polar distance to the next, allowing 1' of overlapping on either side, which is ample when the polar axis is in good adjustment. The combined error of clock and hour circle being also ascertained, the instrument is set to a given right ascension (that fixed upon for the commencement of the area to be mapped—allowing also a minute of time antecedent, as margin), and the observation commences by sweeping with the telescope on the declination circle, up and down from clamp to clamp with a very faintly illuminated field, just sufficient to allow the cross wires to be seen, which of course, for this purpose, must be placed parallel and perpendicular to the *meridian*. This sweeping movement is carried on by hand, slowly and steadily, without moving the right ascension handle, until an object is seen, when the sweeping motion is arrested, the object brought to bisection on the horizontal wire, and the transit taken over the vertical. The circles are then read off, and the observation registered. By this time the object will have advanced in the field beyond the meridian wire. It is then to be brought back *precisely* to that wire by moving the right ascension handle, and the loss of time being thus recovered, the sweeping recommences from the very same point of R A, until another object comes within the range of observation. In this way of operating, by following the heavens in their diurnal movement, it is evidently impossible that any object within the optical power of the instrument can escape being observed, if the attention be kept sufficiently alert, and no clouds intervene. I can scarcely flatter myself that literally *every* star down to the 10th magnitude which exists in the areas so observed of the nubeculae will be found in these Catalogues; but I feel assured that the number which have escaped of that and larger magnitudes must be very small. It was not considered necessary to go over the work twice. Independent of the value of time under all the circumstances, *the sweeping position, at considerable altitudes, with any*

instrument but a reflector is so excessively painful (and indeed so permanently injurious to the muscles of the back and neck), that it is scarcely endurable beyond an hour at a time, for which reason alone I felt little inclination to repeat it.

(137) The places of the objects in the Catalogues annexed, as has been said, are rough. Their accuracy amply suffices, however, for the intended purpose. In polar distance there can hardly be more than 1' error, that being the limit of exactness in reading the declination circle. In R A, I presume also that an error of 12 sec. of time (corresponding at this polar distance to about 1' of space) may occasionally occur from a similar cause as respects the hour circle reading, which, as well as the declination circle, being intended only for setting the instrument, and not for any nice determination of places, admitted of no greater precision. Comparing the places of such stars as have occurred in several zones, I find no instance of a greater discordance in the equatorial places between the extreme determinations and the mean of all in A R, in the Catalogue of the greater nubeculæ, and only one in N P D even in the case of nebulae, which, from their faintness in the equatorial, admit of less certain observation. In the Catalogue of the nubecula minor, being materially nearer to the pole, the discordances in R A are apparently, but not really, greater, and in P D there is only one star (No. 189, Cat.), and no nebula which exceeds the limit assigned.

(138) In this respect, however, the observations are suffered to speak for themselves, since in these Catalogues, as well as in those of the nebulae and double stars, each individual result of observation has been set down without taking means, and none have been rejected for discordance. The nebulae observed in the sweeps are also inserted for the sake of comparison, as well as to complete the nebulous part of the Catalogue. The stars observed in the sweeps have been added for a similar reason, and for the sake of comparison with the Brisbane Catalogue. The Catalogues are by this somewhat extended in bulk, it is true, but on the whole they present in this form a fairer picture of the work done.

(139) In the following catalogues, the first column contains the general number, for each; the second the object, star (S) Nebula (N.), Globular Cluster (\oplus) or cluster of stars (C). Column 3 contains the magnitude of the star as estimated at the time of observation rejecting quarter magnitudes, or the degree of brightness of the nebulae, expressed by the Roman numerals, as in my Father's classes I. II. III. or otherwise, following the nomenclature and notation of his Catalogues. The fourth column contains the right ascension, and the fifth the polar distance reduced to 1830.0. Lastly, column 6, contains the number of the zone in which the object has been observed or the indication of its being inserted from a 20-feet sweep, characterized by the letter *f* in italics. Identifications of stars with stars in the Brisbane Catalogue, and other remarks are placed at the end of the Catalogues, and referred to by the general numbers. In the Catalogue of the Nubecula Minor, it will be noticed that some of the zone observations have extended beyond the limits of R A fixed on, both ways as the boundary of the Nubecula. The stars so observed are retained for the sake of any possible occasion which may arise hereafter of referring to them. In this Nubecula, it ought to be mentioned (or at least in the area proposed to be mapped), a small portion (between the parallels of 164° and 165° , and from R A $0^h 45^m$ to $1^h 16^m$) by some inadvertence escaped being included in the equatorial zones.

(140) Several stars of the Brisbane Catalogue, which (supposing their places in that

Catalogue to be correct) have not been encountered in the zone observations, are inserted into the appended Catalogues by bringing up their places to 1830. Six such cases occur in the Nubecula Minor (see Nos. 29, 70, 123, 131, 136, 155). Of these Nos. 29 and 70 (B 28 and 83) seem to be merely duplicates of other stars of that Catalogue, which I have found in their places, originating in misreadings or errors of reduction therein committed. Nos. 123 and 131 (B 120 and 126) occur in the unobserved space alluded to in the last article. In the case of No. 136 (B 129), it appears to be the star No. 133, with 1st error in R A. No. 155 (B 150, or 151, for these are one star) was missed by a want of exact overlapping in R A in zones 4 and 34. In the Catalogue of the Nubecula Major, I have no reason to suppose that any of the Brisbane stars which really exist have escaped observation. Several cases of duplicates and probable misreadings or errors of reduction in the Brisbane Catalogue indeed occur, but they are not such as to leave any doubt as to the identity of the stars.

FIRST APPROXIMATION TOWARDS A CATALOGUE OF OBJECTS

IN THE

MAGELLANIC CLOUDS,

AS OBSERVED WITH THE SEVEN-FEET EQUATORIAL

AND THE

TWENTY-FEET REFLECTOR.

CONTAINING THE PLACES FOR 1830.0

OF

919 STARS, NEBULÆ, AND CLUSTERS IN THE GREATER

AND OF

244 IN THE LESSER NUBECULA.

INTENDED AS

PREPARATORY TO THE CONSTRUCTION OF CHARTS OF THE NUBECULÆ AND TO
THE FUTURE EXECUTION OF DRAWINGS OF THEM IN DETAIL.

STARS, NEBULÆ, AND CLUSTERS, IN THE NUBECULA MINOR.

No. for Reference.	Obj.	Mag.	R. A. 1890.0. h. m. s.	N. P. D. 1890.0. ° ' "	Zone.	No. for Reference.	Obj.	Mag.	R. A. 1890.0. h. m. s.	N. P. D. 1890.0. ° ' "	Zone.
1	S	10	0 0 32	163 25 54	7	51	S	10	0 24 3	163 6 24	7
2	S	9'	0 1 37	162 4 11	8			9'	0 10	6 28	4
			49	4 54	7	52	S	9'	0 24 59	163 7 16	1
3	S	9	0 1 38	162 54 41	8	53	N	III.	0 25 48	164 3 8	1
4	S	10	0 1 39	162 32 41	8	54	S	6	0 26 9	162 12 14	1
5	S	10	0 1 45	162 31 41	8			11	11 50	2	
6	S	7	0 2 3	164 10 54	7			15	12 46	1	
		6	0 0 14	10 20	7	55	S	10	0 27 36	163 28 58	4
7	S	10	0 3 0	163 33 24	7	56	S	9'	0 28 0	163 47 28	4
		10	0 3 0	32 54	7	57	S	9'	0 28 41	162 28 46	1
8	S	9	0 3 2	163 11 41	7	58	S	9'	0 28 49	164 49 32	6
9	S	10	0 3 11	164 5 54	7			51	49 5	1	
10	S	9	0 3 17	163 13 24	7	59	S	8'	0 28 50	164 9 55	1
11	S	9	0 3 44	162 54 56	8			57	9 28	4	
12	S	10	0 4 32	164 1 54	7			58	9 32	6	
13	S	8'	0 5 4	162 28 41	8	60	N	III.	0 29 8	164 6 25	1
14	S	9	0 5 7	162 25 1	8	61	S	9	0 29 27	163 46 48	4
15	S	10	0 5 29	162 22 41	8	62	S	10	0 30 36	162 37 46	1
16	S	9'	0 6 39	162 14 41	8	63	S	9'	0 30 45	162 47 46	1
17	S	9'	0 6 58	163 7 41	8	64	S	9'	0 30 54	162 35 16	1
			67	7 54	7	65	S	8	0 31 37	164 53 2	6
18	S	9'	0 7 31	162 40 41	8			41	53 50	1	
19	S	8'	0 7 38	162 21 41	8	66	S	8	0 31 38	164 58 43	1
20	S	8	0 8 1	162 11 41	8	67	S	7'	0 31 58	164 4 14	1
21	S	9'	0 9 21	162 51 41	8			60	4 32	6	
22	S	10	0 9 44	162 56 41	8			61	4 38	1	
23	S	10	0 9 58	162 11 11	8	68	S	7	0 32 8	163 12 58	1
24	S	9	0 10 6	162 49 11	8			14	12 48	4	
25	S	9	0 10 23	162 15 41	8	69	S	9	0 32 47	162 2 50	2
26	S	8'	0 10 47	162 19 41	8			54	3 46	1	
27	S	10	0 11 44	163 53 24	7	70	S	7'	0 32 54	164 13 17	1
28	S	9'	0 12 2	163 45 54	7	71	S	9'	0 32 54	162 33 46	6
29	S	7	0 12 44	163 0 21	8	72	S	8'	0 33 27	164 40 32	1
30	S	8'	0 12 52	162 54 41	8	73	S	8	0 33 42	164 53 21	6
31	S	9	0 12 57	162 7 1	8	74	N	II.	0 33 52	164 19 47	1
32	S	8'	0 14 46	163 58 54	7	75	S	III.	0 33 55	164 23 56	1
33	S	10	0 16 9	163 54 7	7	76	S	9	0 34 14	162 33 46	1
34	S	9	0 16 15	163 12 24	7	77	N	II.	0 34 40	164 17 10	1
35	S	10	0 16 19.3	163 2 0	7	78	S	10	0 34 52	164 3 28	1
36	⊕	..	0 16 24	163 2 11	8			53	3 8	1	
			24	0 54	7	79	S	10	0 34 57	165 1 32	6
	⊕	VI.	26	1 35	7	80	S	9'	0 35 7	165 6 12	6
			26	1 5	2	81	S	9'	0 35 33	164 36 32	6
			29	1 5	2	82	N	III.	0 37 5	164 31 32	1
			..	1 46	1	83	N	II.	0 37 10	164 22 10	1
37	S	11	0 16 35	163 3 24	7	84	S	9	0 37 13	164 39 22	6
38	S	9	0 16 30	162 56 46	1	85	S	10	0 37 38	163 14 43	4
			37	56 20	2	86	S	8	0 37 52	162 6 46	1
39	S	11	0 17 19	163 2 54	7			53	6 20	2	
40	S	9	0 17 22	163 33 24	7			55	6 8	6	
41	N	II.	0 19 4	162 28 23	7	87	S	9	0 37 58	164 45 32	6
42	S	9	0 19 22	162 9 16	1	88	S	10	0 38 2	163 11 38	4
			22	11 50	2	89	S	10	0 38 12	162 25 32	6
43	S	8'	0 20 7	162 50 20	2	90	S	9'	0 38 20	164 44 32	6
44	S	8	0 20 12	162 48 46	1	91	S	10	0 38 37	164 9 32	6
			13	162 51 20	2	92	N	II.	0 39 6	164 18 28	1
45	S	9'	0 20 17	163 4 46	1	93	N	II.	0 39 10	164 0 53	1
		10	40	4 28	4	94	N	II.	0 39 38	164 26 36	1
46	S	10	0 20 22	163 6 24	7	95	S	9	0 39 45	164 24 38	1
47	S	10	0 20 31	162 7 50	2			50	24 2	6	
48	S	9'	0 22 25	164 42 32	6	96	S	9'	0 39 49	162 42 46	1
49	S	9'	0 23 2	164 1 24	7	97	S	9'	0 40 5	163 31 58	4
			20	1 52	6	98	N	II.	0 40 17	164 1 51	4
			25	1 58	4	99	S	10	0 40 53	163 46 28	1
50	S	9'	0 23 54	165 6 32	6	100	N	III.	0 40 58	164 24 55	1

R R

No. for Reference.	Obj.	Mag.	R. A. 1830.0. h. m. s.	N P D. 1830.0. o i n	Zone.	No. for Reference.	Obj.	Mag.	R. A. 1830.0. h. m. s.	N P D. 1830.0. o i n	Zone.
101	Cl	..	0 41 44	164 12 28	✓	159	S	10	1 3 4	163 49 45	34
102	N	III.	0 42 16	164 27 52	✓	160	N	..	1 3 6	163 48 15	34
103	S	10	0 42 49	164 29 32	6	161	N	I.	1 3 11	162 47 37	✓
104	S	10	0 42 53	164 16 32	6	161	S	8'	1 3 11	162 44 42	2
105	S	9	0 43 26	163 4 16	1			9'	23	44 47	✓
	S	9	40	3 28	4			8'	28	45 45	34
106	S	9	0 43 20	164 24 57	✓	162	N	III.	1 3 32	162 40 32	✓
	S	9	27	24 32	6	163	S	10	1 3 40	163 47 45	34
107	S	9'	0 43 51	162 27 46	1	164	S	10	1 3 42	163 56 45	34
108	S	10	0 43 57	164 2 32	6	165	S	9'	1 3 49	163 32 45	34
109	S	9'	0 44 14	164 31 32	6	166	S	10	1 3 51	163 32 45	34
110	S	10	0 44 29	164 24 32	6	167	S	10	1 3 51	163 27 45	34
111	S	7'	0 44 29	162 5 20	2	168	S	10	1 4 2	164 6 45	34
		7	0 44 33	4 50	1	169	S	10	1 5 2	163 38 45	34
112	S	10	0 44 39	164 24 2	6	170	S	10	1 5 2	162 57 45	34
113	N	III.	0 45 13	164 4 37	✓	171	S	7'	1 5 3	163 51 45	34
114	S	10	0 45 17	164 57 2	6			8	4	52 16	✓
115	S	9'	0 45 17	162 47 20	2	172	S	9'	1 6 2	163 56 45	34
116	S	10	0 45 18	163 36 28	4	173	S	10	1 6 9	164 5 45	34
117	Cl	VI.	0 45 30	164 16 22	✓	174	S	9	1 6 12	163 4 42	2
118	S	9'	0 45 46	162 42 50	2			9'	12	5 45	34
119	N	II.	0 46 12	164 18 17	✓			9	14	5 45	34
120	N	III.	0 47 12	164 18 46	✓	175	S	10	1 6 45	163 10 45	34
121	N	II.	0 47 19	163 7 10	✓	176	S	10	1 7 1	163 22 45	34
			29	7 20	2	177	S	10	1 7 47	162 31 45	34
122	S	10	0 47 44	163 4 50	2			9'	52	31 42	2
123	S	7	0 47 55	164 47 35	..	178	S	9	1 7 57	162 33 45	34
124	S	10	0 48 8	162 51 20	2	179	S	10	1 7 59	162 29 45	34
125	N	III.	0 48 12	163 9 48	✓	180	S	10	1 8 27	163 22 45	34
126	S	10	0 48 21	162 48 20	2	181	S	9'	1 8 45	162 36 42	2
			22	20	2			9'	53	35 45	34
127	S	10	0 48 54	163 3 20	2	182	N	II.	1 9 0	164 11 40	✓
128	S	6	0 49 12	165 13 43	..	183	S	10	1 9 21	164 6 45	34
129	S	9'	0 50 23	164 2 58	4	184	S	9'	1 9 41	163 38 45	34
130	N	I.	0 50 24	163 23 58	4	185	N	..	1 9 44	162 28 12	2
			25	23 21	✓			II.	47	26 46	✓
131	S	7'	0 50 35	164 44 59	✓	186	N	..	1 9 59	164 12 14	✓
132	S	10	0 50 59	163 54 58	4	187	S	10	1 10 2	164 10 45	34
133	S	8'	0 51 7	163 59 28	4	188	N	II.	1 10 53	164 14 8	✓
134	S	10	0 52 10	162 11 20	2	189	S	10	1 12 45	162 30 12	2
135	N	III.	0 52 16	165 22 12	✓			10	12 52	162 27 45	34
136	S	7	0 52 30	163 59 14	..	190	S	10	1 13 0	162 50 45	34
137	N	..	0 53 15	163 5 12	2	191	S	8'	1 13 11	164 11 45	34
	Cl	VI.	16	6 28	4	192	S	9	1 13 37	163 36 45	34
138	S	10	0 53 20	162 33 42	4	193	S	8'	1 13 53	162 0 42	2
139	S	8	0 55 14	163 36 28	4			8	59	0 15	34
		7	14	37 3	✓	194	S	..	1 14 0	164 15 ..	✓
140	S	8	0 55 44	162 28 42	2	195	S	10	1 14 47	164 5 45	34
			54	27 28	✓	196	S	9'	1 14 56	162 41 12	2
141	S	10	0 56 12	163 7 48	4			9	58	40 45	34
142	N	III.	0 56 48	162 32 15	✓	197	S	9'	1 14 38	162 44 12	2
143	S	9'	0 57 20	162 59 42	2			9	63	43 45	34
	⊕	I.	9	60 18	✓	198	S	10	1 15 11	163 26 45	34
144	S	10	0 57 27	161 45 41	✓	199	S	10	1 15 18	163 22 45	34
145	S	9	0 57 28	163 27 28	4	200	S	8	1 15 40	163 37 45	34
146	S	9	0 57 47	163 15 48	4			8	42	38 36	✓
147	S	9	0 57 56	162 57 42	2	201	S	9	1 15 53	163 34 45	34
	Cl	VI.	57	58 9	✓	202	S	9	1 16 40	162 39 57	33
148	S	II.	0 58 30	163 44 4	✓	203	S	8'	1 16 40	163 55 57	33
			30	44 28	4	204	S	10	1 16 47	163 10 45	34
149	S	10	0 58 30	163 40 28	4	205	S	10	1 16 47	163 5 45	34
150	S	9	0 58 47	163 10 12	2	206	S	9'	1 16 48	163 52 57	33
151	S	10	0 59 12	162 23 12	2	207	S	10	1 16 49	163 8 45	34
152	S	10	0 59 16	162 47 12	2	208	S	9	1 16 51	162 38 42	2
153	S	8	0 59 34	162 38 42	2	209	S	9'	1 17 0	163 26 57	33
		7	35	38 58	✓	210	S	9'	1 17 24	162 28 57	33
154	N	III.	0 59 48	162 54 18	✓	211	S	10	1 18 2	163 21 57	33
155	S	7	0 59 57	163 27 35	✓	212	S	10	1 18 4	162 20 57	33
156	S	9'	1 0 57	162 12 42	2	213	S	10	1 18 5	162 6 57	33
157	N	III.	1 2 29	162 40 11	✓	214	S	10	1 18 17	162 26 57	33
158	N	II.	1 2 43	163 16 1	✓	215	S	9'	1 18 47	163 19 27	33

No. for Reference.	Obj.	Mag.	R.A. 1830.0. h. m. s.	N.P.D. 1830.0. ° ' "	Zone.	No. for Reference.	Obj.	Mag.	R.A. 1830.0. h. m. s.	N.P.D. 1830.0. ° ' "	Zone.
216	S	9	1 19 12	162 53 57	33	227	S	9	1 24 5	164 9 57	33
		9'		53 42	2			9'		9 27	33
217	S	9	1 19 26	162 23 57	33	228	S	8	1 24 30	162 48 57	33
		9		24 42	2			9		48 57	33
218	S	8	1 19 31	163 12 57	33	229	S	9	1 25 13	163 4 57	33
		8		12 37	f	230	S	10	1 25 37	163 50 57	33
219	S	9	1 19 31	162 23 57	33	231	S	9	1 25 39	163 52 57	33
		9		24 42	2	232	N	1	1 25 45	164 25 56	f
220	S	10	1 19 49	162 46 57	33	233	S	8	1 26 36	164 1 57	33
221	S	9	1 20 39	162 56 42	2	234	S	10	1 26 40	163 56 57	33
		8		56 57	33	235	S	10	1 26 57	163 54 27	33
		8		56 18	f	236	S	10	1 27 30	163 38 57	33
222	S	10	1 20 50	163 21 27	33	237	S	9	1 27 54	162 18 57	33
223	S	9'	1 21 18	162 5 57	33	238	S	9'	1 28 55	162 45 57	33
		9'		5 57	33	239	S	9'	1 30 54	163 10 27	33
224	S	10	1 21 57	163 38 57	33	240	S	9	1 31 44	163 12 57	33
		9		38 8	f	241	S	9	1 32 3	163 36 57	33
225	S	8	1 23 5	162 34 12	2	242	S	9	1 32 17	163 41 57	33
		8		35 22	f	243	S	10	1 35 3	161 33 57	33
226	S	7	1 23 15	163 38 27	33	244	S	9'	1 35 37	164 0 57	33

NOTES ON THE FOREGOING CATALOGUE.

No.

Note.

- 6 is B. 6.
 29 B. 28. Not observed by me. I presume it to be B. 29, with 5' error in P.D.
 30 B. 29.
 34 B. 36 = B. 37.
 35 The D * in 47 Touc.
 36 B. 38 = 47 Touc.
 37 The preceding of two.
 38 B. 41.
 39 The following of two.
 40 B. 42.
 44 B. 48.
 45 B. 50. 5' error in P.D. in the Brisbane catal.
 51 B. 60.
 54 B. 66.
 57 B. 73.
 59 B. 74.
 61 B. 75 = B. 76.
 65 Has a star 10 m south about 2' distant.
 67 B. 80. Has a star 10 m 75° s.p. distant about 5'.
 70 B. 83. Not observed by me. Is most probably B. 80, with 1" error in R.A. and 10' in N.P.D.
 72 B. 88 = B. 90. 1" error in R.A. in B, or in my obs.
 73 B. 85. Place from B. Seen by me in zone 6, but place not taken, for some reason not apparent.
 81 B. 91.
 84 B. 98.
 86 B. 101.
 87 B. 102.
 90 B. 104. The R.A. in the Brisbane cat has 39".
 97 B. 105.
 105 B. 111.
 106 B. 110.
 110 The preceding of 2.
 111 B. 112.
 112 The following of 2.
 117 The middle of the great resolved cluster of the Nubecula Minor.
 123 B. 120. Not observed by me.
 128 B. 123. Not observed in the zones, being beyond their limit; but is the most conspicuous star (5.6 m) to the naked eye close to the Nubecula.

No.

Note.

- 130 B. 124. The zone observed gives 49" R.A. but 4 coinciding observations in sweeps make it 50.
 131 B. 126. Not observed by me.
 136 B. 129. Do. But I presume this to be identical with No. 133; with 1" error of R.A. in the Brisbane catal.
 137 B. 131.
 139 B. 139.
 140 B. 140.
 143 B. 143. 5' error in the P.D. of the Brisbane catal.
 144 B. 142.
 150 B. 146.
 153 B. 148.
 155 B. 150 = 151. Not observed by me. There is certainly no such double star in this place.
 161 B. 164.
 164 B. 161?
 171 B. 169.
 172 B. 170.
 178 The minute of R.A. should perhaps be 6.
 179 Do.
 189 No doubt the same star, with a mis-reading in P.D. in one or other observation.
 192 B. 184.
 193 B. 185.
 194 The Nubecula Minor terminates at this place, as observed in the 20-foot. One minute further in R.A. it is completely past.
 196 B. 189.
 197 B. 191.
 200 B. 194.
 202 B. 198.
 203 B. 200.
 208 B. 198.
 217 B. 206.
 218 B. 207.
 219 On parallel of B. 206.
 224 B. 211.
 225 B. 215.
 230 The preceding of 2.
 231 The following.
 234 The preceding of 2.
 235 The following of 2.

STARS, NEBULÆ, AND CLUSTERS, IN THE NUBECULA MAJOR.

No. for Reference.	Obj.	Mag.	R.A. 1830.0. h. m. s.	N.P.D. 1830.0. ° ' "	Zone.	No. for Reference.	Obj.	Mag.	R.A. 1830.0. h. m. s.	N.P.D. 1830.0. ° ' "	Zone.
1	S	9	4 41 7	156 12 54	12	50	S	9	4 47 58	156 45 54	13
2	S	8	4 41 20	157 12 55	51	51	S	8	4 48 27	161 24 55	16
3	..	7	4 41 21	13 15	32	52	N	8	4 48 33	159 38 20	5
4	S	8	4 41 58	161 48 25	16	53	S	9	4 48 35	159 4 7	5
5	..	8	4 42 2	158 55 16	5	54	S	10	4 48 37	4 16 3	32
6	N	8	4 42 5	55 53	5	55	S	10	4 48 39	157 5 15	32
7	S	8	4 42 13	156 7 25	5	56	S	10	4 48 41	159 40 10	32
8	S	8	4 42 36	156 50 36	5	57	S	10	4 48 41	157 3 15	32
9	S	8	4 42 43	49 54	13	58	S	9	4 48 45	157 8 45	32
10	S	10	4 42 42	157 43 15	32	59	S	10	4 48 50	156 51 54	13
11	S	10	4 42 43	160 31 13	15	60	S	10	4 48 51	158 30 31	3
12	S	10	4 42 46	160 30 43	15	61	S	10	4 49 2	160 25 13	15
13	S	10	4 43 4	158 2 15	32	62	S	10	4 49 4	157 7 15	32
14	S	9	4 43 6	158 0 45	32	63	N	10	4 49 8	158 0 27	32
15	S	9	4 43 5	160 16 45	15	64	N	10	4 49 13	0 15	32
16	S	9	4 43 12	156 40 24	13	65	N	10	4 49 18	158 50 35	3
17	..	7	4 43 13	157 3 3	32	66	N	10	4 49 21	156 13 24	13
18	S	10	4 43 22	4 15	32	67	S	10	4 49 51	159 23 46	3
19	S	9	4 43 28	159 24 16	3	68	S	10	4 50 21	160 32 13	15
20	N	9	4 43 47	157 6 45	32	69	S	10	4 50 31	159 59 16	3
21	N	9	4 43 47	160 7 20	32	70	N	10	4 50 31	161 17 25	16
22	N	9	4 44 1	160 50 1	32	71	N	10	4 50 40	160 8 32	3
23	N	9	4 44 26	159 7 48	32	72	N	10	4 50 56	160 3 16	3
24	N	9	4 44 27	161 47 55	16	73	N	10	4 51 5	2 14	3
25	N	9	4 44 43	161 13 55	16	74	N	10	4 51 5	159 57 16	3
26	S	9	4 44 43	14 35	5	75	N	10	4 51 41	158 20 46	3
27	S	10	4 45 3	158 25 44	5	76	N	10	4 51 44	21 32	5
28	S	10	4 45 9	160 56 13	15	77	N	10	4 51 52	160 14 43	15
29	S	10	4 45 20	158 19 43	32	78	N	10	4 51 59	157 15 57	3
30	S	10	4 45 29	20 12	5	79	N	10	4 52 1	157 10 44	3
31	S	10	4 45 22	157 53 15	32	80	N	10	4 52 20	157 19 38	3
32	S	10	4 45 23	156 22 40	32	81	N	10	4 52 41	158 21 41	3
33	S	10	4 45 25	22 24	13	82	N	10	4 52 53	159 40 6	3
34	S	10	4 45 35	156 48 54	5	83	N	10	4 53 12	159 37 1	3
35	S	10	4 45 44	160 40 43	15	84	N	10	4 53 14	156 56 41	3
36	S	10	4 45 57	157 41 15	32	85	N	10	4 53 15	24 13	32
37	S	10	4 46 9	157 35 15	32	86	N	10	4 53 18	57 15	32
38	S	10	4 46 18	157 55 15	32	87	N	10	4 53 21	157 11 29	3
39	S	10	4 46 32	156 17 41	32	88	N	10	4 53 25	159 41 5	3
40	S	10	4 46 35	160 56 54	13	89	N	10	4 53 26	40 16	3
41	S	10	4 46 34	156 56 43	15	90	N	10	4 53 27	40 15	9
42	S	10	4 46 39	158 0 15	32	91	N	10	4 53 31	160 20 13	15
43	S	10	4 46 47	156 7 24	13	92	N	10	4 53 47	156 56 36	3
44	S	10	4 46 56	156 25 24	13	93	N	10	4 53 50	158 55 15	3
45	S	10	4 47 4	24 36	5	94	N	10	4 54 8	160 40 43	15
46	S	10	4 47 57	157 25 15	32	95	N	10	4 54 16	159 2 8	3
47	S	10	4 47 4	159 3 16	3	96	N	10	4 54 18	157 21 47	3
48	S	10	4 47 6	161 15 55	16	97	N	10	4 54 23	158 20 13	15
49	S	10	4 47 8	158 50 47	5	98	N	10	4 54 34	158 38 28	5
50	S	10	4 47 13	51 39	5	99	N	10	4 54 42	159 27 1	16
51	S	10	4 47 10	156 25 ..	32	100	N	10	4 54 55	161 49 55	3
52	S	10	4 47 17	157 49 15	32	101	N	10	4 55 10	159 25 16	3
53	S	10	4 47 19	157 27 15	32	102	N	10	4 55 18	28 7	9
54	S	10	4 47 20	27 44	93	103	N	10	4 55 18	159 26 16	3
55	S	10	4 47 21	160 26 43	15	104	N	10	4 55 18	26 ..	3
56	S	10	4 47 24	157 30 15	32	105	N	10	4 55 18	26 ..	3
57	S	10	4 47 24	156 30 44	5	106	N	10	4 55 18	26 ..	3
58	S	10	4 47 24	156 28 6	13	107	N	10	4 55 18	26 ..	3
59	S	10	4 47 28	26 54	13	108	N	10	4 55 18	26 ..	3
60	S	10	4 47 38	157 33 15	32	109	N	10	4 55 18	26 ..	3
61	S	10	4 47 40	32 39	32	110	N	10	4 55 18	26 ..	3
62	S	10	4 47 56	157 27 45	32	111	N	10	4 55 18	26 ..	3
63	S	10	4 48 61	27 48	32	112	N	10	4 55 18	26 ..	3

No. for Reference.	Obj.	Mag.	R.A. 1830.0. h. m. s.	N.P.D. 1830.0. ° ' "	Zone.	No. for Reference.	Obj.	Mag.	R.A. 1830.0. h. m. s.	N.P.D. 1830.0. ° ' "	Zone.
99	Cl	VI.	4 55 13	157 26 20	✓	164	N	N	5 1 57	156 21 54	13
100	N	III.	4 55 21	158 27 14	✓		N	I.	5 1 58	20 35	✓
101	N	II.	4 55 24	159 27 54	✓	165	N	8	5 1 57	158 16 18	✓
102	N	9	4 55 29	159 46 15	✓		N	9	5 1 64	16 16	5
103	N	III.	4 55 33	160 4 47	✓	166	N	II.	5 2 2	159 19 27	✓
104	N	10	4 55 40	160 38 43	✓	167	N	9	5 2 13	156 55 54	13
105	N	I.	4 55 41	158 28 29	✓	168	N	9	5 2 14	160 55 43	15
	N		4 55 44	29 7	✓	169	N	8	5 2 19	160 52 43	15
106	N	III.	4 55 48	159 30 9	✓		N	8	5 2 29	51 40	✓
107	N	II.	4 55 52	160 17 13	✓	170	N	II.	5 2 36	158 13 47	✓
108	N	10	4 55 54	160 42 37	✓	171	N	9'	5 2 40	159 13 15	9
109	N	10	4 56 6	156 52 54	✓	172	N	9'	5 2 43	159 44 15	✓
110	N	9	4 56 13	156 46 38	✓		N	7'	5 3 0	43 40	✓
111	Cl	VI.	4 56 16	156 43 50	✓	173	N	9	5 3 0	158 5 33	12
112	N		4 56 25	156 40 54	✓		N	8	5 3 1	4 42	✓
	N		29	39 58	✓	174	N	9	5 3 5	157 8 33	12
113	N	III.	4 56 42	158 36 23	✓	175	N	10	5 3 6	160 54 43	15
114	N	10	4 56 45	157 57 23	✓	176	N	8	5 3 6	159 6 14	5
115	N	10	4 56 46	160 12 43	✓	177	N	9'	5 3 6	160 16 43	15
116	N	9	4 56 49	160 17 13	✓	178	N	III.	5 3 6	156 36 43	✓
117	N	9	4 56 57	160 29 13	✓	179	N	II.	5 3 18	159 51 40	✓
118	N	9	4 57 0	160 34 43	✓	180	N	10	5 3 21	156 51 54	13
119	N	9	4 57 11	161 59 55	✓	181	N	9'	5 3 24	159 27 45	9
120	N	9'	4 57 25	159 5 15	✓	182	N	9	5 3 45	158 45 11	✓
121	N	I.	4 57 27	156 42 38	✓	183	N	III.	5 3 57	157 32 7	✓
	N	29	42 54	13	✓	184	N	5	5 3 58	156 39 54	13
122	N	II.	4 57 28	158 30 47	✓		N	I.	5 4 0	157 39 29	✓
123	N		4 57 31	159 39 15	✓	185	N	III.	5 4 0	155 59 24	13
124	N	10	4 57 31	160 29 0	✓	186	N	9'	5 4 12	160 33 10	✓
125	S	10	4 57 34	156 22 54	✓	187	N	III.	5 4 15	160 51 10	✓
126	N	9	4 57 43	161 33 55	✓	188	N	II.	5 4 21	161 34 25	16
127	N	CC	4 57 47	156 36 41	✓	189	N	10	5 4 24	157 29 15	✓
128	N	CC	4 57 51	158 40 24	✓	190	N	VI.	5 4 45	156 26 10	✓
	N	53	40 21	✓	191	N	III.	5 4 54	160 40 43	15	
129	N	9'	4 57 53	156 29 54	✓	192	N	9'	5 4 56	161 32 46	✓
130	N	II.	4 58 0	159 50 15	✓		N	5	5 5	32 55	16
	N	I.	4 58 1	48 44	✓	194	N	10	5 5 1	156 36 54	13
131	N	9	4 58 12	157 29 47	✓	195	N	7'	5 5 1	162 5 55	16
132	N	9	4 58 18	159 6 45	✓	196	N	III.	5 5 7	156 27 20	✓
133	N	10'	4 58 20	156 40 41	✓	197	N	II.	5 5 10	160 34 17	✓
134	S	9	4 58 22	159 54 15	✓	198	N	9	5 5 10	159 59 15	9
135	S	8	4 58 24	161 3 43	✓		N	10	5 5 10	59 13	15
	S	28	2 25	16	✓	199	N	5	5 5 12	159 10 15	✓
136	S	9'	4 58 34	156 26 54	✓	200	N	II.	5 5 28	158 16 37	✓
137	N	9	4 58 35	159 14 15	✓	201	N	5	5 29	159 36 43	✓
138	N	III.	4 58 36	160 41 7	✓	202	N	7'	5 5 36	158 19 10	✓
139	N	I.	4 58 39	156 14 16	✓		N	8	5 5 39	18 27	✓
140	S	9'	4 58 39	156 58 24	✓	203	N	8	5 5 40	159 8 15	9
141	S	10	4 58 42	157 19 33	✓		N	10	5 5 44	8 5	✓
142	S	6'	4 58 48	161 9 55	✓	204	N	5	5 5 45	161 37 55	16
143	S	10'	4 58 49	159 55 15	✓	205	N	II.	5 5 46	159 34 7	✓
144	N	I.	4 58 55	159 38 56	✓	206	N	9'	5 5 51	160 53 43	15
	N	59	39 15	9	✓	207	N	8	5 5 55	159 24 45	9
	N	59	38 15	9	✓	208	N	9	5 5 59	156 11 24	13
145	S	10	4 59 5	161 51 55	✓	209	N	5	5 6 7	159 56 15	9
146	S	9	4 59 21	159 19 15	✓	210	N	5	5 6 14	159 39 15	✓
147	N	9	4 59 21	159 6 15	✓		N	I.	5 6 16	37 35	✓
148	N	I.	4 59 24	157 59 40	✓	211	N	III.	5 6 15	159 26 17	✓
149	S	8'	4 59 38	160 24 13	✓	212	N	5	5 6 17	160 57 27	✓
150	S	9	4 59 47	156 5 15	✓	213	N	9'	5 6 20	160 48 43	15
151	S	10	5 0 2	156 34 54	✓	214	N	5	5 6 21	158 51 1	✓
152	S	9	5 0 20	156 34 54	✓	215	N	9	5 6 28	158 7 35	✓
153	S	8	5 0 36	158 49 19	✓	216	N	5	5 6 36	160 56 43	15
154	N	III.	5 0 36	160 24 25	✓		N	8	5 6 43	158 37 4	✓
155	N	II.	5 0 49	159 47 57	✓	217	N	5	5 6 38	158 37 4	✓
156	N	9	5 1 1	159 8 15	✓		C	10	5 6 43	160 25 43	15
157	N	II.	5 1 13	160 2 12	✓	218	N	5	5 6 43	160 32 43	15
158	N	9'	5 1 25	157 40 33	✓	219	N	5	5 6 43	160 56 16	✓
159	N	8'	5 1 33	159 35 15	✓	220	C	VI.	5 6 47	158 50 57	✓
160	S	10	5 1 34	161 6 25	✓	221	N	II.	5 7 6	160 6 43	15
161	N	10	5 1 44	160 42 13	✓	222	N	10	5 7 6	161 58 28	✓
162	N	II.	5 1 47	159 51 0	✓	223	N	II.	5 7 13		✓
163	S	10	5 1 53	160 42 13	✓						

No. for Reference.	Obj.	Mag.	R. A. 1830.0. h. m. s.	N P D. 1830.0. ° ' "	Zone.	No. for Reference.	Obj.	Mag.	R. A. 1830.0. h. m. s.	N P D. 1830.0. ° ' "	Zone.	
224	N	III.	5 7 23	157 29 33	f	6		56		22 33	12	
225	N	II.	5 7 39	157 32 13	f	5		59		22 55	21	
226	S	10	5 7 43	161 32 55	16	5		59		23 39	17	
227	S	8	5 7 46	160 54 43	15	5		65		23 13	15	
		8		54 9	17	275	S	5	13 49	157 46 3	12	
228	S	10	5 7 46	160 15 43	15	276	C	5	14 1	157 34 7	f	
229	N	II.	5 7 48	157 40 14	f	277	S	5	14 5	158 12 49	5	
230	S	8	5 7 56	159 22 15	9	278	C	5	14 9	157 38 46	f	
231	S	9	5 7 56	160 43 43	15	279	N	I.	5	14 11	159 17 30	f
		9		48 55	17	280	C	5	14 11	157 31 23	f	
	Cl	9		68	15	281	C	5	14 14	159 31 15	f	
232	S	10	5 8 1	161 18 55	16		N	II.			10	
233	N	I.	5 8 7	159 11 10	f	282	N	II.	5	14 25	159 33 55	f
234	S	9	5 8 10	160 19 39	17	283	N	I.	5	14 29	159 33 1	f
		9		13	15	284	N	III.	5	14 32	159 34 1	—
235	C		5 8 29	161 24 8	f	285	S	9	14 45	159 11 15	9	
236	S	9	5 8 52	156 24 54	13	286	N	III.	5	14 46	160 39 52	f
237	S	10	5 8 55	157 23 3	12	287	S	9	14 49	159 45 15	9	
238	S	9	5 9 3	158 41 31	5		..	9	56	43 18	10	
239	N	III.	5 9 18	156 30 56	f	288	S	5	14 52	159 32 15	9	
240	S	7	5 9 22	161 28 55	16	289	N	..	5	14 52	159 33 46	—
241	S	10	5 9 27	161 24 25	16	290	S	10	5 14 53	159 31 0	—	
242	N	I.	5 9 35	158 57 59	0		10	65	30 48	10		
		9		59	0	291	S	10	5 14 57	159 27 48	10	
243	S	10	5 9 38	161 20 55	16	292	S	10	5 14 59	159 43 38	10	
244	N	II.	5 9 40	157 59 10	f	293	S	10	5 15 2	161 18 25	16	
245	S	8	5 9 51	156 37 24	13	294	S	10	5 15 10	159 22 18	10	
	..	8		52	f	295	S	7	5 15 11	161 14 25	16	
246	N	I.	5 10 7	159 5 15	9	296	N	II.	5	15 13	156 18 51	f
		12		3	9	297	N	5	15 16	159 29 0	—	
247	N	5	10 16	159 2 25	5	298	S	10	5 15 20	159 44 18	10	
	Cl	18		2	9	299	S	10	5 15 33	159 43 43	10	
248	S	9	5 10 24	159 23 15	9	300	S	10	5 15 39	159 23 18	10	
249	N	I.	5 10 24	159 20 15	9	301	N	III.	5	15 42	156 20 41	f
		32		20	9	302	N	III.	5	15 52	156 30 11	f
250	S	7	5 10 42	159 55 39	17	303	S	10	5 15 53	156 44 54	13	
	..	8		45	9	304	S	10	5 15 57	159 22 38	10	
		8		50	9	305	S	9	5 15 58	160 8 9	17	
251	N	I.	5 10 46	159 6 15	9		N	II.	5	15 58	159 9 21	f
		47		5	9	306	N	5	16 6	159 2 15	9	
		55		6	9	307	S	9	16 6	159 0 18	10	
252	S	9	5 11 11	156 53 54	13		..	9	22	0		
253	S	9	5 11 27	160 46 9	17	308	S	9	5 16 10	157 14 27	5	
254	N	II.	5 11 31	158 57 45	f	309	S	9	5 16 10	159 49 18	10	
255	S	8	5 11 32	159 30 15	9	310	S	8	5 16 17	160 46 9	17	
256	S	9	5 11 47	160 40 9	17	311	S	9	5 16 32	160 27 39	17	
257	S	10	5 11 50	160 23 9	17	312	S	8	5 16 45	161 41 55	16	
258	S	10	5 11 58	161 35 55	16	313	S	9	5 17 4	157 43 33	12	
259	N	III.	5 12 3	156 20 50	f	314	N	5	17 5	159 37 48	10	
260	N	III.	5 12 23	160 59 2	f		II.	10		38 35	f	
261	N	I.	5 12 28	158 55 27	f	315	N	II.	5	17 6	157 30 29	f
262	S	9	5 12 36	157 46 1	f	316	S	5	17 13	160 13 39	17	
263	S	8	5 12 43	159 44 17	f	317	S	9	17 17	159 29 18	10	
	..	8		44	9	318	S	9	17 21	158 21 45	5	
		8		49	10	319	S	10	17 34	158 19 39	5	
264	S	9	5 12 48	158 9 51	5	320	S	7	17 43	160 38 39	17	
265	S	II.	5 13 0	157 49 18	f	321	N	III.	5	17 47	157 37 11	f
266	S	10	5 13 1	156 24 54	13	322	S	10	5 17 47	159 2 48	10	
267	S	10	5 13 10	160 38 9	17	323	S	9	5 17 48	158 18 7	5	
268	S	9	5 13 15	157 54 33	12	324	S	10	5 17 49	159 57 18	10	
269	N	III.	5 13 16	158 57 40	f	325	S	9	5 17 52	159 13 18	10	
270	S	10	5 13 19	161 21 55	16	326	N	II.	5	18 4	158 2 57	f
271	S	9	5 13 21	160 34 39	17	327	N	II.	5	18 6	159 49 35	f
272	N	III.	5 13 25	156 29 6	f	328	S	9	5 18 8	158 39 5	5	
273	S	6	5 13 29	156 31 54	13		..	8	12	38 32	19	
274	S	5	5 13 44	157 23 3	12	329	S	10	5 18 14	159 56 18	10	
		5		48	22	330	N	I.	5	18 14	156 47 50	f
		5		49	23	331	N	9	5 18 17	159 45 18	10	
		5		50	22	332	C	7	5 18 17	158 45 56	f	
		5		55	23		S	8	25	46 34	5	
		5		55	22		S	8	33	46 2	19	
		5		55	22	333	S	10	5 18 32	156 58 54	13	

No. for Reference.	Obj.	Mag.	R. A. 1830.0. h. m. s.	N. P. D. 1830.0. ° ' "	Zone.	No. for Reference.	Obj.	Mag.	R. A. 1830.0. h. m. s.	N. P. D. 1830.0. ° ' "	Zone.
334	N	N	5 18 33	159 30 18	10	396	S	8'	5 22 45	158 13 32	19
335	S	I.	5 18 35	159 30 29	f	397	S	10	5 22 46	159 36 14	f
336	S	9	5 18 43	159 56 18	10	398	N	10	5 22 48	158 8 0	11
		10	5 18 47	158 31 2	5		N		50	8 2	19
		9	5 18 58	158 31 32	19	399	N	III.	5 22 50	158 3 27	—
337	S	10	5 18 48	158 41 32	19	400	N	9'	5 22 51	157 29 33	12
338	S	8	5 18 51	160 25 39	17	401	S	10	5 22 54	161 42 55	16
339	S	9	5 18 52	158 38 30	5	402	N	III.	5 22 54	166 32 10	f
		52	5 18 52	158 38 2	19	403	S	10'	5 22 57	158 1 32	19
340	S	10	5 19 10	160 0 18	10	404	N	II.	5 22 57	157 20 24	f
341	S	10	5 19 11	158 38 2	19	405	N	II.	5 23 2	160 6 17	f
342	S	10	5 19 14	161 6 55	16	406	S	10	5 23 3	156 34 35	14
343	N	II.	5 19 14	156 55 51	f	407	S	7'	5 23 13	160 1 19	25
344	S	VII.	5 19 17	156 9 54	13	408	S	10	5 23 22	160 6 58	18
345	CI	9	5 19 23	159 23 18	f	409	S	10	5 23 38	159 55 44	11
	N	9	5 19 31	158 23 18	10	410	S	9'	5 23 41	160 43 28	11
346	S	10	5 19 33	159 23 18	10	411	S	8'	5 23 41	158 13 32	19
347	S	10	5 19 23	158 12 32	19	412	S	10	5 23 43	158 2 32	19
348	S	10	5 19 31	159 20 18	10	413	S	9'	5 23 46	158 59 2	14
349	S	9	5 19 34	159 25 18	10	414	S	10	5 23 46	156 32 5	19
350	N	III.	5 19 37	156 58 8	f	415	N	II.	5 24 12	166 18 24	f
351	S	9'	5 19 38	158 43 32	19	416	S	10'	5 24 15	160 23 18	18
352	S	8'	5 19 41	156 36 54	13	417	N	III.	5 24 47	156 36 16	f
	..	8'	5 19 42	156 36 5	14	418	S	7	5 24 51	161 39 55	16
353	S	7'	5 19 42	156 13 54	13	419	S	10	5 24 52	156 59 35	14
	..	9	5 19 42	156 13 54	13	420	S	9'	5 24 59	159 38 44	11
354	S	9	5 19 43	156 25 24	13	421	N	II.	5 25 7	156 32 1	f
355	S	10	5 19 43	156 25 24	13	422	S	9	5 25 11	158 1 33	12
356	N	9	5 19 48	159 43 18	10		..	8	14	2 32	19
357	N	I.	5 19 49	158 2 2	19	423	S	8	5 25 16	156 24 35	14
358	N	9'	5 19 53	159 34 33	f		CI		39	24 36	19
	N	55	5 19 55	158 35 18	10	424	S	10	5 25 23	160 15 58	18
359	S	9'	5 19 51	156 46 54	13	425	S	10'	5 25 33	158 43 32	19
360	S	8	5 19 57	158 44 32	19	426	S	10	5 25 37	158 8 32	19
361	S	9	5 19 57	161 42 25	16	427	S	10	5 25 47	161 13 55	16
362	S	10	5 19 58	158 35 32	19	428	S	10	5 25 51	157 37 33	12
363	N	III.	5 20 1	161 25 29	f	429	N	II.	5 25 56	158 27 33	f
364	S	9'	5 20 1	158 55 32	19	430	N	8	5 26 0	156 35 5	14
365	N	III.	5 20 5	159 10 0	f	431	N	I.	5 26 4	159 44 0	f
366	S	10	5 20 10	158 3 2	19		N		8	45 5	14
367	C	VI.	5 20 16	157 2 41	f	432	N	I.	5 26 7	160 2 53	f
368	S	10	5 20 18	157 18 3	12	433	S	10	5 26 23	159 23 44	11
369	N	10	5 20 25	159 48 18	10	434	S	10	5 26 24	157 40 33	12
370	S	10	5 20 33	159 48 18	10	435	N	II.	5 26 28	158 58 31	f
371	N	II.	5 20 33	156 56 28	f	436	N	CI	5 26 30	157 37 33	12
372	S	10	5 20 36	158 7 32	19		S	10	5 26 35	158 30 5	f
373	N	III.	5 20 50	159 56 52	f	437	S	10	5 26 34	161 17 55	16
374	N	III.	5 21 7	159 38 18	10	438	S	10	5 26 47	159 29 44	11
375	N	VIII.	5 21 19	156 1 58	f	439	S	10	5 26 50	159 31 44	11
376	S	8	5 21 27	159 11 18	10	440	S	9'	5 26 51	159 45 14	11
377	S	11	5 21 33	158 8 2	19		9	64	45 33	20	19
378	S	11	5 21 35	159 38 18	10	441	S	10	5 26 55	157 57 33	12
379	S	9	5 21 51	158 31 32	19	442	N	II.	5 27 3	159 58 50	f
380	N	II.	5 21 55	159 41 32	f		N		5	58 44	11
381	S	11	5 21 57	159 38 18	10	443	S	10'	5 27 7	159 12 44	11
382	S	9'	5 21 58	159 25 18	10	444	S	10'	5 27 11	159 12 44	11
383	S	8'	5 22 2	160 54 39	17		S	10	18	13 33	20
	..	8'	5 22 11	53 58	18	445	N	III.	5 27 7	160 4 19	f
384	N	9'	5 22 8	158 5 13	16	446	N	III.	5 27 10	158 58 34	f
385	N	II.	5 22 13	161 55 55	16	447	S	10	5 27 13	158 14 32	19
386	N	II.	5 22 13	156 18 7	16	448	N	III.	5 27 27	158 56 52	f
387	N	I.	5 22 16	159 38 40	16	449	N	II.	5 27 36	158 57 3	f
388	S	8	5 22 27	161 7 25	16	450	S	10	5 27 41	158 58 32	19
389	N	10	5 22 27	158 4 31	—		CI	*	47	57 34	f
390	..	10	5 22 27	159 37 48	10	451	N	CI	5 27 43	157 34 33	12
	..	10	5 22 28	36 44	11		N		48	35 34	f
	..	10	5 22 28	161 37 55	16	452	N	6	5 27 45	158 58 ..	19
391	S	II.	5 22 31	158 6 58	f	453	N	6	5 27 46	158 45 34	19
392	N	10	5 22 40	159 37 44	11		..	54	54	45 19	f
393	S	10	5 22 40	159 35 44	11		..	54	54	45 33	20
394	S	9'	5 22 41	158 46 32	19	454	S	10	5 27 49	159 35 33	20
395	S	9'	5 22 41	158 46 32	19	455	S	11	5 27 49	158 58 42	19

No. for Refer- ence.	Obj.	Mag.	R. A. 1830.0. h. m. s.	N P D. 1830.0. ° ' "	Zone.	No. for Refer- ence.	Obj.	Mag.	R. A. 1830.0. h. m. s.	N P D. 1830.0. ° ' "	Zone.
456	N		5 27 50	159 13 44	11	505	N		5 31 26	157 4 25	22
457	N		61	13 33	20		C		5 31 28	5 23	23
458	N	III.	5 27 57	158 37 32	19	506	N		5 31 30	4 3	12
459	S	9	5 28 7	159 59 4	12	507	S	9'	5 31 31	160 23 28	18
		9	13	43 33	12		—	9	5 31 35	159 54 33	20
		8'	17	42 25	22	508	S	9	5 31 37	160 5 58	18
460	N		5 28 9	159 58 44	11	509	S	8'	5 31 39	159 52 33	20
	N		16	58 44	11	510	S	8'	5 31 39	156 48 5	14
	N	II.	18	59 49	16	511	S	9'	5 31 44	158 13 52	19
461	S	9'	5 28 11	161 6 25	16	512	S	10	5 31 45	159 27 33	20
462	S	9'	5 28 12	156 40 5	14	513	S	10'	5 31 49	159 13 43	20
463	N	III.	5 28 19	159 58 59	18	514	S	9'	5 31 55	156 28 5	14
464	S	8	5 28 19	160 12 28	18	515	S	9	5 32 0	159 10 33	20
	..	8'	24	11 55	7		—	10'	5 32 0	10 33	20
465	S	8	5 28 21	158 11 32	19	516	S	10	5 32 5	157 34 25	22
466	N		5 28 32	156 21 35	14	517	S	10	5 32 6	156 0 35	14
	N	I.	33	21 41	20	518	S	10	5 32 9	159 40 33	20
467	S	10'	5 28 42	159 34 33	14		N	10	5 32 11	159 16 33	20
468	N		5 28 44	159 16 44	11	519	N	II.	12	18 7	7
	C		50	15 33	20		N	9	5 32 12	160 18 28	18
469	C		52	15 35	20	520	S	9	5 32 12	157 55 33	22
	C		5 28 45	159 7 44	11	521	S	9	5 32 24	55 25	22
470	S	10	5 28 47	157 39 33	12		S	8'	5 32 24	160 56 8	18
		8'	53	60 32	19	522	S	8'	5 32 25	55 55	22
471	S	9	5 28 47	160 52 28	18		N	II.	5 32 39	160 57 12	16
472	S	10	5 28 55	159 20 44	11	523	N	9'	5 32 45	157 11 25	22
473	S	8	5 29 7	156 48 35	14	524	S	9'	5 32 49	11 25	22
474	S	8	5 29 13	156 45 5	14		N	I.	5 32 45	157 38 13	21
475	N	I.	5 29 15	160 6 19	19	525	N	10	5 32 47	158 38 29	21
476	N		5 29 17	157 33 42	19	526	S	9	5 32 48	156 29 5	14
477	S	7	5 29 20	156 33 56	14	527	S	9	5 32 52	157 47 25	22
	..	7'	23	33 5	14	528	S	9	5 33 2	48 36	16
478	N	II.	5 29 22	160 52 15	19	529	S	8	5 33 2	161 2 41	23
479	N	9'	5 29 24	158 10 2	19		C	7	5 33 3	3 25	16
480	N		5 29 27	159 16 44	11	530	CI	VII.	5 33 5	159 22 38	23
	C	VII.	34	16 22	20	531	S	10	5 33 10	161 32 11	23
481	S	10	5 29 29	160 39 20	18	532	S	10	5 33 11	161 20 11	23
482	S	10	5 29 30	159 2 44	11	533	N	II.	5 33 15	160 4 17	21
483	S	10	5 29 34	158 56 32	19	534	S	9'	5 33 15	159 16 33	20
484	S	9	5 29 34	160 5 14	11	535	N	5	5 33 33	160 16 28	18
485	S	10	5 29 37	156 9 5	14		N	I.	5 33 48	16 3	21
486	S	8'	5 29 50	161 20 55	16	536	N	II.	5 33 36	161 11 11	23
487	S	10	5 29 55	160 3 28	18		N	II.	41	11 30	7
488	CI		5 30 2	158 52 15	19	537	N	II.	5 33 37	157 49 26	22
489	N	II.	5 30 15	161 59 55	22	538	N	II.	5 33 42	157 36 25	22
490	S	9	5 30 26	157 51 25	12		N	II.	53	34 7	7
	—	9	30	50 33	12	539	S	9	5 33 43	159 20 33	20
491	S	9'	5 30 26	156 42 35	14	540	S	10'	5 33 58	158 22 29	18
492	N	I.	5 30 26	157 0 3	12	541	S	10	5 34 2	160 39 58	21
	N	27	29	0 31	14	542	S	9'	5 34 9	157 7 25	22
493	S	8	5 30 28	161 13 55	16	543	S	10	5 34 14	158 40 29	21
494	S	9	5 30 32	158 60 32	19		S	10	5 34 17	40 59	21
		9'	34	59 33	20	544	S	9'	5 34 26	157 26 55	22
495	S	9	5 30 39	158 22 32	19	545	S	8'	5 34 29	157 20 25	22
496	S	8	5 30 41	161 2 55	16	546	S	9	5 34 30	158 3 29	21
497	S	9	5 30 44	156 40 5	14	547	S	9	5 34 38	157 6 25	22
498	S	9'	5 30 47	158 3 32	19	548	S	10	5 34 44	160 47 28	18
499	N	II.	5 30 49	156 35 25	19	549	S	10	5 34 44	157 23 25	22
	N	54	35 35	14	550	S	10	5 34 49	157 4 25	22	
500	S	10	5 30 53	159 34 33	12	551	S	8'	5 34 50	157 0 25	22
501	N	I.	5 30 54	157 24 33	12		CI	VI.	5 34 56	157 14 25	22
	N	58	24 35	12	552	S	10	5 34 58	157 3 25	22	
502	N	9	5 31 11	158 13 32	19	553	S	10	5 35 6	157 27 25	22
	—	9	13 29	21	554	S	10'	5 35 10	158 6 29	21	
503	S	10	5 31 12	158 6 32	19	555	S	10	5 35 11	156 59 55	22
504	S	8	5 31 15	160 55 55	16	556	S	10	5 35 11	157 27 5	22
		19	56 28	18	557	S	10	5 35 15	158 20 9	21	
					558	S	10	5 35 17	157 7 25	22	

No. for Reference.	Obj.	Mag.	R. A. 1880.0. h. m. s.	N P D. 1880.0. ° ' "	Zone.	No. for Reference.	Obj.	Mag.	R. A. 1880.0. h. m. s.	N P D. 1880.0. ° ' "	Zone.
560	N	I.	5 35 17	161 48 30	∫	623	S	8	5 37 55	158 57 33	20
561	S	8'	5 35 20	157 34 25	22	—	10	5 37 59	161 40 11	23	21
562	S	10	5 35 24	159 53 33	20	624	S	7'	5 37 59	159 35 33	23
563	Cl	VI.	5 35 24	156 7 55	∫	625	S	10'	5 38 3	161 12 11	23
564	N	II.	5 35 25	157 39 48	∫	626	S	10'	5 38 3	157 31 6	∫
565	S	7'	5 35 27	158 20 29	21	627	N	II.	5 38 8	159 29 10	18
566	S	10'	5 35 27	159 20 33	20	628	C	VI.	5 38 9	159 53 10	21
567	S	10'	5 35 28	158 18 29	21	629	N	V.	5 38 20	160 23 28	21
568	N	III.	5 35 29	160 3 32	∫	630	S	10	5 38 20	158 48 29	21
569	S	10	5 35 39	160 34 58	18	631	S	10	5 38 21	160 49 48	18
570	S	10	5 35 42	160 21 58	18	632	S	10	5 38 26	161 6 20	∫
571	N	I.	5 35 45	157 40 51	∫	633	S	8'	5 38 26	159 30 57	18
572	N	46	5 35 51	158 51 29	21	634	S	10	5 38 27	160 15 28	∫
573	S	10	5 35 52	158 25 29	21	635	N	II.	5 38 27	159 30 57	18
574	Cl	VI.	5 35 54	156 59 46	∫	636	Cl	VI.	5 38 29	160 46 13	∫
575	N	55	5 35 55	161 5 41	22	637	N	II.	5 38 38	159 30 57	18
576	N	I.	5 35 58	157 41 24	∫	638	N	I.	43	15 21	∫
577	S	8	5 36 2	157 9 25	22	639	N	II.	41	160 46 13	∫
578	S	8	5 36 2	159 34 33	20	640	N	III.	44	160 21 38	∫
579	Cl	11	5 36 2	159 53 33	20	641	N	8'	5 38 48	160 13 24	∫
580	S	10'	5 36 4	157 45 25	21	642	S	5	5 38 48	157 16 25	22
581	S	9'	5 36 5	157 59 25	22	643	S	9	5 38 56	159 15 33	20
582	S	10	5 36 7	156 57 25	22	644	S	III.	5 38 56	158 30 59	21
583	S	III.	5 36 10	160 9 42	∫	645	S	5	5 38 59	156 57 46	∫
584	S	8'	5 36 11	156 24 5	14	646	S	10	5 39 4	158 50 29	21
585	S	10	5 36 13	157 9 55	22	647	S	11	5 39 14	159 12 3	20
586	S	10	5 36 16	156 46 35	14	648	N	N	5 39 25	158 55 29	21
587	S	10	5 36 16	157 49 25	22	649	S	I.	30	160 20 28	18
588	S	10	5 36 24	157 43 25	22	650	S	8	5 39 31	160 30 28	18
589	S	9'	5 36 26	160 35 8	18	651	S	9	5 39 34	30 19	25
590	S	8	5 36 26	158 37 29	21	652	S	7'	5 39 37	160 46 28	18
591	N	II.	5 36 33	157 40 5	∫	653	S	7'	5 39 37	160 2 58	18
592	S	8	5 36 34	160 16 7	∫	654	S	10	5 39 42	3 19	25
593	—	8	5 36 35	159 52 33	20	655	N	8	5 39 46	158 58 29	21
594	N	I.	5 36 38	157 5 25	22	656	N	V	5 39 46	157 6 25	22
595	S	10	5 36 38	159 47 3	20	657	N	V	5 39 50	159 5 37	∫
596	S	10'	5 36 43	157 35 25	22	658	S	10'	5 39 50	159 11 29	21
597	S	10	5 36 44	159 7 33	20	659	S	10'	5 40 5	10 53	30
598	S	10'	5 36 44	158 23 59	21	660	S	10'	5 40 6	11 12	∫
599	N	I.	5 36 45	160 39 25	∫	661	S	10	5 40 9	11 23	20
600	S	6	5 36 50	156 51 55	14	662	S	9'	5 40 11	11 33	24
601	—	6	5 36 54	156 39 35	14	663	S	10	5 40 18	160 01	27
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608	C	8'	5 37 21	159 18 33	20	670	S	10'	5 40 37	46 13	∫
609	S	9	5 37 22	160 35 28	18	671	S	10'	5 40 40	160 49 49	25
610	S	III.	5 37 30	159 51 3	23	672	S	10'	5 40 45	159 17 13	24
611	N	8	5 37 31	161 50 11	23	673	S	10'	5 40 51	161 45 11	23
612	S	10'	5 37 34	158 13 59	21	674	S	9	5 40 55	159 32 43	24
613	S	9	5 37 34	159 0 33	20	675	S	10'	5 40 57	161 22 11	23
614	S	10	5 37 39	159 0 29	21	676	S	9'	5 41 1	158 29 59	21
615	S	7	5 37 36	161 13 41	23	677	S	9'	5 41 5	158 49 29	21
616	S	11	5 37 37	159 28 33	20	678	S	III.	5 41 6	159 44 39	—
617	S	11	5 37 39	159 29 33	20	679	S	10	5 41 6	157 12 25	22
618	S	10	5 37 45	158 13 29	21	—	10	7	11 55	22	22
619	N	10'	5 37 46	160 17 15	∫						
620	S	III.	5 37 47	158 42 29	21						
621	N	9	5 37 53	158 50 59	21						
622	S										

No. for Reference.	Obj.	Mag.	R. A. 1830.0. h. m. s.	N. P. D. 1830.0. ° ' "	Zone.	No. for Reference.	Obj.	Mag.	R. A. 1830.0. h. m. s.	N. P. D. 1830.0. ° ' "	Zone.
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681	N		5 41 11	159 51 33	—	741	S	8	5 44 33	160 27 19	25
682	N		5 41 15	159 51 13	24	742	S	10	5 44 32	156 50 0	27
683	N	I.	5 41 12	159 44 13	24	743	S	9	5 44 37	160 5 19	25
684	N	9.	5 41 13	158 44 13	21	744	S	10	5 44 38	159 19 13	24
685	N	VI.	5 41 23	158 20 29	21	745	S	9	5 45 9	161 45 11	23
686	N		5 41 25	159 29 10	—	746	N	III.	5 45 11	159 14 40	23
687	N		5 41 28	159 49 14	—	747	N	II.	5 45 16	160 42 54	25
688	N	8	5 41 32	159 50 41	—	748	S	10	5 45 17	158 36 30	25
689	N		5 41 33	161 43 41	23	749	S	9	5 45 21	157 14 15	22
690	N		5 41 35	159 45 47	—	750	S	10	5 45 22	159 33 13	24
691	S	10	5 41 39	159 45 43	24	751	S	9	5 45 23	157 5 25	22
692	S	10	5 41 41	158 44 30	27	752	S	10	5 45 23	160 32 19	25
693	S	9	5 41 42	159 35 13	24	753	S	10	5 45 24	157 6 25	22
694	S	10	5 41 43	159 1 13	24	754	S	8	5 45 27	161 13 11	23
695	S	10	5 41 45	159 35 53	24	755	S	8	5 45 30	160 8 19	25
696	S	8	5 41 48	158 54 29	21	756	S	9	5 45 35	157 32 34	28
697	N	II.	5 41 49	158 32 32	—	757	S	9	5 45 35	160 2 19	25
698	N	III.	5 41 50	159 45 19	—	758	S	10	5 45 40	157 7 25	22
699	S	9	5 41 55	159 56 13	24	759	S	9	5 46 1	161 25 11	23
700	S	7	5 42 3	157 28 25	22	760	S	9	5 46 2	158 5 36	26
701	S	9	5 42 7	158 42	—	761	S	9	5 46 8	156 5 26	26
702	S	8	5 42 4	159 14 43	24	762	S	8	5 46 11	160 29 19	25
703	S	10	5 42 10	159 58 19	25	763	S	10	5 46 12	161 6 11	23
704	S	10	5 42 10	159 47 13	24	764	S	10	5 46 15	159 10 13	24
705	S	10	5 42 10	159 21 13	24	765	S	10	5 46 16	159 3 43	24
706	S	9	5 42 11	160 34 13	24	766	S	9	5 46 20	157 54 34	28
707	S	9	5 42 11	160 26 19	25	767	S	10	5 46 33	158 54 36	26
708	S	7	5 42 17	158 50 29	21	768	S	8	5 46 33	160 16 19	25
709	S	7	5 42 17	158 50 51	—	769	S	6	5 46 33	157 16 19	25
710	N	—	5 42 17	158 50 51	—	770	S	9	5 46 41	157 46	—
711	N	—	5 42 20	159 31 55	26	771	S	8	5 46 42	157 46	—
712	N	III.	5 42 22	158 26 25	—	772	N	III.	5 46 52	161 3 23	23
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714	N	III.	5 42 43	159 19 33	—	774	⊕	II.	5 46 57	159 50 20	—
715	S	10	5 42 48	159 40 13	24	775	S	10	5 47 0	157 45 4	28
716	S	10	5 42 50	158 35 0	27	776	S	8	5 47 20	156 44 30	27
717	S	10	5 42 51	157 15 25	22	777	S	9	5 47 20	157 28 34	28
718	S	III.	5 42 52	159 17 20	—	778	S	10	5 47 20	158 32 36	26
719	S	9	5 42 53	157 24 56	—	779	S	10	5 47 28	159 23 13	24
720	S	7	5 42 55	159 0 4	—	780	S	8	5 47 34	157 48 42	28
721	S	10	5 42 56	157 12 55	22	781	S	8	5 47 57	156 42 30	27
722	S	8	5 42 58	158 12 43	—	782	N	II.	5 48 7	158 33 43	—
723	S	10	5 42 57	161 18 11	23	783	N	II.	5 48 12	157 30 5	—
724	S	10	5 42 58	159 52 43	24	784	S	7	5 48 21	156 41 0	27
725	S	8	5 43 4	158 31 29	21	785	S	10	5 48 29	156 36 0	27
726	S	9	5 43 6	161 9 11	23	786	S	10	5 48 45	160 14 19	25
727	N	I.	5 43 7	158 21 29	21	787	S	10	5 48 51	159 25 13	24
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742	S	12	5 44 13	159 39 13	24	802	S	8	5 49 55	161 2 31	23
743	S	10	5 44 14	157 46 25	22	803	S	10	5 50 1	160 10 19	25
744	S	10	5 44 17	158 31 36	26	804	S	10	5 50 1	159 56 34	—
745	S	7	5 44 17	158 9 36	26	805	S	6	5 50 3	156 56 34	28
746	S	21	5 44 26	156 58 42	—	806	S	6	5 50 6	156 56 34	28
747	S	—				807	S	6	5 50 7	156 56 34	28
748	S	—				808	S	6	5 50 8	160 25 15	31
749	S	—				809	S	7	5 50 10	160 24 19	25
750	S	—				810	S	8	5 50 12	160 24 19	25

No. for Reference.	Obj.	Mag.	R. A. 1830.0. h. m. s.	N P D. 1830.0. ° ' "	Zone.	No. for Reference.	Obj.	Mag.	R. A. 1830.0. h. m. s.	N P D. 1830.0. ° ' "	Zone.
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804	S	11	5 50 19	156 37 4	28	860	N	9	5 54 20	161 8 9	23
805	S	8	5 50 22	161 0 11	23	861	N	II.	5 54 22	159 31 7	30
806	S	10	5 50 29	160 16 50	31	862	S	10	5 54 26	160 58 15	31
		10	31	17 19	25	863	S	9	5 54 29	159 6 23	30
807	S	10	5 50 30	161 23 11	23	864	S	9	5 54 31	156 31 0	27
808	S	10	5 50 31	156 34 0	27	865	N	III.	5 54 38	159 30 39	30
809	S	VI.	5 50 35	160 6 44	31	866	S	9	5 54 52	159 2 33	30
	N		35	6 49	25	867	S	10	5 54 53	161 0 11	23
	N		36	6 45	31	868	S	8	5 55 4	160 53 15	31
810	S	10	5 50 37	156 25 0	27	869	S	10	5 55 10	161 33 11	23
811	S	8	5 50 39	157 5 4	28	870	N	II.	5 55 11	158 37 44	30
812	S	III.	5 50 43	161 31 11	23	871	S	8	5 55 19	157 13 4	28
813	S	8	5 50 55	159 50 43	24	872	S	9	5 55 28	157 44 4	28
		8	59	50 23	28	873	S	9	5 55 29	157 44 4	28
814	S	10	5 50 58	156 26 0	27	874	S	10	5 55 31	161 0 11	23
815	S	10	5 51 2	156 39 30	27	875	S	10	5 55 49	158 4 33	29
816	S	10	5 51 5	156 46 0	27	876	S	7	5 55 54	157 33 34	28
817	S	10	5 51 23	156 15 0	27	877	S	10	5 55 55	160 41 15	31
818	S	8	5 51 31	159 53 23	28	878	S	10	5 56 0	160 41 45	31
819	S	10	5 51 32	160 3 40	25	879	S	10	5 56 2	161 21 11	23
820	S	7	5 51 32	158 27 30	26	880	S	10	5 56 9	160 39 15	31
821	S	9	5 51 32	158 6 36	26	881	S	7	5 56 12	157 5 4	28
822	S	10	5 51 38	160 14 15	31	882	S	8	5 56 18	158 4 4	28
		10	41	13 49	25			7	19	5 33	29
823	S	10	5 51 42	159 16 23	30	883	S	8	5 56 26	157 33 34	28
824	S	10	5 51 47	159 36 23	30	884	N	III.	5 56 31	158 13 22	28
825	S	10	5 51 48	160 45 45	31	885	N	II.	5 56 37	160 56 47	31
		10	53	45 19	25	886	S	8	5 56 41	160 33 15	31
826	S	10	5 51 49	158 9 6	26	887	S	10	5 56 44	158 17 3	29
827	S	10	5 51 53	156 16 0	27	888	S	8	5 56 44	161 59 11	23
828	S	10	5 51 56	156 47 0	27	889	S	10	5 56 47	156 40 0	27
829	S	10	5 51 59	157 5 34	28	890	S	10	5 56 51	156 20 0	27
830	S	10	5 52 5	158 43 36	26	891	S	8	5 56 57	159 26 23	30
831	N	III.	5 52 15	159 31 38	23	892	S	8	5 57 0	160 26 23	30
832	S	10	5 52 18	156 40 0	27			8	58	160 58 41	23
833	S	10	5 52 18	161 33 11	23			10	11	60 15	31
834	S	10	5 52 26	157 5 44	28	893	N	II.	5 57 16	159 35 3	30
835	S	10	5 52 26	160 40 15	31	894	N	9	5 57 25	161 41 11	23
836	S	7	5 52 32	159 57 15	31	895	N	II.	5 57 26	159 2 8	28
		7	36	55 45	30	896	S	8	5 57 39	157 24 4	28
		7	40	56 19	30	897	N	III.	5 57 46	156 25 1	30
837	S	10	5 52 37	159 57 20	31	898	S	10	5 57 49	157 40 34	28
		10	42	55 33	30	899	S	9	5 57 52	161 27 11	23
838	N	II.	5 52 43	159 23 54	31	900	S	9	5 57 53	161 22 11	23
839	N	II.	5 52 45	157 21 55	31	901	N	II.	5 57 56	157 16 18	30
840	S	10	5 52 48	160 51 15	31	902	S	10	5 58 11	156 20 30	27
841	S	8	5 52 51	161 24 11	23	903	S	8	5 58 18	160 20 15	31
842	S	9	5 52 58	157 36 4	28	904	S	9	5 58 35	157 42 4	28
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844	S	10	5 53 7	158 22 6	26	906	S	7	5 58 42	161 31 11	23
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846	S	9	5 53 13	156 25 0	27	908	S	9	5 58 44	161 55 41	23
847	S	10	5 53 15	160 43 15	31	909	S	10	5 58 44	159 18 53	30
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852	S	10	5 53 25	160 56 15	31	913	S	10	5 59 1	161 52 11	23
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		8	37	61 2	26	916	S	9	5 59 35	160 14 15	31
854	S	9	5 53 44	158 29 8	26	917	S	10	5 59 45	157 2 4	28
		9	58	28 3	29	918	S	10	5 59 46	159 35 23	30
855	S	10	5 53 48	161 1 41	23	919	N	⊕	5 59 48	158 31 2	28
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858	N	II.	5 53 59	157 27 17	28						

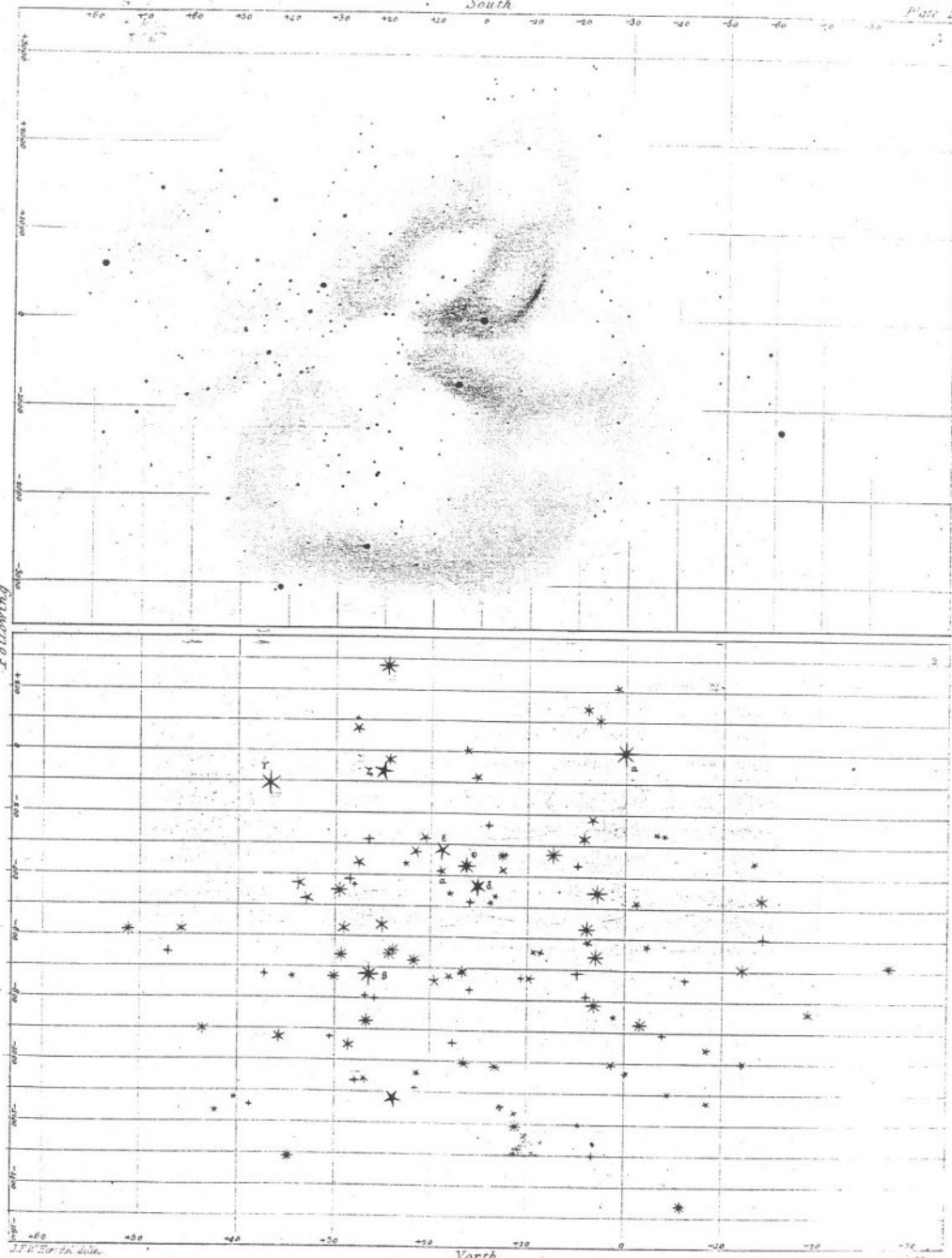
- No.
 3 B. 787.
 4 B. 786.
 7 B. 788.
 15 B. 790.
 20 B. 800.
 21 B. 801.
 24 B. 805.
 39 B. 813.
 41 B. 814.
 42 Is a duplicate of No. 37 numbered by mistake.
 51 B. 822. 5' error in N P D in B.
 53 B. 821. B has 5' error in N P D. This is no doubt also identical with B 820.
 66 B. 827.
 74 B. 832. Probably identical with B. 829, in which 1° error in P D exists.
 76 Possibly = No. 30.
 83 B. 837.
 85 B. 839.
 86 B. 838?
 110 By measurement of drawing.
 111 A double star in a cluster.
 115 B. 864.
 123 B. 867.
 153 B. 871.
 159 B. 875.
 172 B. 880.
 189 B. 886.
 193 B. 889.
 217 B. 895.
 227 B. 897.
 231 B. 898.
 245 The f obs has 10" R A.
 250 B. 912.
 262 Double.
 263 B. 920.
 274 B. 922.
 277 B. 926.
 281 The 1st neb in fig. 6, Pl. III.
 282 The 1st of the southern cluster of nebulae in fig. 6, Pl. III.
 283 The principal neb in the ditto, ditto.
 288 The star s p the central star of fig. 6, Pl. III.
 289 The last nebula in the southern cluster of nebulae of fig. 6, Pl. III.
 290 The chief star in the centre of the figure 6, Pl. III.
 295 B. 927 no doubt; but the R A of B. is 20° too little if my obs be correct.
 297 The very faint neb following a double star in fig. 6, Pl. III.
 305 Double 10 and 10.11 m.
 308 B. 936.
 313 B. 940.
 318 B. 941.
 323 B. 939. R A in B. is probably 1° too small.
 328 B. 947.
 331 B. 950. The P D of the Brisb. Cat. is 160°, which is a misreading. My obs being in the midst of a zone is liable to no such mistake.
 332 B. 951.
 336 B. 954.
 339 B. 953.
 359 Double 40", 9' and 11 m.
 381 Is possibly the neb. 387 seen as a faint star in the equatorial.
 384 The 1st faint nucleus of the cluster of nebulae, figure 2, Pl. III.
 388 B. 967.
 389 The 2nd nebula of the cluster of neb. fig. 2, Pl. III.
 393 The 3rd ditto, ditto.
 398 The 4th the following and brightest of ditto.
 399 The small detached nebula of fig. 2, Pl. III.
 408 Possibly the nebula No. 405, seen in the equatorial as a faint star.
- No.
 414 Possibly the neb No. 421, seen as a faint star.
 418 B. 971. Double 5th class, 7 and 11 m.
 421 B. 974.
 423 Double.
 432 1st of a group.
 442 2nd of ditto.
 444 The obs of zone 20 is of the middle of the stars 443 + 444, seen as one.
 445 3rd of a group.
 446 1st of another group.
 448 2nd of ditto.
 449 3rd of ditto.
 450 Nebulous in equatorial.
 452 4th of a group.
 453 B. 983.
 458 4th of a group.
 460 5th ditto.
 463 6th ditto.
 464 B. 985.
 468 A double st in cluster.
 473 B. 989.
 478 B. 991.
 491 B. 993, ? 1' error P D.
 508 B. 1001.
 522 B. 1004.
 529 B. 1003. Double, companion = 11 m.
 567 B. 1016.
 592 f makes the degree 159; 160 is right.
 601 B. 1023.
 615 B. 1025.
 618 Possibly No. 613 taken a second time.
 651 B. 1037.
 655 B. 1038. The great looped nebulae, fig. 4, Pl. II.
 661 } Two stars of 10 m involved in a nebula or very faint cluster.
 662 }
 663 }
 670 The place of this * is better determined as No. 87 in the Catal. accompanying the monograph of 30 Doradus, viz., 5 40 18, 159 18 26. It is too small for good obs in the equatorial.
 678 The preceding of the double neb, Pl. III, fig. 4.
 680 The n p of the four principal nebulae of the group, Pl. III, fig. 4.
 681 The s p of ditto, ditto.
 682 The following of the double neb in ditto.
 685 The n f of the four principal in the group, fig. 4, Pl. III.
 686 The s f of ditto, ditto.
 688 The v f neb preceding a star in ditto.
 689 The said star in ditto.
 697 The neb following this star in ditto.
 706 B. 1047.
 709 B. 1050 ? if errors be presumed in B. of 20° in R A, and 10' in P D. If not, B. 1050 does not exist.
 732 Double 9 and 12 m.
 733 B. 1059.
 766 B. 1065. The R A of B is probably 30° too little. B. 1070 is probably identical with this star, and with B 1065.
 776 Double.
 801 B. 1091.
 836 Double in f.
 841 Double 8', 12 m.
 844 Double, 10 and 11 m.
 621 These nebulae and clusters have been inserted, and their places deduced (in all probability with quite as much correctness as if actually taken in sweeping), from a very careful and deliberate drawing of the neighbourhood of 30 Doradus made with the 20 feet, and duly checked and corrected by the known stars in it. No. 664 is the nebula (a very remarkable one) alluded to in the note above on Nos. 663 and 665.

South

Plate I.

Following

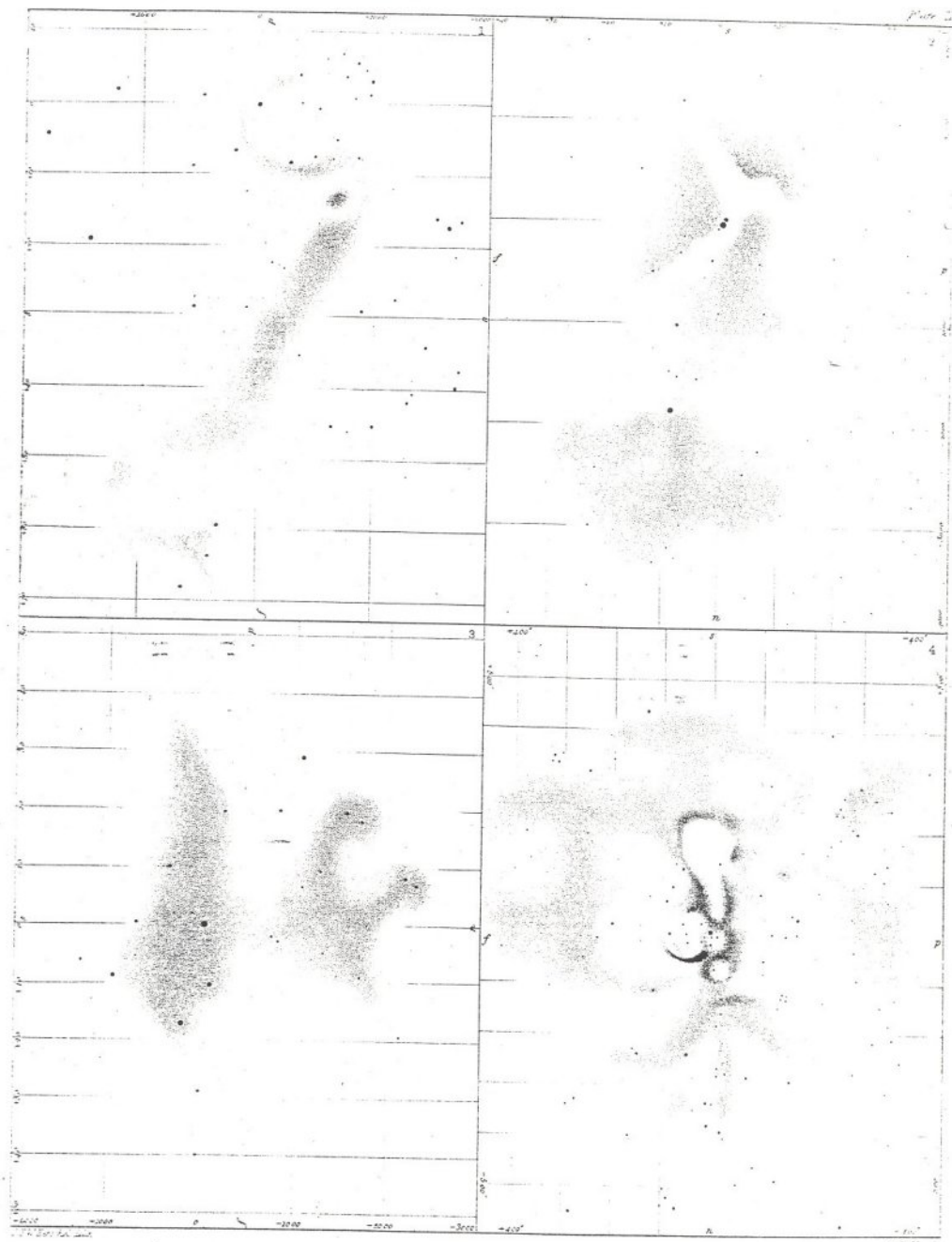
Preceding



J.R. E. P. A. 1880.

North

London: Smith, 138 & C^o 65, Cornhill.



South

Plate LII



Following

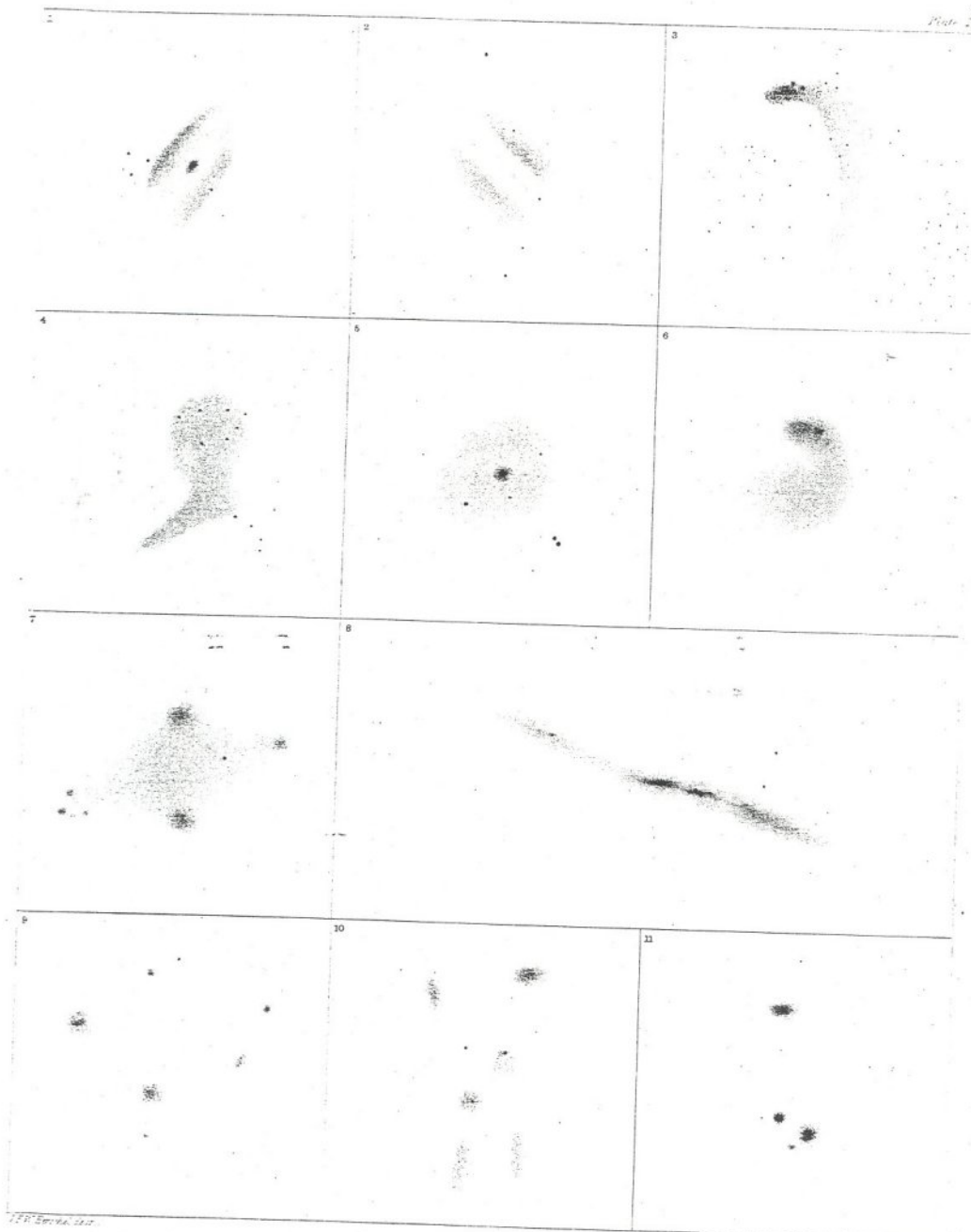
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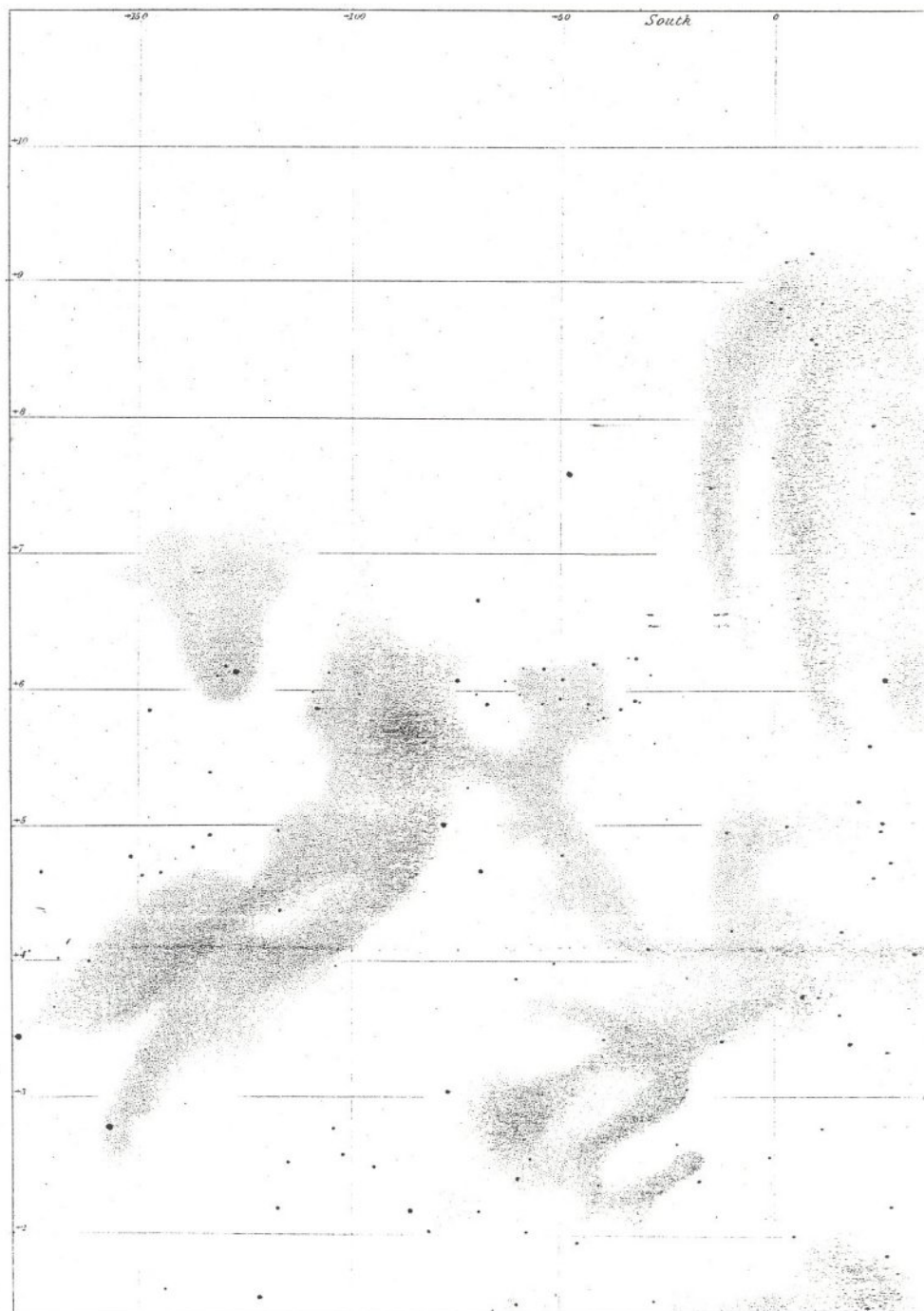
J.F. Borchgrevink

North

Star 11

London: Smith, Elder & Co. 66, Cornhill.





-30

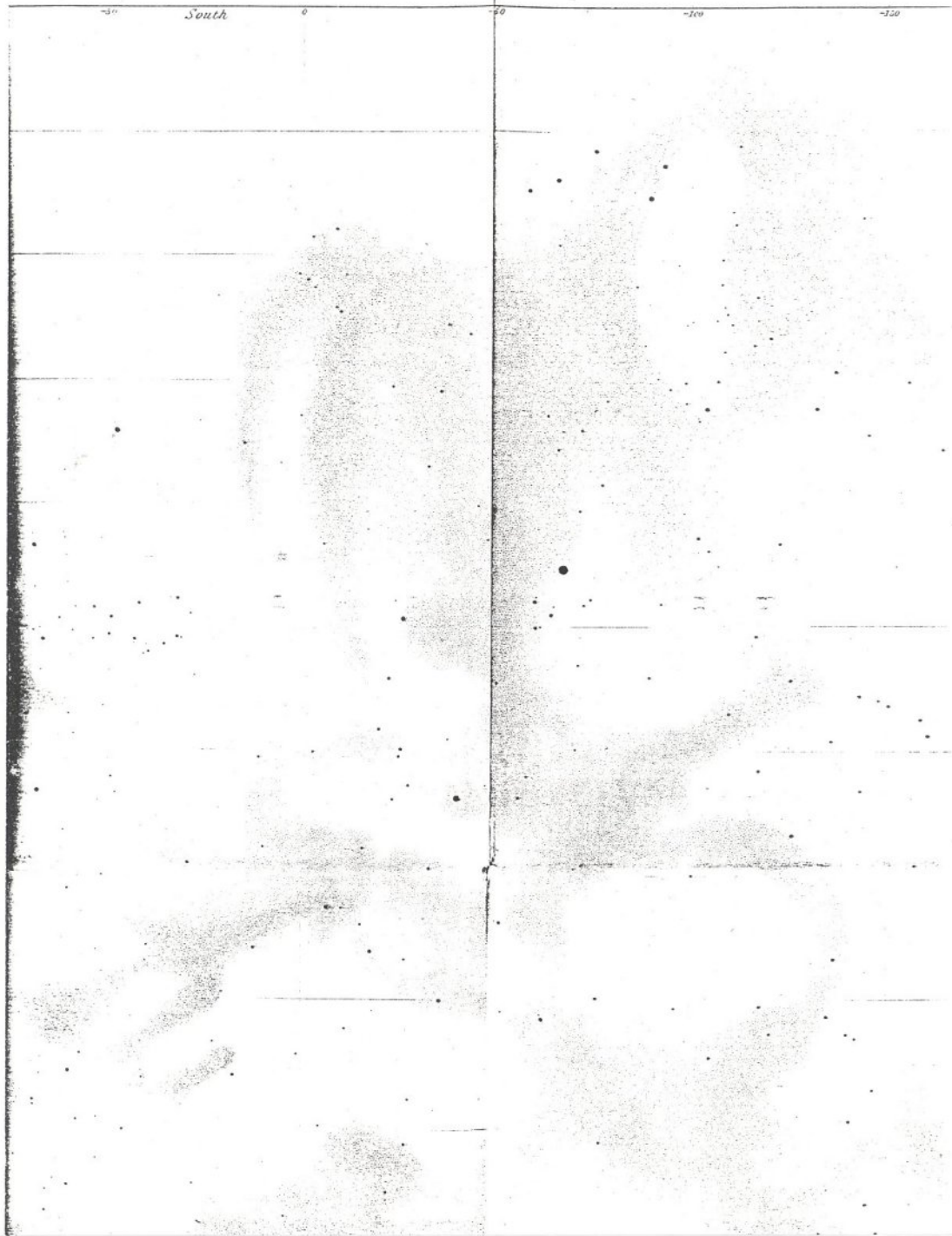
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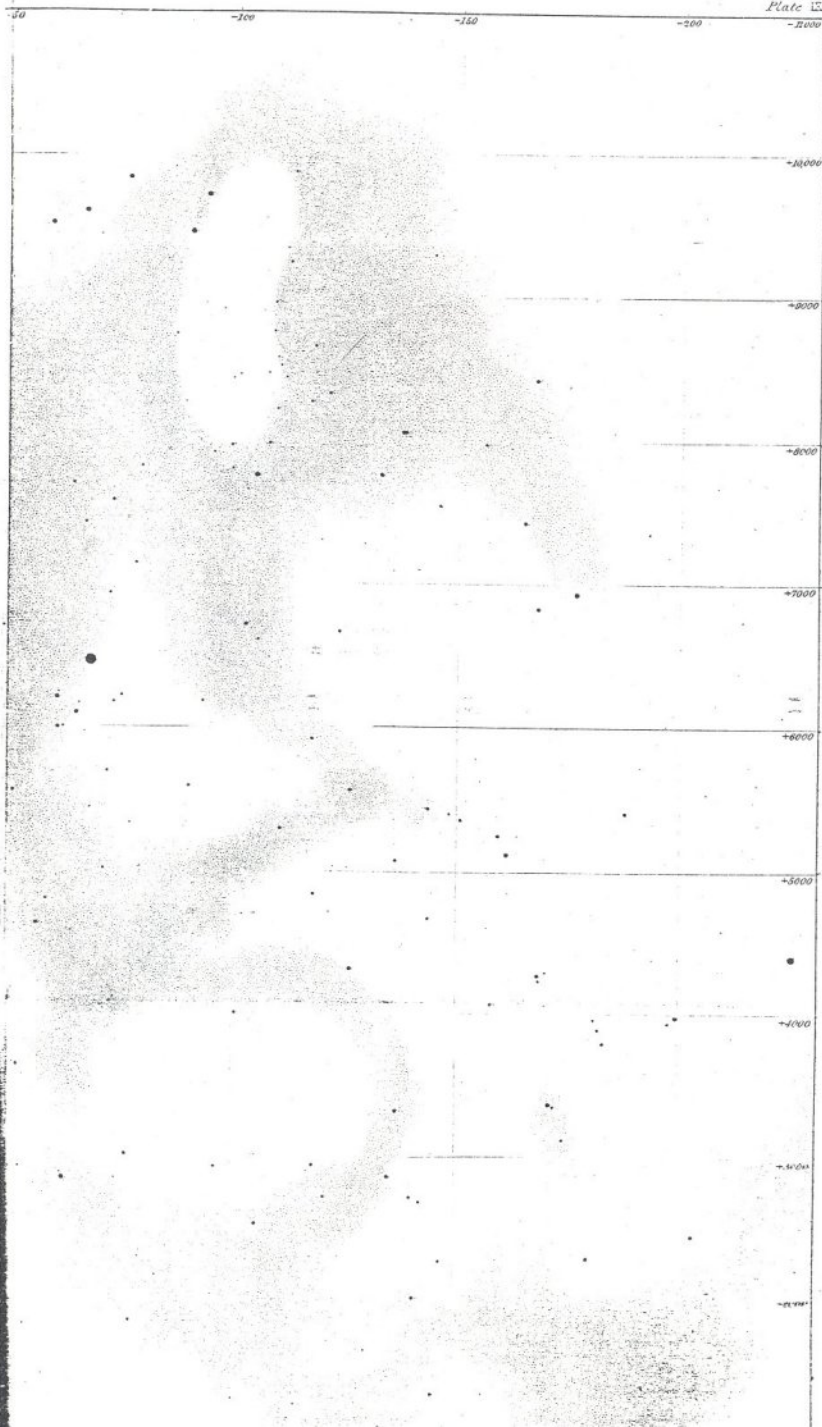
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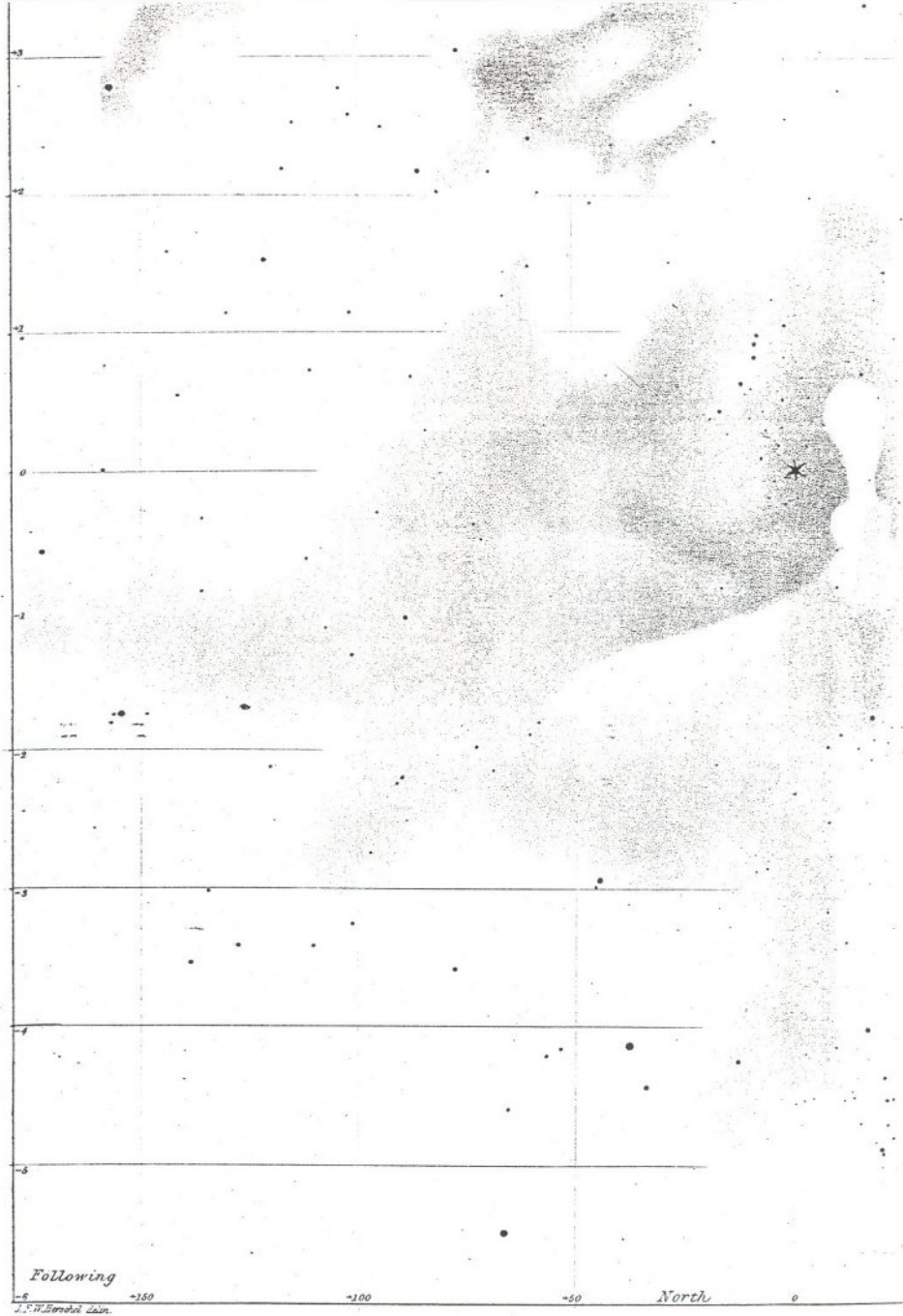
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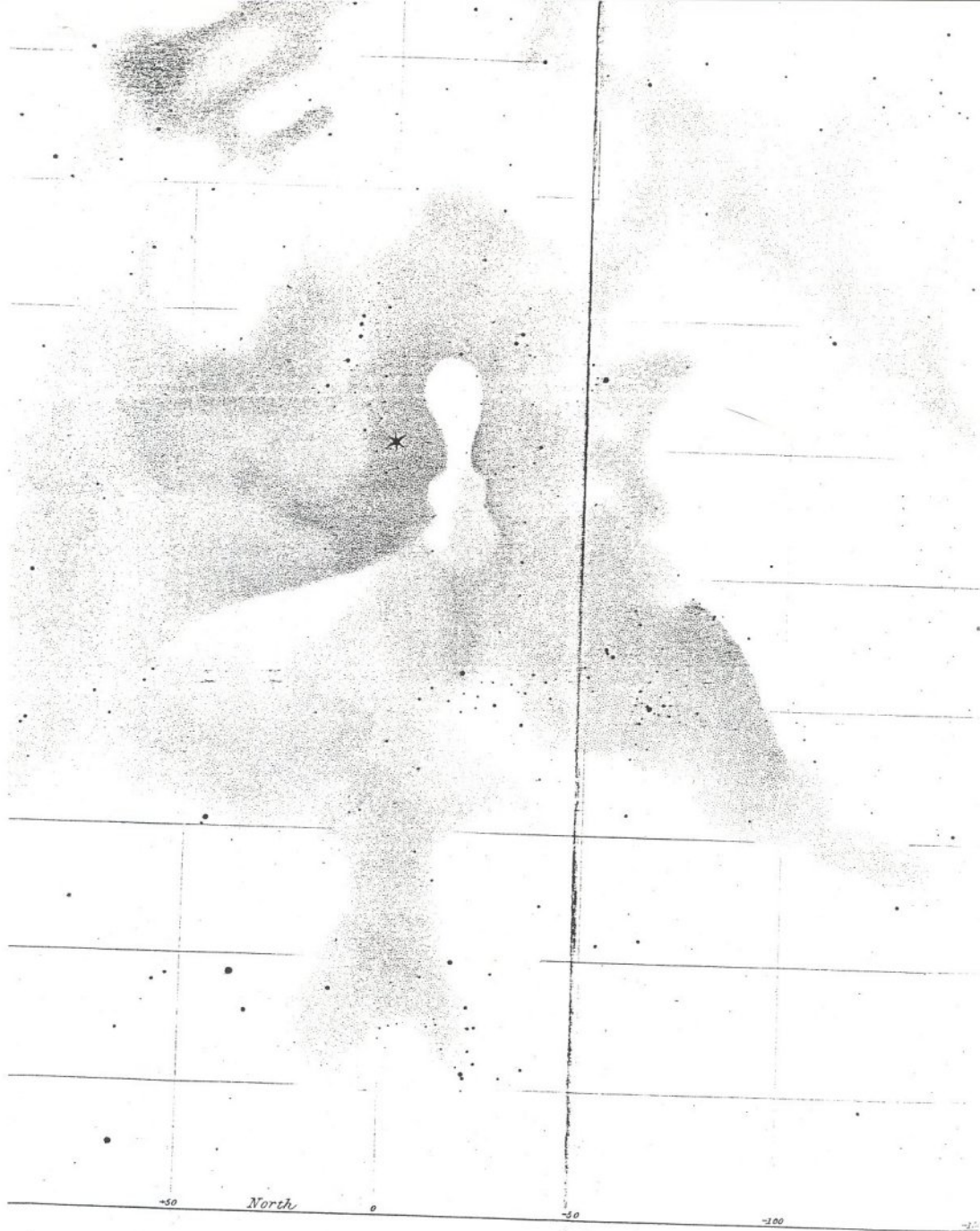
-120



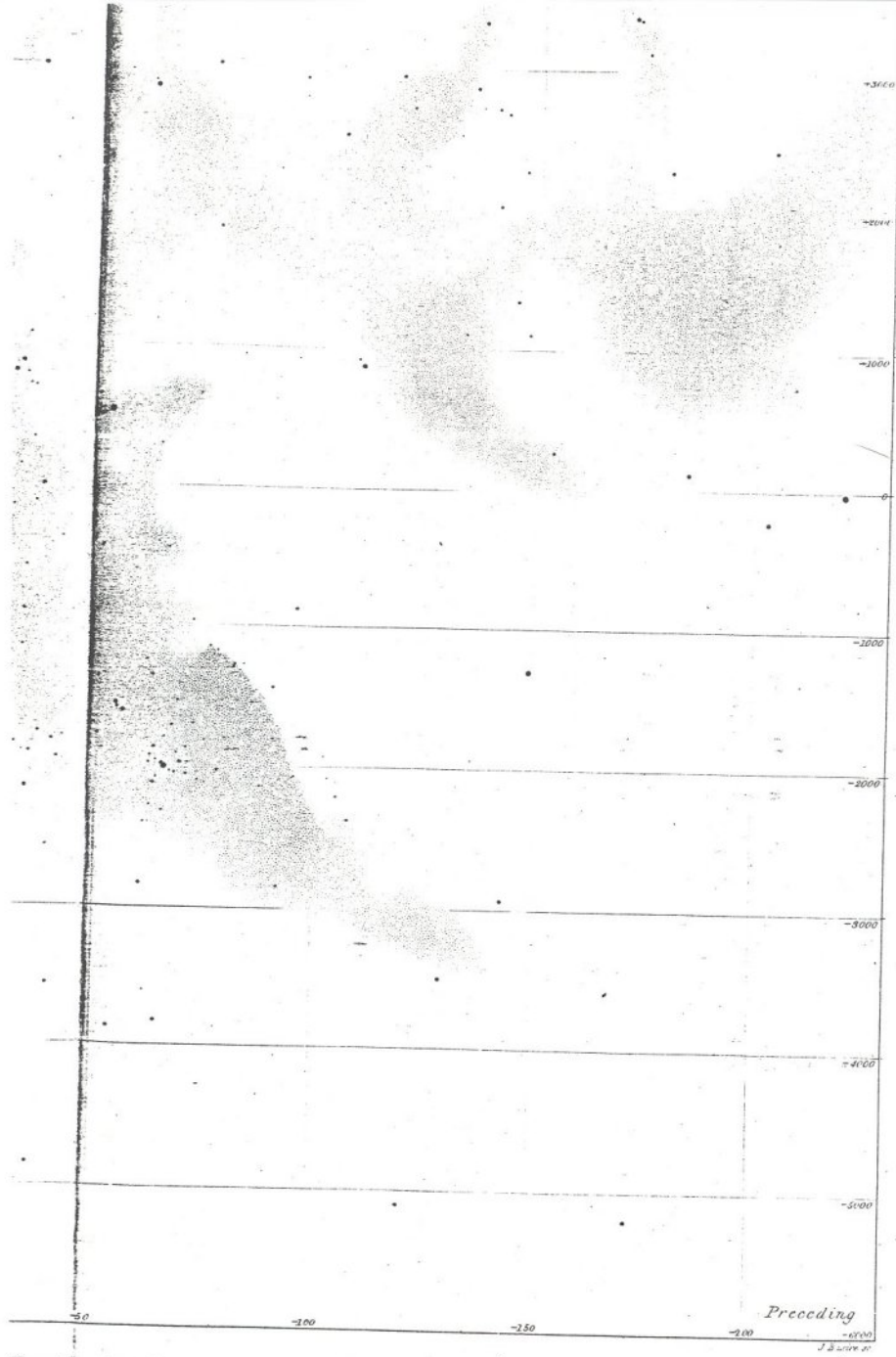




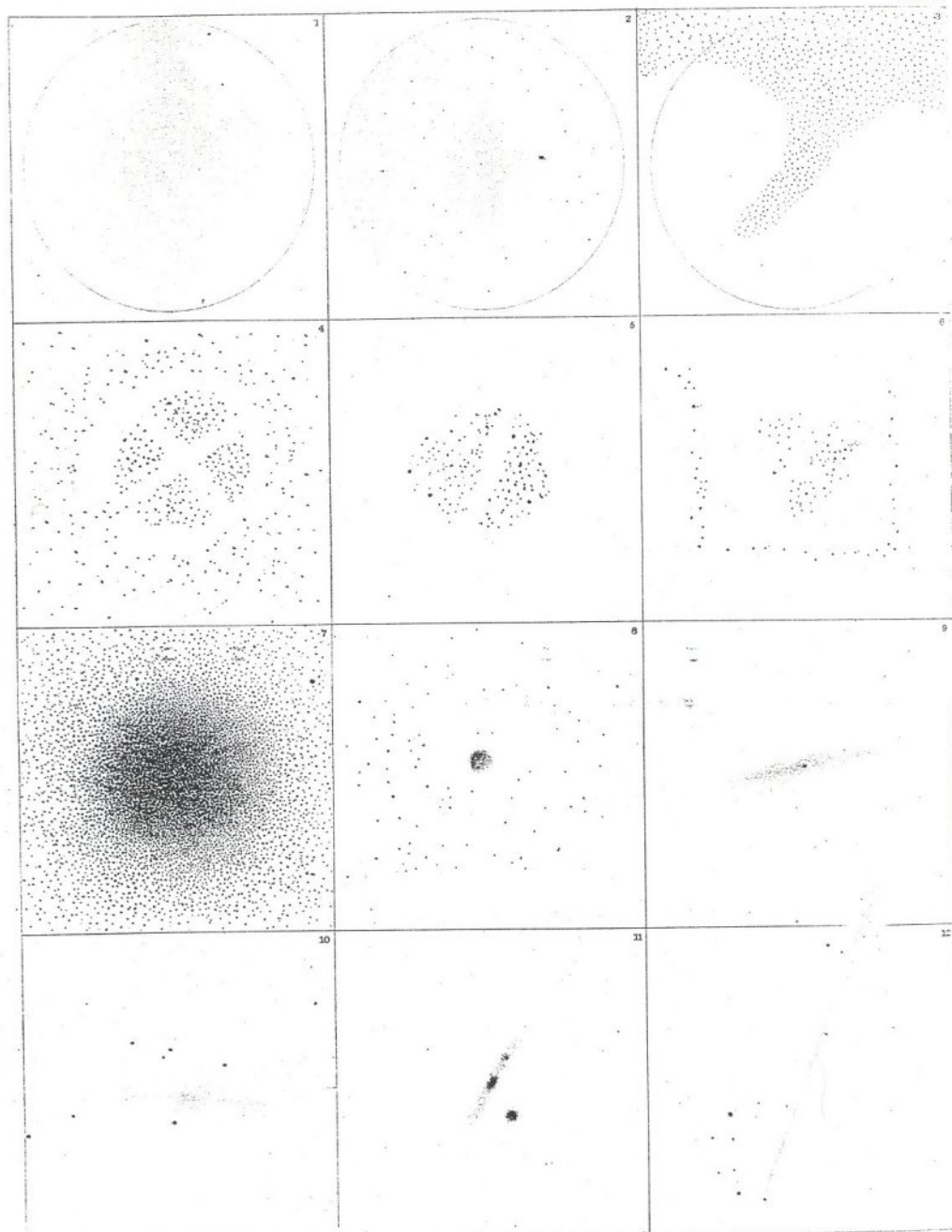
The Great Nebula about η Argus as seen in 18

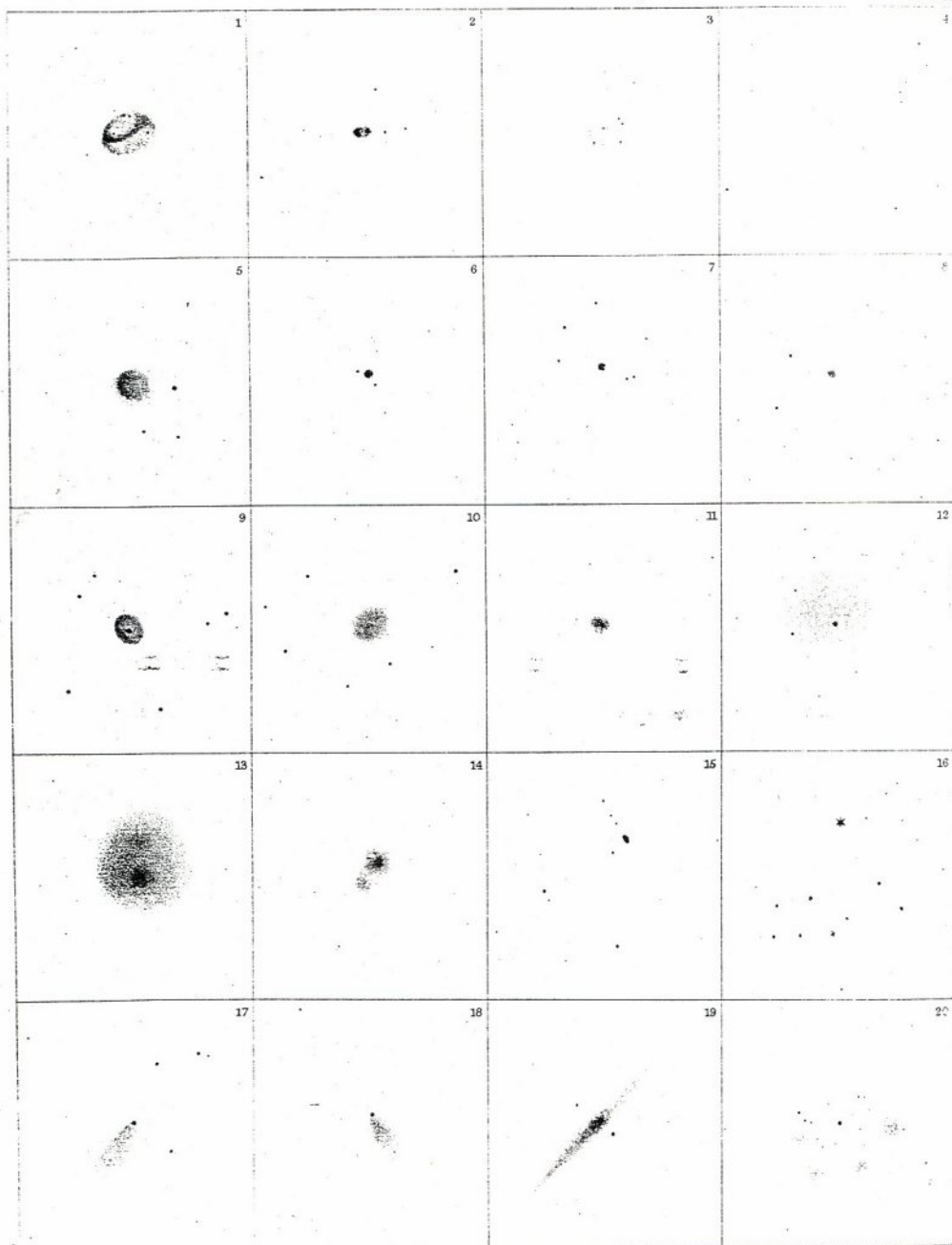


Great Nebula about η Argūs as seen in the Twenty-foot Reflector at Feldhausen. C. G. II.



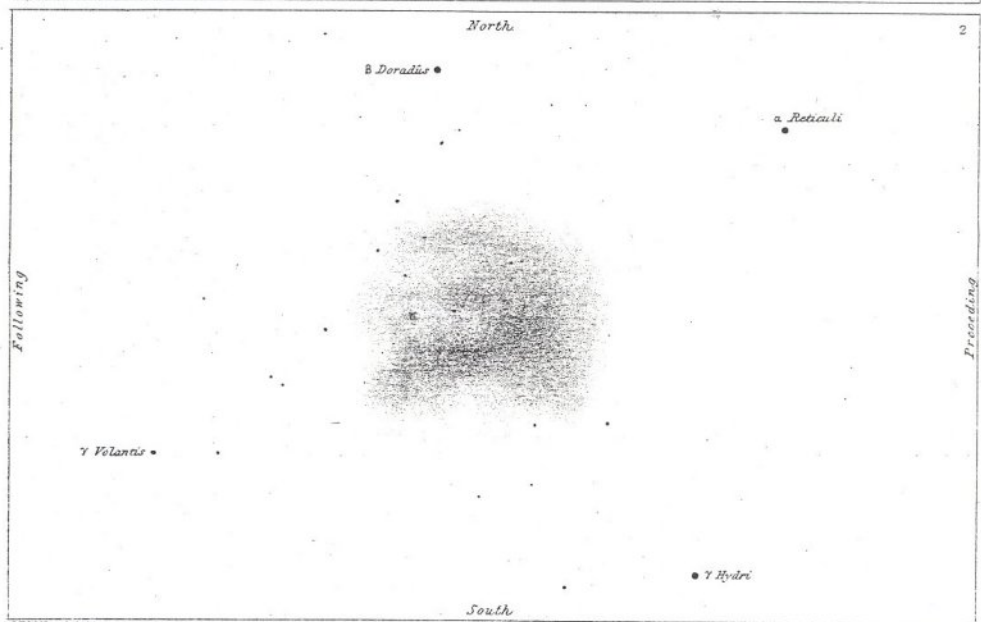
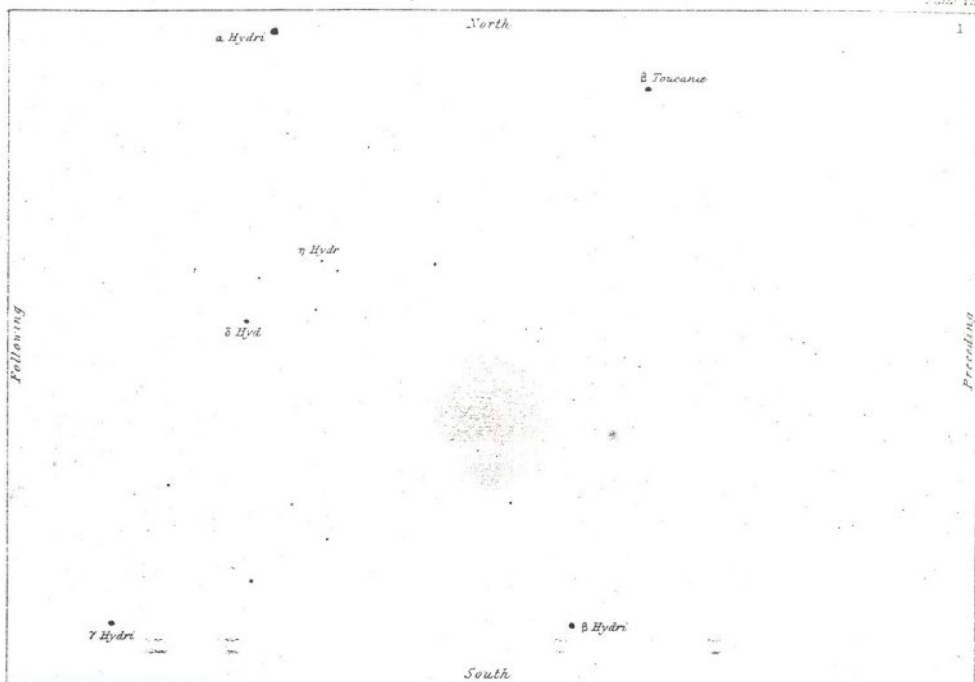
Twenty-foot Reflector at Feldhausen, C. G. H.



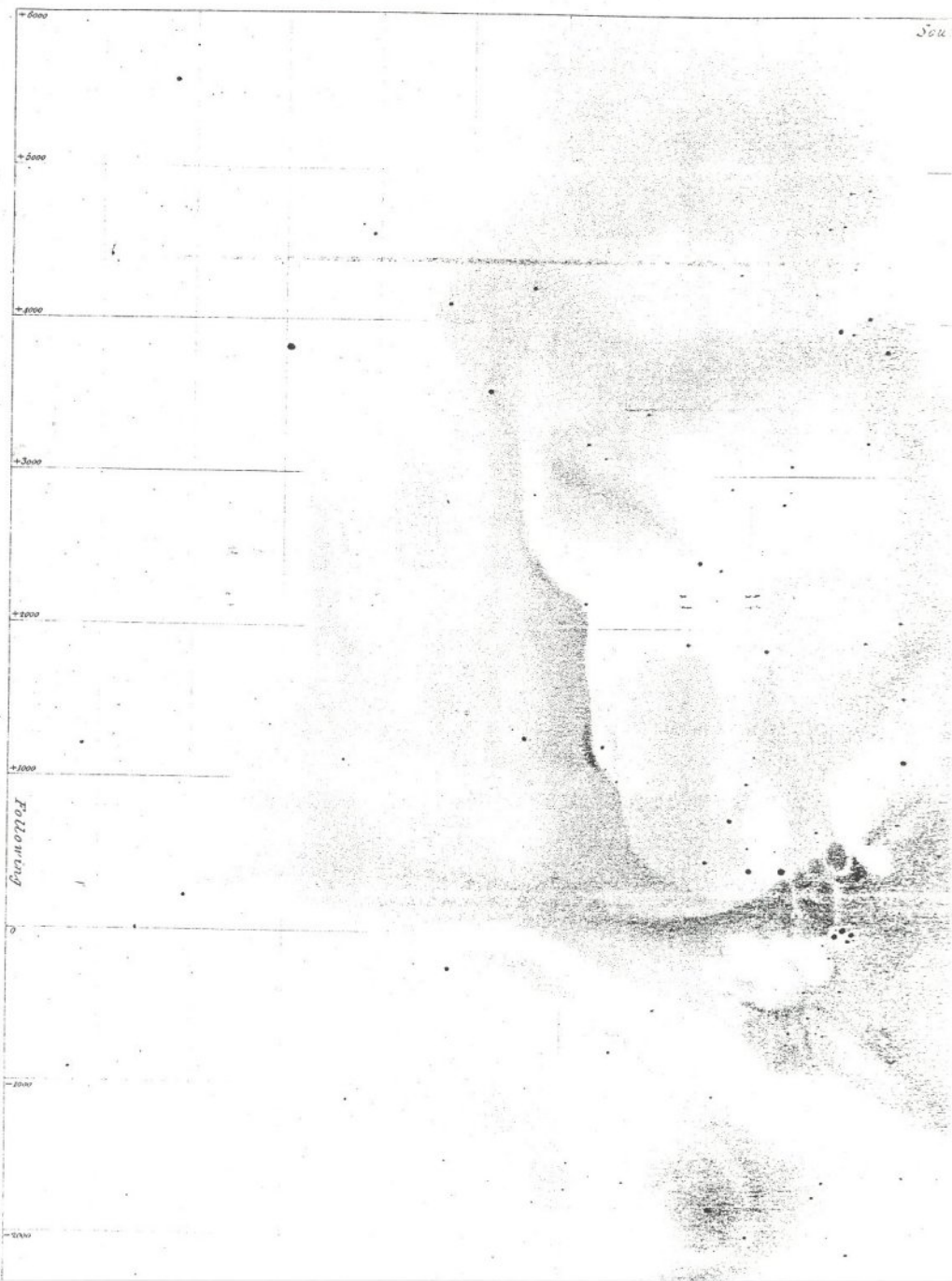


J. H. Evershed, data.

J. H. Evershed, data.

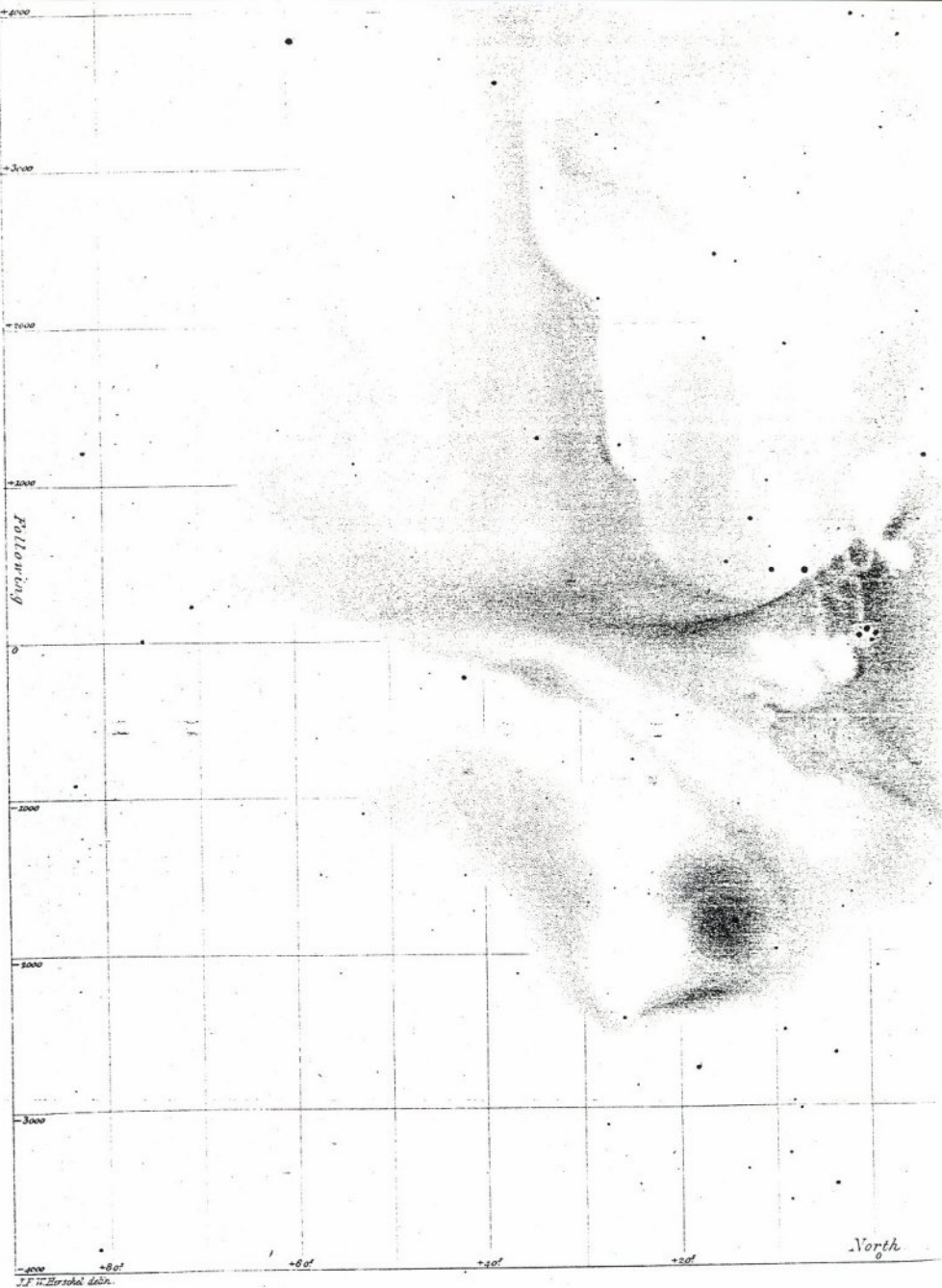


The two Magellanic Clouds as seen with the naked Eye.

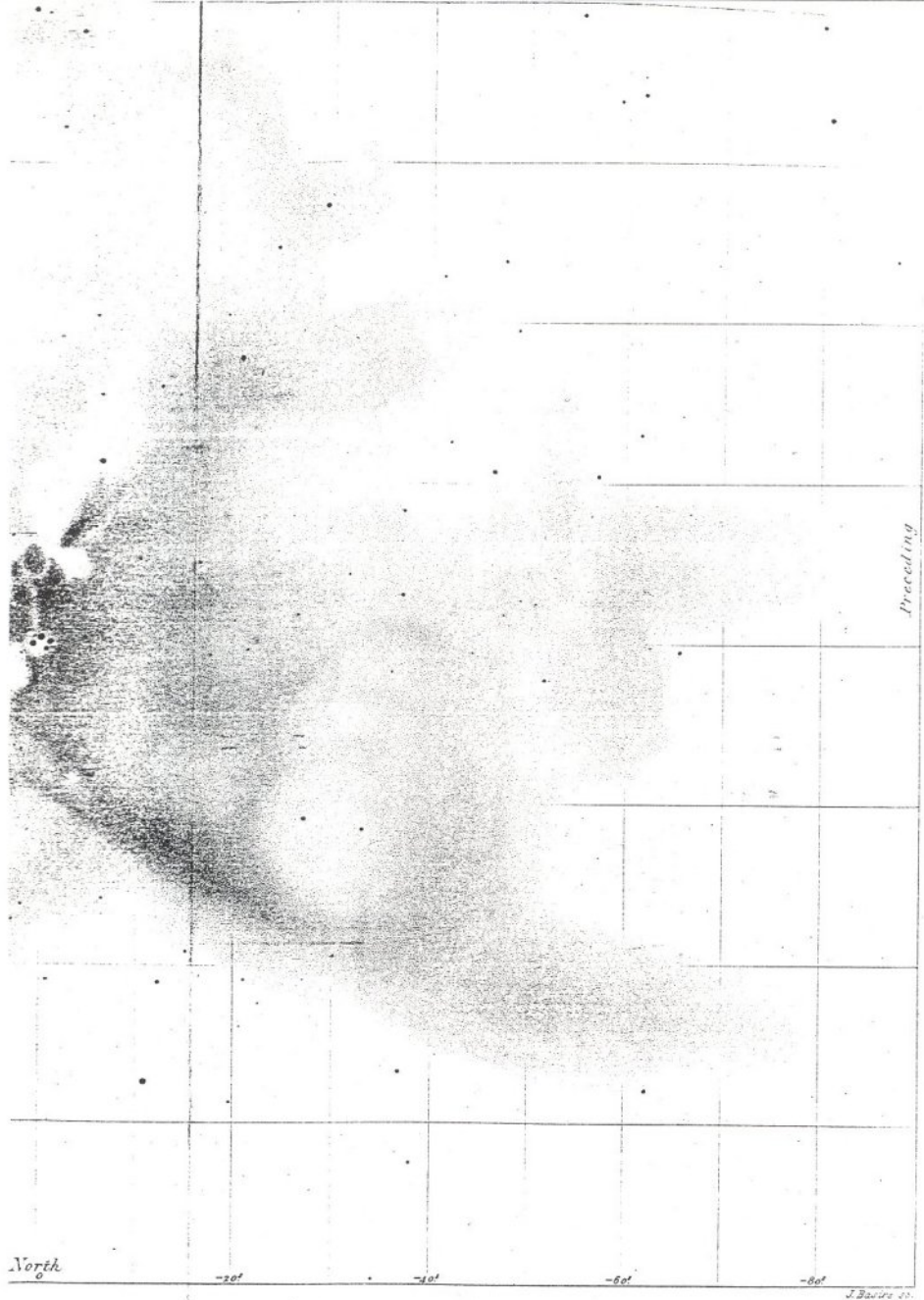


South

Preceding



The Great Nebula in the Sword-handle of Orion as seen in



seen in the Twenty-foot Reflector at Feldhausen. C. G. H.

VI h.
156 Y.P.D.

50^m

40^m

157^m

158^m

159^m

Pl. III.
fig. 5.

Pl. II.
fig. 4.

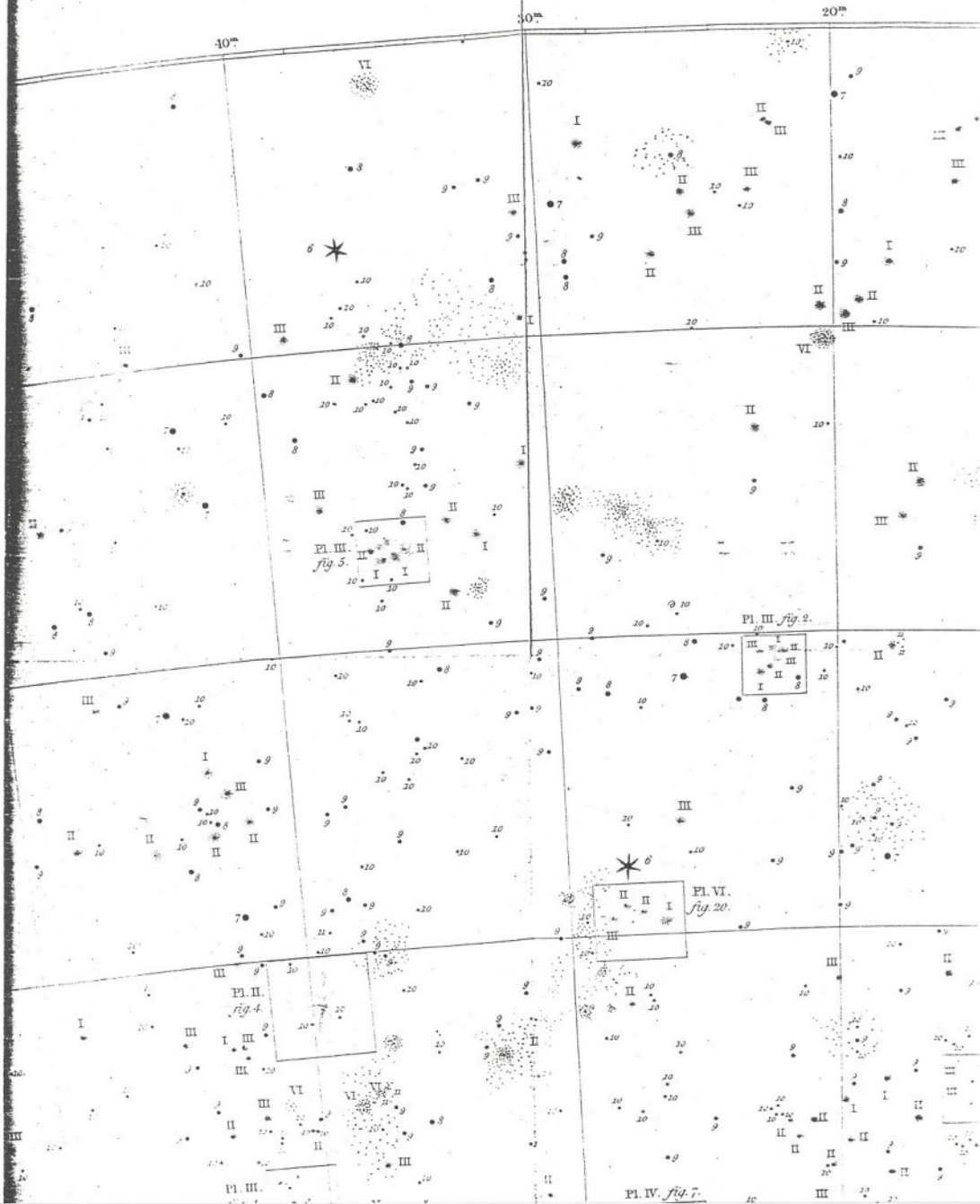
Pl. III.
fig. 4.

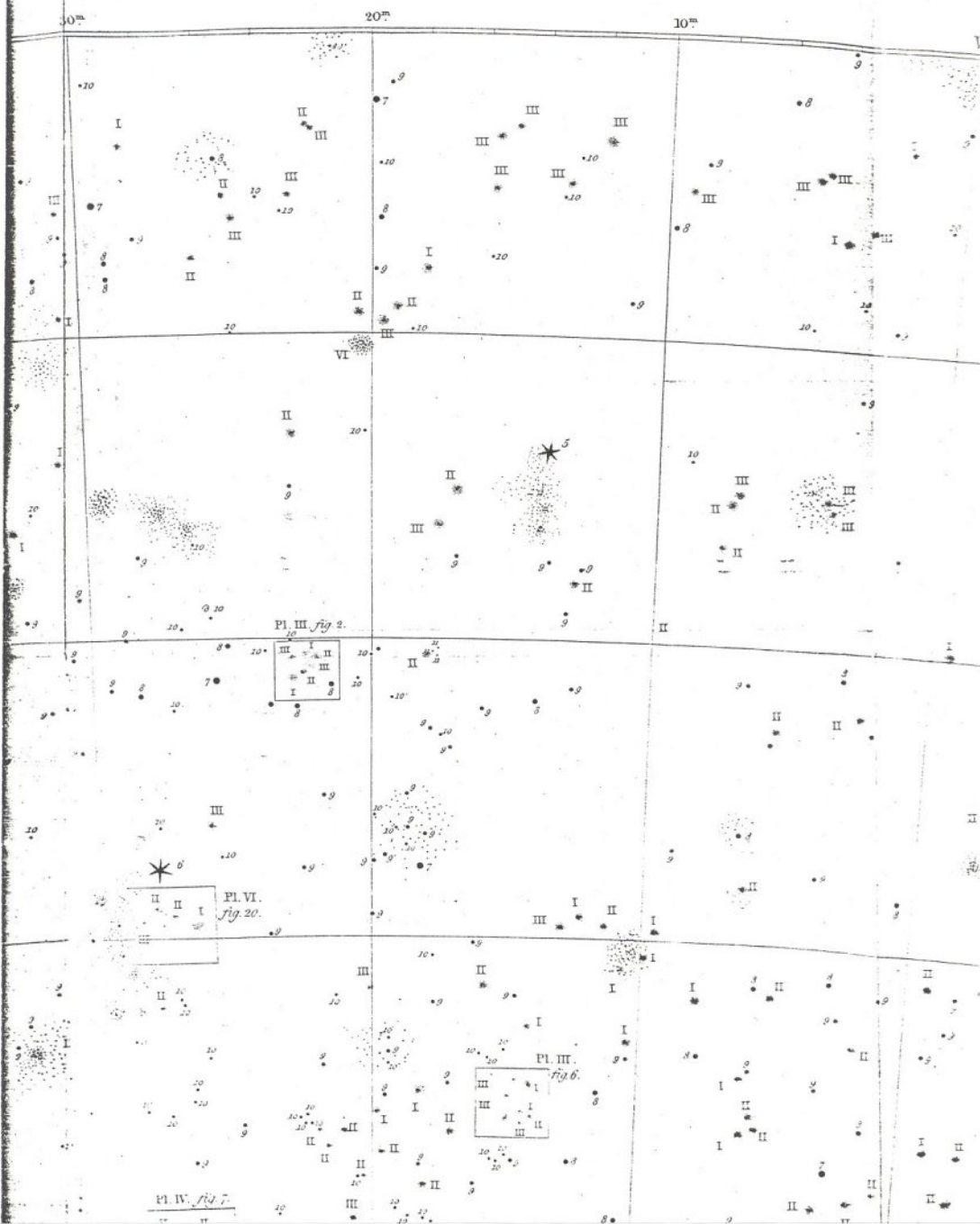


40°

30°

20°





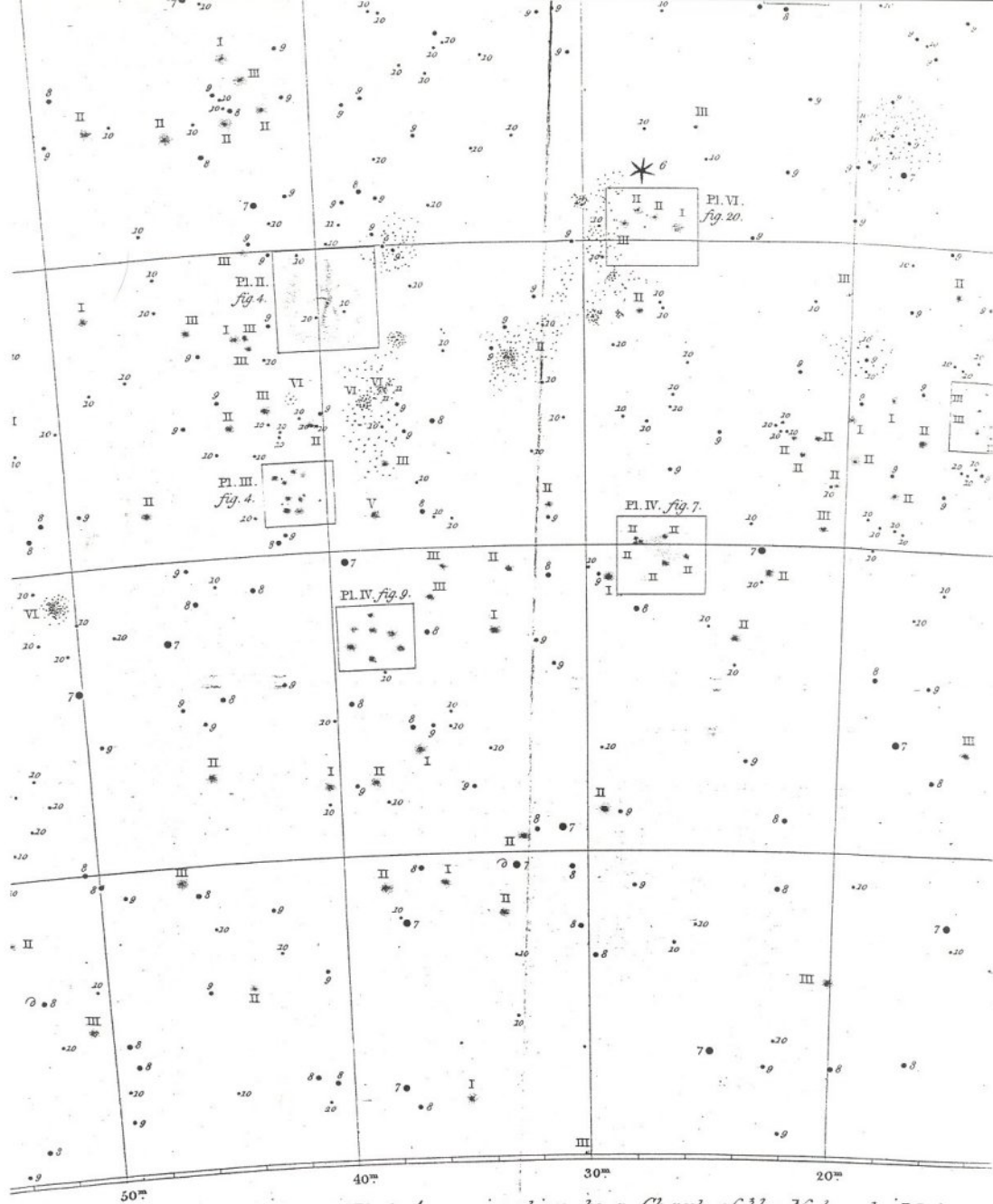




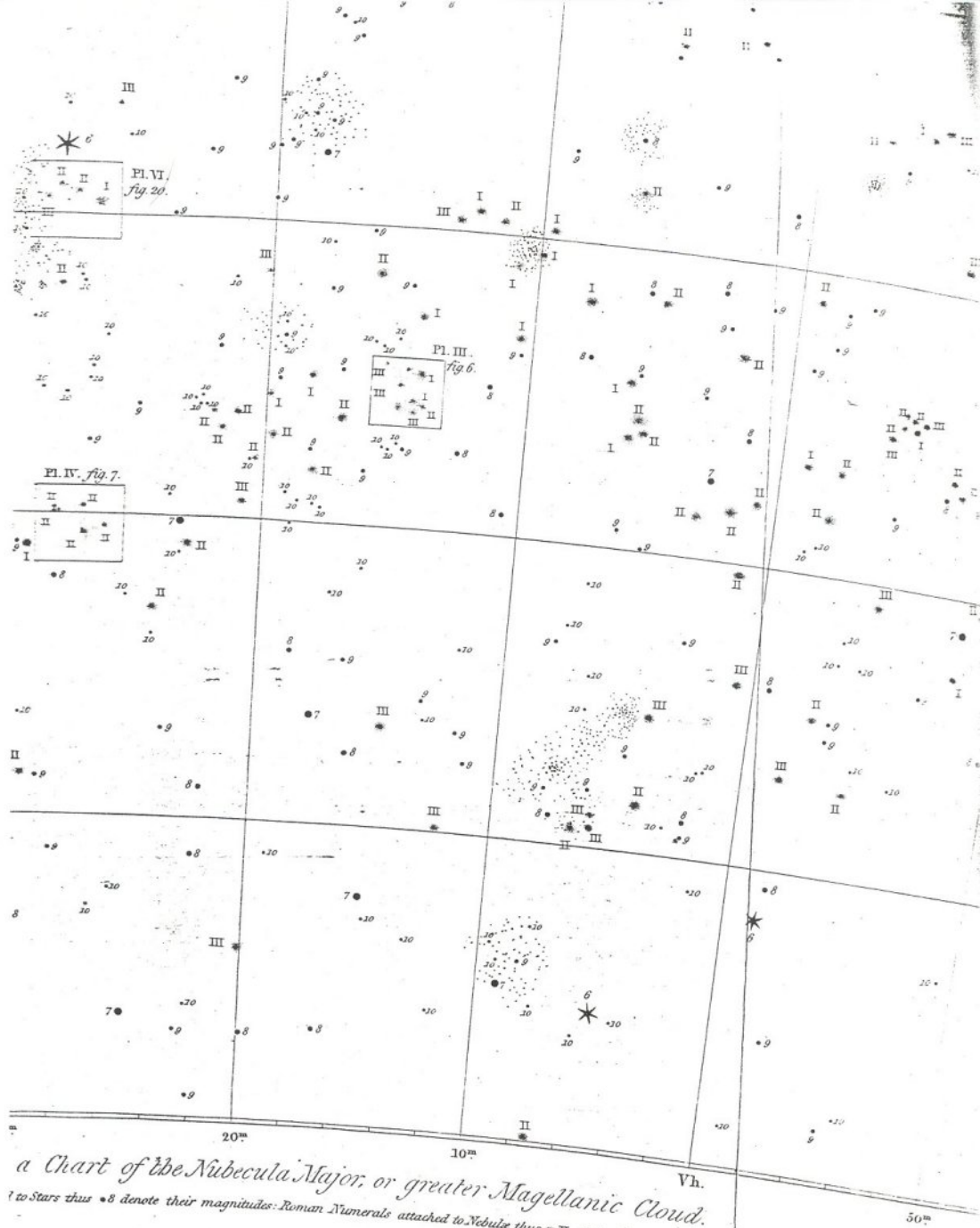
VIh.

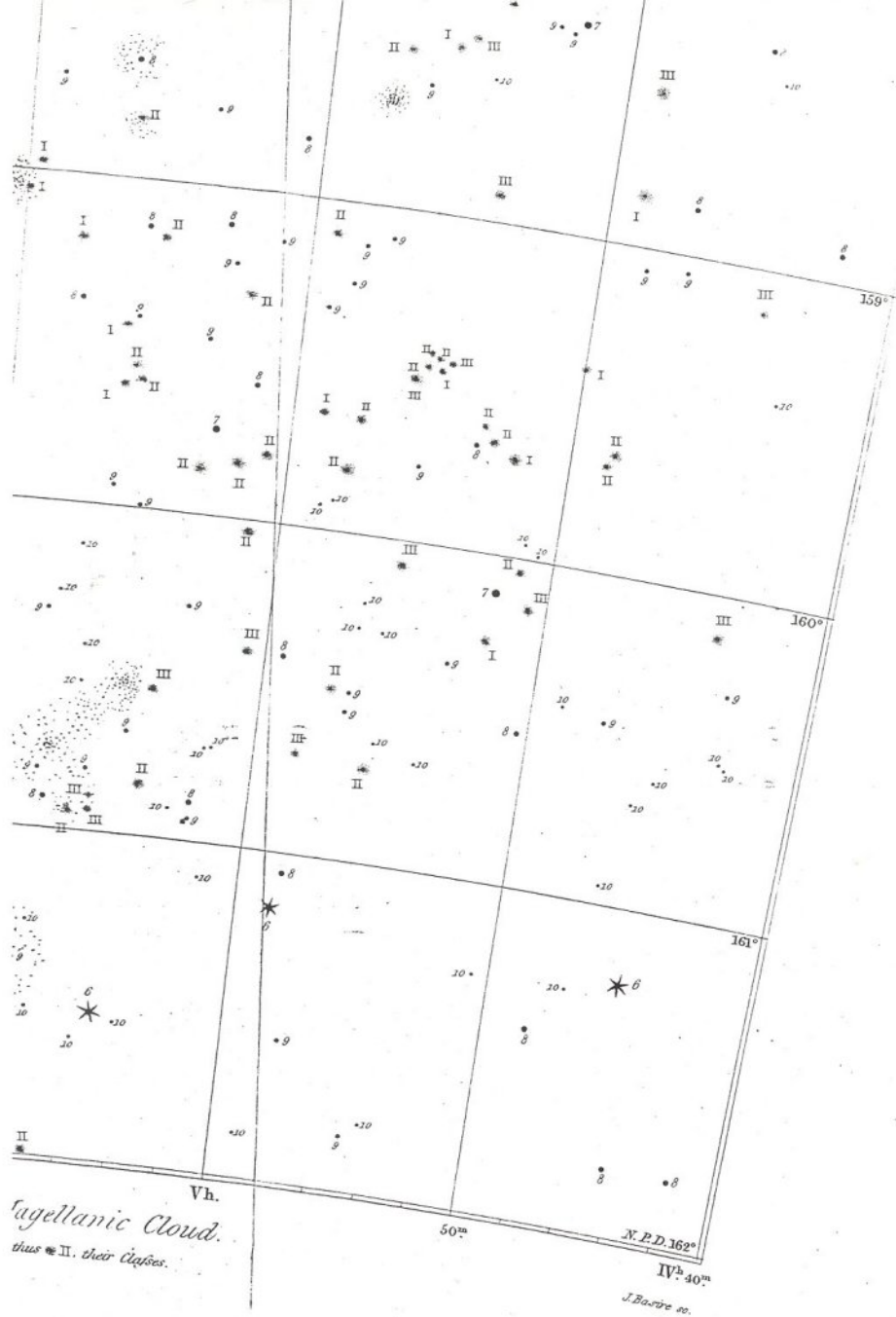
J. F. W. Herschel delin.

First. 1.



*First Approximation to a Chart of the Nubecula Major, or
23. The Arabic Numerals attached to Stars thus 8 denote their magnitudes: Roman Numerals*

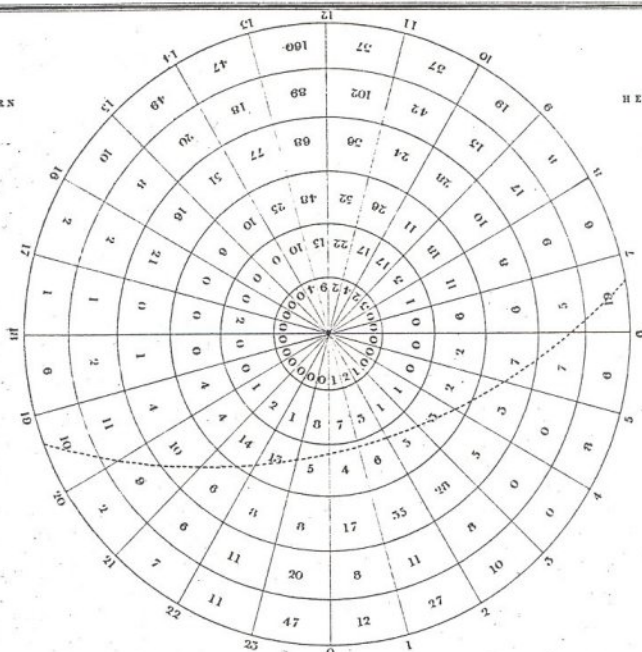




DISTRIBUTION OF NEBULAE AND CLUSTERS IN THE TWO HEMISPHERES.

NORTHERN

HEMISPHERE



THE DOTTED LINE REPRESENTS THE COURSE OF THE MILKY WAY

SOUTHERN

HEMISPHERE

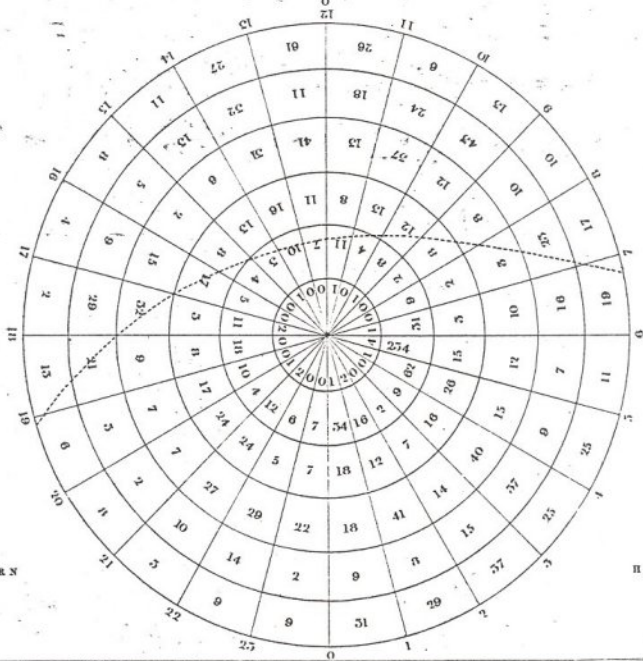


Fig. 1.

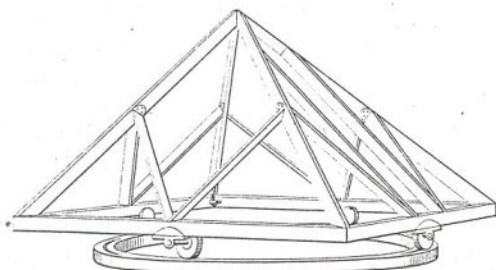


Fig. 2.

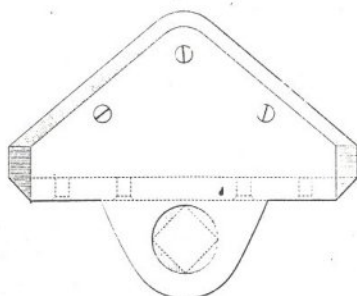


Fig. 3.

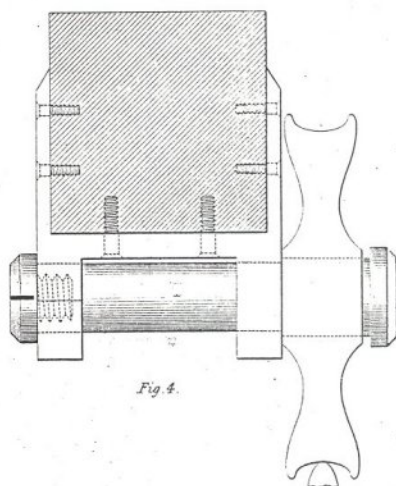
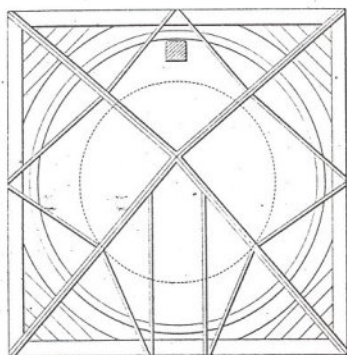


Fig. 4.

Fig. 5.



Fig. 6.

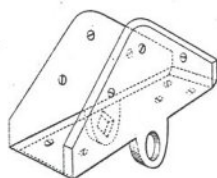


Fig. 7.

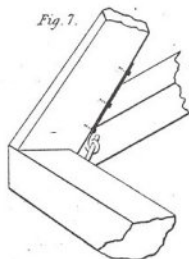


Fig. 8.



Scorpio

XVII

Ara

XVI

Triangulum

XIV

Monoceros

IX

Argo

VIII

Canis major

J. B. 1852

ERRATA, ADDITIONS, CORRECTIONS, &c.

Page.	Line.	Error.	Correction.	Page.	Line.	Error.	Correction.
xi	15	however, this	however this	299	1	radius vector	radius vector
xii	7	as on one	as on an	299	12	text {	text {
xiii	26	mirror; in the	mirror in the	299	12	9".69	3".58
4	7	search, thereby caused	search, thereby caused,	300	18	has	have
		it to become	became	304	15	Lyra	Lyrae
7	24	argument	arguments	340	24	Sequel	Sequence
18	8	II	π	368	10	2.98 + Log M	2.98 x Log M
27	19	respecting	respectively	368	14	3.1514	2744.7
30	13	215.5	215.1	392	13	cause	course
19	19	corraente	corrente	394	25	versed sine	versed sine
32	14	of chart	of a chart	395	17	nucleus	nucleus
34	20	7th, 13th	7th and 13th	21	$\sigma =$	comet	comet
	25	Spira	Spica	397	22	perihelion	perihelion
35	7	Rigel, were	Rigel were	406	3	as to give	as to give
135	4	April, twelvemonths	April twelvemonths	417	3	term	term
141	1	Canis Bootis	Canes Bootes	text {	(see Art. 168)	(on further and better	(on further and better
145	22	in thus	and in thus	417	text {	consideration of	consideration of
147	33	the whole ?	the whole OK as is	418	4	what is said on this	what is said on this
148	29	distinct	distinct	427	24	head in Art. 170)	head in Art. 170)
149	13	medium	meridian	448	10	mean, of which	mean of which
156	8	nubecula ?	nubeculae OK as is	451	25	Jupiter	Iapetus
		wire secured	wire would allow, se-	452	4	α Hydre	α Hyd. Crat.
			cured			179 59 7	179 59 7
247	6	valves	valves			west,	west,
	note }						

In the table, p. 391, omitted in their proper places between Nos. 28, 29 and 34, 35—21° 0', 126°....129°, f 486; 21° 40', 126°....129°, f 486. Also at end of Art. 338, add

In sweep 486 (N P D 126°....129°) at 21° 0' the commencement of the sweep, "the ground of the heavens was most delicately and closely stippled"—at 21° 21' "the stippling has ceased throughout the whole breadth of the sweep though the sky continues perfectly bright"—at 21° 40' "the stippling of the sky resumed of exquisite closeness and delicacy. The left eye shows it perfectly, the right only suggests it. It is like the first aggregation of a precipitate in a liquid. The stippling ceased at 42" and that very abruptly."

CORRECTIONS TO BE MADE IN THE CATALOGUE OF NEBULÆ.

No.	Obs.	Col.	In the	For	Read	No.	Obs.	Col.	In the	For	Read
2309	1	f	..	735	504	3079		R A	min.	16	17
2342	2	f	..	504	735	3111	4	R A	sec.	34.6	32.6
2349	3	P D	min.	31	21	3126		R A	sec.	18.6	14.6
2350		f	..	37	57	3132	4	R A	sec.	42.4	32.6
2359	3	R A	sec.	448	484	3162		f	..	350	566
2392	2	R A	sec.	12.1	72.1	3182		F D	m, s	58 11	25 31
2396		R A	min.	30.1	24.1	3186		R A	sec.	37.2	27.2
2423		f	..	6	5	3197		P D	min.	53	53
2445		Desc.	..	822	802	3205		P D	min.	9	7
2462		P D	deg.	2441	2440	3224	2	R A	sec.	74.6	72.9
2501		f	..	2442	2441	3229		P D	deg.	158	156
2529		F D	deg.	126	127	3259		R A	min.	21	22
2686		f	..	651	652	3274		P D	min.	57	27
2715	3	R A	sec.	107	127	3292	1	R A	sec.	17.3	16.7
2761	1	P D	sec.	657	658	3346	3	P D	sec.	9	29
2799	1	P D	min.	14.1	41.1	3509		f	..	449	451
2864		f	..	4	54	3533	2	F D	m, s	.. 39	30 39
2896		R A	sec.	16	18	3611	2	P D	sec.	17	57
2905	2	P D	sec.	573	523	3614		R A	sec.	10.8	20.8
2912		R A	sec.	38.4	48.4	3679		P D	deg.	123	119
2941		f	..	3	23	3711		P D	min.	16	17
2959		R A	sec.	38.8	28.8	3939		f	..	494	495
2971	3	P D	deg.	513	759	3956		F D	sec.	45	25
2972		P D	sec.	32.4	54.8	3966		P D	min.	58	28
3009	2	P D	min.	....	158	3988		R A	sec.	31.0	41.0
3046		P D	deg.	39	59	4007		R A	hour	23	0
				7	9	4008		R A	hour	23	0
				113	111	4012		R A	hour	23	0

NOTANDA.—2961, obs. 3, belongs to 2959; 3229 is a third obs. of 3231, the degree being wrong; 3259, the minute ought to be 22 in both the observations.

OMITTED OBSERVATIONS OF NEBULÆ, &c., AND SUPPLEMENTARY NEBULÆ.

No.	Syn.	R. A. 1830.0.	N. P. D. 1830.0.	Descriptive Remarks, &c.	Sweep.
2359	....	h. m. s.d.	o s h	v L; p B; between 3 st 8 m; seen in twilight.....	802
4016	....	5 18 38.9	157 27 13	F; S; R; r.....	760
4017	Δ.609	8 36 32.9	122 2 41	Cl class 8; not m comp; not v rich; v irreg fig.; 5' diam; st 12.13 m.	678
3178	....	9 23 59.1	142 9 19	Cl class 7; of irreg sc st; irreg fig.; fills field. The * taken is one of 2 chief st, the 1st of a small equilateral triangle.	440
4018	....	9 34 4.1	119 16 35	e F; 20'; a B * 8 m follows.....	771
4019	....	10 18 2.5	128 57 18	v F; above a * 11 m, dist 1½'	574
3338	....	11 37 49.8	145 20 54	e F; oval or v l E; v g v l b M; 2' l; 1½' br; has milky way stars in it.	436
3369	....	....	....	Seen beyond meridian in sweeps 436, 437.	
3660	Δ.456	16 48 32.1	134 25 13	A v L, rich, but not brilliant cluster, full 20' diam; not m comp M; stars 12.13 m.	455
3689	....	17 23 37.1	122 27 15	A B *, chief of a cl 3' or 4' in extent.....	794
4020	....	17 28 28.1	123 8 3	A p rich, L, F, cluster; class VII.; nearly fills field; composed of concave flakes; not m comp; st 13 or 15 m.	794
3726	Δ.473	....	....	See a remarkable observation of this nebula by Cacciatori, in the Astr. Nachrichten, No. 113.	
4021	....	18 41 49.7	143 55 31	F; S; R; 15'; the following of a group.....	710
		54.5	55 7	p B; R; 90'; g p m b M.....	789

CORRECTIONS TO BE MADE IN THE CATALOGUE OF DOUBLE STARS.

No.	Obs.	Col.	In the	For	Read	No.	Obs.	Col.	In the	For	Read
2306		P D	deg.	105	106	4196		∫	..	762	763
3248		R A	min.	21	41	4197		P D	sec.	9	49
3391	2	∫	..	....	735	4207		∫	..	762	763
	3	∫	..	....	502	4256		∫	..	647	697
3429		R A	hour	1	0	4278		R A	sec.	19.7	14.9
3431		R A	hour	1	0	4291		R A	sec.	39.0	40.0
3440		R A	hour	1	0	4317		∫	..	694	695
3442		R A	hour	1	0	4396		R A	sec.	31.4	34.0
3463	2	∫	..	....	489	4411		R A	sec.	58	5.8
3465	1	P D	sec.	41	21	4420		∫	..	476	416
3474		∫	..	624	628	4436	1	∫	..	483	453
3511	2	∫	..	....	642	4439		∫	..	404	444
3607		R A	sec.	43.6	42.6	4510		R A	min.	7	17
3612	1	∫	..	774	747	4535		∫	..	580	581
3614		P D	sec.	31	1	4604	3	∫	..	456	450
3618	1	∫	..	626	526	4683		P D	deg.	151	152
3643	2	P D	min.	....	804	4738		No.	..	4638	4738
3681		R A	min.	30	36	4801		R A	min.	32	34
3701		P D	hour	4	5	4812	2	∫	..	412	462
3706		R A	deg.	747	157	4813		∫	..	718	717
3716	2	∫	..	58.4	50.2	4829		∫	..	—	—
3718		P D	deg.	126	123	4848	1	R A	min.	35	55
3723		P D	sec.	12	52	4860	2	∫	..	702	792
3728	1	∫	..	628	638	4867	2	∫	..	573	593
3763	1	P D	sec.	25	1	4875	2	∫	..	....	454
3768	1	∫	..	654	658	4875		∫	..	—	—
3829		P D	sec.	25	55	4916		R A	sec.	3.3	2.3
3847	2	∫	..	639	539	4923		∫	..	466	467
3884		∫	..	766	767	4927		∫	..	698	699
3903		∫	..	666	667	4966		R A	sec.	55.1	51.1
3913		P D	min.	47	48	4973		R A	sec.	29.7	25.7
3943		P D	min.	33	38	4981		∫	..	466	467
3954		∫	..	534	535	5093	1	P D	min.	20	30
3961		∫	..	697	679	5105		P D	sec.	4	44
4048	1	∫	..	712	772	5130		∫	..	465	466
4120	2	P D	min.	58	58	5294	1	R A	min.	35	31
4132		∫	..	—	—	5296		R A	sec.	44.6	46.4
4143		P D	sec.	21	41	5326		∫	..	—	—
4143		∫	..	555	558	5333		P D	deg.	160	165
4155		R A	min.	50	49	5368	2	P D	m, s	25 54	55 24
						5409	2	∫	..	796	797
								∫	..	513	510

NOTES.—Nos. 2306, 3248, belong to my former Catalogues.—In No. 3941, Remarks, for exclusively read excessively.

No.	R. A. 1830.0.	N. P. D. 1830.0.	Position.	Dist.	Magnitude.	Remarks.	Sweep.
3350	h. m. s.d.	o s h	o s h	o s h	o s h		
3430	3 10 53.3	146 59 39	173.3	23	9 10	Exactly in parallel by the horizontal wire.....	504
3824	6 15 ..	134 43 ..	90.0	3	10=10	Viewed and measured past meridian.....	804
3943	7 15 4.1	113 53 30	6.3	4	9 12	.....	532
3954	9 15 12.4	134 45 22	12.6	3	10=10	.....	685
4855	15 59 5.5	143 47 2	107.6	12	9 13	.....	696
4880	16 6 23.3	124 24 29	81.3	15	8 8'	.....	791
4948	17 14 8.8	112 37 33	296.6	31	8 9	Neat star.....	588
5453	18 2 11.4	143 34 59	112 37 33	15	8 11	.....	599
			268.1	12	9 12	.....