thus the density of the deposit will be determined by the "effective" surface brightness $B_3 = L_3/b_3$. For the visibility of a faint corona line on a photographic plate, however, it is not only necessary that this B_3 is sufficient to make an impression on the plate, but there must also be a sufficient difference of blackness against the continuous background. The contrast between the emission line and the continuous spectrum is determined by the value of

$$C = B_3/B'_3 = Df_3/b_3 = D/(s_1/f_2 + c/d_3 + e/f_3).$$

In order to see these relations in a numerical example we will take $f_2/d_2 = 10$; $c = 0.5\,\mu$; s_1 varying from 5 to $40\,\mu$; $f_3 = f_2$ and $= 2f_2$; $e = 30\,\mu$ (cf. MEES, *Proc. R. Soc.* **83**, 15 (1909) found with a strong blackening) and $e = 10\,\mu$. The table gives values for B_3, B'_3 and the contrast $C = B_3/B'_3$, in the upper part for $f_3 = f_2$, in the lower part for $f_3 = 2f_2$, in the left hand part for $e = 30\,\mu$, in the right hand part for $e = 10\,\mu$.

s_1	B_3	B'_3	C	B_3	B'_3	C
5	12^5	50	25	25	50	50
10	22	100	22	40	100	40
20	36	200	18	57	200	29
30	46	300	15	67	300	22
40	53	400	13	73	400	18
5	5	12^5	40	8^3	12^5	67
10	8	25	32	12^5	25	50
20	12^5	50	25	17	50	33
30	15	75	20	19	75	25
40	17	100	17	20	100	20

This table shows that by narrowing the slit the contrast increases, but at the same time the brightness of the line diminishes, more rapidly for small widths, more slowly for great widths. For small values of the photographic irradiation the most favourable width is smaller than in the case of a larger irradiation. By increasing the focal distance of the camera the contrast is increased, but at the cost of a much more important diminution of the brightness. The formulae for C and B show, that by increase of the focal distance the contrast is increased (increasing all the instrumental dimensions is equivalent to a decrease of e, the most important cause of faintness), while the brightness of the line B_3 as well as the total light L_3 increase with the angular aperture d/f.

To make faint emission lines visible both great brightness and great contrast are required. Contrast is got by a great dispersion D, that weakens the continuous spectrum. As to focal distance and width of slit the conditions of brightness and contrast are antagonistic, and we cannot decide with certainty which should be preferred. Looking at existing photographs of the coronal spectrum, however, one usually sees a rather strong continuous spectrum, strong enough to obliterate faint emission lines. Thus contrast seems to be so far the more important factor, and a greater spreading of the continuous background, by more prisms and also by a longer focus, seems to offer advantages. The great number of faint lines in the yellow part of the spectrum obtained by Father CORTIE in 1914 at Hernösand with a long focus Littrow spectrograph points in the same direction.

3. With a slitless prism camera the conditions are much more simple. The surface brightness of the image of the corona is given by d^2/f^2. This will also be the surface brightness of a monochromatic image of the corona formed by the objective prism. For the continuous spectrum the surface is proportional to Df^2, the total quantity of light is proportional to d^2, and the surface brightness of the continuous background is given by d^2/f^2D. Therefore the contrast is simply determined by D. If we wish to photograph monochromatic annular images of the corona, we have to use a great angular aperture of the camera and a high dispersion of the prism train. The absolute dimensions of the apparatus determine only the scale of the monochromatic images.

Some remarks on the relative intensity of the two sides of the Milky Way, by *A. Pannekoek.*

During the eclipse expedition to Christmas Island in 1922 Dr. J. HOPMANN has made a number of observations of the southern Milky Way, which form a most valuable contribution to our knowledge of its brightness. The chief part of these observations, which are published and discussed in *Astron. Nachr.* **219** 189. ("Eine neue Milchstrassenkarte" von J. HOPMANN), consists in eye-estimates (expressed in steps) of the differences between 75 chosen points of the southern Milky Way and adjacent points of the northern part.

These differences have been treated nearly in the same way, as has been done with my estimates on the northern Milky Way (Die Nördliche Milchstrasse, *Annalen Leiden*, XI **3**, p. 3—5), by successive approximations yielding final values for the brightness of each point in an arbitrary scale. (*l. c.* Tabelle III).

In studying the interlacing of these comparisons we see that the connection of the Monoceros-Argo and the Centaurus-Sagittarius parts is a very weak one. The points with AR below 12^h are connected inter se by numerous comparisons, and so are the points with AR greater than 12^h. But estimates comparing points of the first named parts with points of the other are entirely lacking, because the observer was visiting the southern regions only in the months of July to November. So he was compelled to connect these parts by comparing them both with the small Magellanic Cloud; though no time of observation is given, it is probable that these observations were made at rather large zenith distances. Thus the whole system rests on 5 comparisons of the Small Cloud with points 114, 102, 123, 103 in or near the Argo part and 4 comparisons with 105, 107, 68, 133 in the Sagittarius part.

In comparing HOPMANN's scale of brightness with mine it is necessary, therefore, to treat these two parts of the Milky Way separately. In the following table the first half contains common points at the 6^h side, the second such points at the 18^h side. The first and second columns give the designation or number in my catalogue and in HOPMANN's list, the third and 4^{th} columns contain the intensities as given by each observer. If the first column is lacking, the place does not occur in my catalogue and the intensity is taken from my charts with isophotic lines. Often the coordinates given in both catalogues are somewhat different, but their identity may safely be assumed; HOPMANN also identifies, by using the same letters L, M, G some of his points with mine, though giving them other coordinates. Some cases where I cannot agree with his identifications are added in remarks.

Design.		P	H	H red to P	Design.		P	H	H red to P
H	H	1.0	1.4	0.5	—	148	0.4	4.1	1.0
116	135	1.5	3.4	2.0	—	7	0.4	4.2	1.1
—	140	1.6	2.2	1.1	—	65*)	(0.4	4.9)	1.7
G	G	2.0	3.7	2.2	—	146	1.2	4.1	1.0
—	39	2.2	4.1	2.5	16	40	1.4	4.2	1.1
—	69	2.5	4.5	2.8	P	P	2.2	5.0	1.8
F	F	2.6	4.7	3.0	—	67	2.3**)	6.0	2.8
125	70	2.8	4.2	2.6	8	64	2.8	6.6	3.4
127	Π	3.5	4.7	3.0	—	20	4.0***)	7.1	3.8
					M	M	4.3	7.2	3.9
					2	36	4.8	7.8	4.5
					30	63	5.3	8.9	5.6
					L	L	6.4	9.5	6.1

Remarks. *) If no printer's error for H, practically identical with preceding one.

**) Assumed to design the little spot $18^h20^m + 6°$.

***) H assumes 5.3, which, however, lies more north.

The table shows at a glance that in the two parts of the Milky Way the scales do not have the same relation to one another; at the 18^h side HOPMANN makes the Milky Way brighter, relatively to the 6^h side, than my estimates do. The relation between the scales may be expressed by the formulae

$$P = 0.76\,(H - 0.8) \text{ at the } 6^h \text{ side,}$$
$$P = 0.96\,(H - 3.1) \text{ at the } 18^h \text{ side.}$$

The values computed by these formulas are contained in the last column.

This result contradicts the conclusion of Dr. HOPMANN himself, (*l. c.* p. 198). He has made measures of some southern points with a GRAFF wedge photometer; from six points that had been measured also by GRAFF his results were reduced to GRAFF's scale. Then the scale of my catalogue is also reduced to GRAFF by 47 points whose brightness is given by GRAFF (*l. c.* Table IV). He now compares his scale of estimates with the combined results (reduced to GRAFF's scale) of his and GRAFF's measures and my estimates (*l. c.* Table IV); he finds for the 6^h and the 18^h side almost identical formulas and concludes that his scale and the values found by reducing it to GRAFF are homogeneous.

Now in plotting the values of his Table V it appears that for the lower intensities there is a systematic difference between P and the other sources, the values of P being on the whole fainter than the others. (Moreover for points 65 and 20 the value of P is not 3.3 and 5.2, as has been used by HOPMANN, but 0.4 and 4.0). We may be sure that the cause of the discrepancies is to be found in the reduction to photometric scale. The accuracy of the measures with the photometer is far below the accuracy of step-estimates; while the p. e. of a comparison in the tables above is found 0.31 steps, it is found by HOPMANN 0.8—1.0 steps. Moreover in the GRAFF photometer a rather large part of the sky is measured, so that the result is not at once comparable with the estimate of a smaller part in its centre. Thus the method of reducing step values first to the photometric scale and then comparing them with other step values may introduce considerable errors that are avoided in directly comparing the two scales of step values. Generally, if we have more accurate results expressed in arbitrary scales, and far less accurate ones in an absolute scale, the first named ones should be joined into one accurate system, and afterwards we may try to reduce this system, with less certainty, to the absolute scale.

The remark, however, must be added that the photometric scale introduced by GRAFF (*Astron. Abhandl. Hamburg-Bergedorf*, *Bd* II. 5) does not seem to be an adequate absolute scale for the Milky Way. GRAFF measures the ratio of brightness of a Milky Way spot and a chosen normal region (the North Pole) and expresses it in stellar magnitudes; so the North Pole region is adopted 2.00, the Cygnus cloud near b_1 Cygni is found 1.10, the brightest spot in Scutum becomes 0.96, the galactic pole 2.42. Here no account is taken of the illumination of the sky caused by other phenomena (zodiacal light, aurora), which has been found variable by YNTEMA and VAN RHYN. (*Public. Groningen* **22** and **31**). This variable earth light causes a certain constant difference of brightness between two parts of the Milky Way, if expressed in magnitudes, to be also variable. So e. g. taking two days with values of the earth light 0.121 and 0.084, giving at the North Pole a brightness 0.151 and 0.114 (VAN RHYN, *l. c.* Table 6), we find for a Milky Way spot, having a brightness 0.130 of itself, on the first day a magnitude difference 0.55, on the second day 0.68; the true difference without earth light would be 1.46 magnitude.

Concluding we may say that for the relative brightness of the two opposite regions of the Milky Way different results are given by the scales of P and H. Since my estimates are connected by a series of intermediate northern points, while this connection is absent in the southern sky, I think it probable that the discrepancy must be ascribed to HOPMANN and that his scale is different for the two regions. Thus our knowledge about the general distribution of brightness along the Milky Way must be considered as still very unsatisfactory, and new observations of the southern sky in a more favourable season will be necessary.