A Paper was read, entitled "Approximate Places of Double Stars in the Southern Hemisphere, for 1827, as observed at Paramatta, N. S. Wales. By Mr. James Dunlop."

After the departure of Sir T. M. Brisbane from the colony of New South Wales, the author, finding himself in the possession of reflecting telescopes capable of adding considerably to our knowledge of the nebulae and double stars of that portion, resolved to remain, for the purpose of making a general survey of the heavens, from the south pole to 30° of south declination. The dark nights, in the absence of the moon, were devoted to observations of the nebulae, and the moonlight to those of double stars, of which however only a part could be subjected to exact micrometrical measurement. The apparatus employed for this purpose consisted of a 46-inch achromatic telescope, equatorially mounted, and furnished with two micrometers;—one a parallel line micrometer, the author's own workmanship; the other, a double image micrometer, on Amici's principle. Those which could not be micrometrically measured, had their positions and distances noted by estimation while passing the field of the 9-feet refector, with which they were discovered in the sweeps for nebulae, and their places are given as determined in the sweeps.

The author prefaces his catalogue with the details of the micrometrical measures of about 30 principal Southern double stars, the most remarkable of which are α Crucis and α Centauri, the former bearing a great resemblance, both in the magnitudes and the mutual distance of its individuals, to Castor; the latter being a star of the first magnitude, accompanied by one of the fourth, at about 20' distance,—a remarkable combination, such as does not occur in our hemisphere.

A Catalogue of 254 double stars, arranged in order of right ascension, follows, in which the right ascension to seconds of time, and declination to the nearer minute of space,—the position, quadrant, distance, the differences of right ascension and declination when observed, and the magnitudes, are set down in separate columns. They comprise double stars of all classes and of every variety. One very remarkable is the star 1 κ Argus, AR. 8h 4m, declin. — 42° 7', which consists of individuals of the sixth and eighth magnitudes, the large star being blue, and the small one dusky red. This affords almost the only instance known of a combination of two considerably bright stars differing decidedly in mag-
nitudes, where a marked excess of the less refrangible rays enters into the composition of the light of the smaller star, and of the more refrangible into that of the larger. Among the double stars is set down also one of the seventh magnitude, right ascension 1\textsuperscript{h} 19\textsuperscript{m} 43\textsuperscript{s}, declin. -33° 31', of that singular deep red purple colour, of which examples are not wanting in our own hemisphere.

An extract of a letter was read from Professor Harding, of Göttin gen, to Dr. Tiarks, in which he alludes to a phenomenon which had recently been observed by several astronomers on the continent, relative to an inequality of the dark space between the body of Saturn and its ring. This appearance was first noticed by M. Schwabe, on December 21, 1827, and has since been confirmed by several persons to whom M. Harding had communicated the circumstance. It seems that the space on the eastern side of the planet appears larger than the space on the western side. M. Harding was at first inclined to treat the whole as an optical deception, till the fact was confirmed by others, when he was induced to attempt an explanation of the phenomenon. He endeavoured to account for it by the present position of Saturn; but the result of his calculation proved that that cause would not increase the space (in March) more than \( \frac{1}{88} \); a quantity probably too small to become perceptible to the eye. He indeed imagined that the appearance might be caused by the shadow of the body, which at present falls much beyond the south-eastern part of the ring, and which might render it impossible to perceive the equality of the two spaces. But this, he says, is disproved by the observation of M. Schwabe who saw the same phenomenon on the 31st of December, three weeks before the opposition, when the shadow was on the western side, and could be but faintly discerned. M. Harding is unable to explain it as an optical deception, and yet cannot consider it in any other light at present. Actual measurement, he says, can alone decide the question. He has already written to M. Struve to take some measures with his powerful telescope, and he requests that this communication may, with the same view, be forwarded to Messrs. Herschel and South, who have the best means, in this country, of determining this singular phenomenon.

Mr. South then read a note, which he had annexed to the above communication, stating, that in compliance with M. Harding’s wishes, Mr. Herschel and himself had directed their attention to Saturn, but that they did not detect any inequality in the two spaces above alluded to, by means of micrometers attached to his 5-feet equatorial. The mean of 35 measures, taken on April 26, April 29, and May 8, gave the preceding (or western) space 3“.532, and the following (or eastern) space 3“.607. At the same time he remarks, that the mean of 20 measures taken on April 26 (viz. 10 by Mr. Herschel and 10 by himself), gave the spaces precisely the same; each being 3“.472. Mr. Herschel’s measures gave the preceding (or western) space 3“.612, and the following (or eastern) space 3“.442; whilst his own gave the former 3“.331, and the lat-
ter 3°-502. Mr. South adds, however, that Mr. Herschel, after a careful examination, thought that, beyond all doubt, the following (or eastern) space appeared the larger: and it is a remarkable fact, that of seven persons who were present in Mr. South’s observatory shortly afterwards, and who successively viewed Saturn through his 5-feet equatorial, six of them gave it as their opinion that the apparent right (or eastern) space was the larger: whilst the other observer declared he could not distinguish any difference. The situation, however, of Saturn was so low, as to render most of these observations far from satisfactory.

M. Harding also alludes in his letter to the re-appearance of the variable star in the constellation Serpens, mentioned in No. 5 of the Society’s monthly notices. He says it is now again become visible, and has already attained the 8th or 9th magnitude. Its position for the beginning of this year is

\[ \text{RA} = 15^h 46^m 45^s \quad \text{Decl.} = + 15^\circ 39' 30''; \]

and he invites astronomers to watch this star during the period of its changes.

A communication was then read from Mr. Rumker, of the observatory at Paramatta, in New South Wales, giving an account of his observations for determining the absolute length of the pendulum vibrating seconds there, according to Borda’s method. The apparatus with which these experiments were made, was constructed by Fortin, of Paris, and taken out to the colony by Sir Thomas Brisbane. There are some slight alterations from the apparatus described by M. Biot, which are pointed out by Mr. Rumker; and he also alludes to a new method of observing the coincidences. In Borda’s method, the coincidence is determined by the intersection of the wire of the pendulum of experiment, with a cross marked on the bob of the pendulum of the clock. In lieu of this cross, Mr. Rumker placed a small graduated arc, and the determination of the coincidence resolves itself into observing the moment when the wire describes its minimum amplitude on the arc. Mr. Rumker likewise adopts a new mode of determining the correction for the arc of vibration. He finds that in large arcs (such as 8 or 9 degrees, to which his arcs sometimes extend,) the decrease is not in a geometrical progression, when the times are in arithmetical progression. He has therefore formed a table of the actual decrease of the arcs as observed by himself, at equal intervals of five minutes each, and given the corresponding corrections for each interval. In the course of his reductions he notices some errors in the formula given by M. Biot, for finding the centre of oscillation of a pendulum constructed according to the method of Borda. The mean of 41 series of experiments gives the length of the pendulum, vibrating seconds in Paramatta, in vacuo, at the freezing point, and at the level of the sea, equal to 992·412801 millimetres, or 39·071618 English inches.

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