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5.

The large Meridian-circle in Markree.

By Dr. W. Doberck.

The meridian-circle has been described and delineated in Mr. Cooper's paper „Observations on Comets made at the observatory of Markree, during the first six months of the year 1846“. It was delivered by Ertel in 1839 and in use up to some years before his death. It was since neglected and the distant meridian-marks were removed. All the parts made of steel including the pivots and the screws were rusty. The rain penetrated through the old shutters and left a stain on the object-glass of seven inches diameter, which however has since been mostly removed. It is a greater drawback that the circle is somewhat bent, so that the divisions do not always focus together with the wires in the microscopes, only four of which I have adjusted on the circle. I try if possible to avoid any error by focussing between the divisions and the wires and the following observations made with the view of trying this seem to show that the circle is still useful*). Before this, Mr. Grubb of Dublin had repaired some parts of the instruments, but I introduced subsequently other improvements, which were suggested by the observations. The screws of the microscopes do not longer appear good, though the irregularities only in the commencement were much felt while turning the screw. When redelivered to me there was an immense loss in them, which I got rid of by screwing the microscopes more carefully together. Parallel wires had been drawn in Dublin, because I rejected the old cross-wires, but they are no improvement in this instance. Their distance ought to have been no more than 20'' as the magnifying power is above 30 on the 3 feet circle, but they were found to be resp. 26''0, 30''3, 23''1, 30''5, and the intervals between the vertical wires in the eyepiece are even more irregular. The latter have with a great sacrifice of time had to be determined over and over again, because they were rapidly destroyed by insects. I believe,

*) The refractions were taken from Robinson's Tables, which have been in use at Markree-Observatory.

that I have now got rid of them but a certain kind of vegetation is still growing on all the spider-lines connected with the meridian-circle. — I intend to commence a series of Zone-observations next year of stars between 5° and 10° north declination. The telescope will be clamped during each zone. The transits over nine wires will be observed with a chronograph, which works for two hours, and the differences in declination by aid of the micrometer-screw, that carries the whole eyepiece with all the wires, which are illuminated by aid of a small lamp hung at the side of the telescope. It will be seen that the drawbacks mentioned above are entirely eliminated by this method. The corrections, which are here especially constant, are occasionally determined as follows. A large, carefully rectified striding level reversed and read off repeatedly with a few minutes interval gives the inclination assuming the scale-value according to Graham. It can only be used when the telescope is horizontal, so that the pivots could not be examined by that. The object-glass is generally pointed south, when towards north the westend appears 0^s018 higher, though the angle of all the V's is about the same. The telescope is immediately afterwards placed vertically and the middle wire is by aid of a micrometric screw, that moves the vertical wires sideways made to coincide with its image reflected from a surface of mercury, placed on the fundament but at other times covered by a board. The cellar is so ventilated that no great difference in temperature can take place. Light is reflected into the tube by aid of a minute disc of mica. I do not know of any founded objection to the use of such a basin of mercury. Wherever faults have been found with it, they lay in other parts of the apparatus, and the astronomers, who reject it, thereby deprive their determinations of a desirable verification. By aid of the previously obtained inclination the wires are then clamped so as to avoid any error of collimation, and the error denominated n is afterwards determined from polaris and a southern star. The rightascension of a

fixed star may then be obtained by the formula: $\alpha = t + \Delta t + n \operatorname{tg} \delta$ and even a small error of collimation would be partly taken into account by this formula, while of course the inclination has no influence. These observations are made with eye and ear and the comparison stars are taken from the Nautical Almanac. I take care to focus the eyepiece accurately on the wires lest they should appear to shift their place, in case the glasses were not exactly centered. Constant errors in the transits may arise by counting the tick of the clock a little too late and observe after these countings

instead of the ticks, particularly if the observer counts only up to ten. —

Year	Date	Object	Declination	Decl. N. A.
1875	December 27	Neptune	+ 9°54' 58"7	+ 1'7
"	" 31	"	+ 9.54.35.4	+ 0.4
"	" 27	Mars	— 6.21.53.2	+ 1.1
1876	January 1	"	— 4.51.44.8	— 0.8
"	" 10	"	— 2. 8.11.5	— 2.7
"	" 12	"	— 1.31.46.0	— 1.8
"	" 13	"	— 1.14.36.3	— 4.0
Markree, 1878 January 26.			W. Doberck.	

Planetenbeobachtungen,

angestellt am 12füßigen Aequatoreal der Leipziger Sternwarte,
mitgetheilt von Herrn Professor C. Bruhns. (Schluss.)

Vergleichung der Beobachtungen mit den Ephemeriden (B.—R.).

		④⑨ Pales.	
Mai	13	+ 0°06	— 3'4
		⑤⑨ Elpis.	
Juni	4	+ 0.02	— 1.6
	9	+ 0.17	— 2.0
	11	+ 0.17	— 1.6
		④③ Ariadne.	
Juli	4	— 4.99	— 13.9
	4	— 5.06	— 21.1
	8	— 5.03	— 21.2
	14	—	—
	19	— 5.51	— 19.9
	20	— 5.89	— 19.2
	22	— 5.78	— 19.3
	22	— 5.81	— 23.9
	23	— 5.69	— 19.1
	23	— 5.83	— 24.5
	31	— 5.38	— 14.0
	31	— 5.92	— 22.8
Aug.	5	— 5.16	— 13.4
	5	— 5.45	— 17.6
	6	— 5.64	— 19.5
		⑨⑩ Antiope.	
Sept.	3	+ 4.33	+ 33.7
	6	+ 4.71	+ 35.8
	26	+ 4.70	+ 35.9
	29	+ 4.71	+ 34.3
Oct.	1	+ 4.71	+ 34.2

		⑩⑧ Hecuba.	
Sept.	6	— 6°71	— 80'9
		⑩③④ Sophrosyne.	
Sept.	6	— 78.00	— 831.2
		⑩③ Hera.	
Oct.	27	— 0.11	— 2.8
		⑩②④ Alkestes.	
Oct.	27	— 1.13	— 7.8
	29	— 1.46	— 6.9
Nov.	3	—	—
	21	— 1.94	— 8.1
		⑦ Iris.	
Nov.	21	+ 5.68	+ 9.9
Dec.	14	+ 5.03	+ 11.2
	18	+ 4.88	+ 10.4
		⑩⑧ Melpomene.	
Nov.	21	+ 7.53	+ 4.3
Dec.	18	+ 6.85	+ 3.2
	21	—	—
		③⑦ Fides.	
Dec.	18	— 11.59	— 0.8
		②⑥ Proserpina.	
Dec.	18	+ 12.24	+ 52.7
		③① Euphrosyne.	
Dec.	21	— 9.17	— 20.0

Die Position von ②⑥ Proserpina ist mit der Ephemeride von Dr. Neugebauer in Nr. 2059 der Astron. Nachrichten verglichen; alle übrigen Vergleichen beziehen sich auf die Ephemeriden des Berliner astron. Jahrbuches für 1877.